

Physical Plant Inspection of Comcast Communications in the City of Bellingham, Washington

May 2010

Inspected by
Kramer.Firm, Inc.

Submitted by:


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**PHYSICAL PLANT SAFETY INSPECTION
OF COMCAST CABLE COMMUNICATIONS
IN THE CITY OF BELLINGHAM, WASHINGTON**

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Physical Plant Safety Inspection of Comcast Cable Communications in the City of Bellingham, Washington

A

Introduction

At the direction of the City of Bellingham, Washington, Kramer.Firm, Inc. has conducted an outside plant safety compliance inspection of the Comcast Cable broadband system within the City of Bellingham, Washington. The inspection was conducted from May 24, 2010, to May 26, 2010.

The purpose of this inspection was to gauge Comcast's level of compliance with the National Electrical Safety Code, governing outside plant construction (i.e., pole-to-pole, and underground systems), as well as with the National Electrical Code, governing construction and installation safety issues associated with the homes and businesses attached to Comcast's system.

Jonathan L. Kramer, JD, FSCTE, BTS, BDS, BPS developed the procedures for and supervised the testing process. Steve Allen, BCE, of Kramer.Firm conducted the entire inspection of the cable system. The qualifications of Messrs Kramer and Allen to develop the test plan, conduct this inspection, and report on the findings are provided as Attachment A2 of this report.

Methodology and Observations

Representative portions of the Comcast plant throughout the City were inspected for compliance with the following safety codes:

National Electrical Code (NEC)
National Electrical Safety Code (NESC)

As representative violations were observed, they were logged and, in most cases, photographed to become the underpinnings of our analysis and conclusions.

To observe the Comcast Plant, approximately 146 road miles were driven in the City. The specific areas that were inspected are shown on the following page.¹

The representative log of our observations is provided as Attachment A1 of this report. Additional site-specific maps are included in the log attached as Attachment A1.

¹ The route was generated by using the automated tracking function of a Garmin V Global Positioning System (GPS) satellite receiver (serial number 3086406) connected to an external amplified roof-mounted antenna. The recorded position data was then download and displayed on DeLorme Street Atlas 2008 Pro software, which created the basic map output. Note that due to the accuracy of the position data provided by civilian GPS receivers such as the Garmin listed above, the track plotted is approximate only, and the actual track may vary by upwards of 10 meters, although the error is typically about 5 meters or less.

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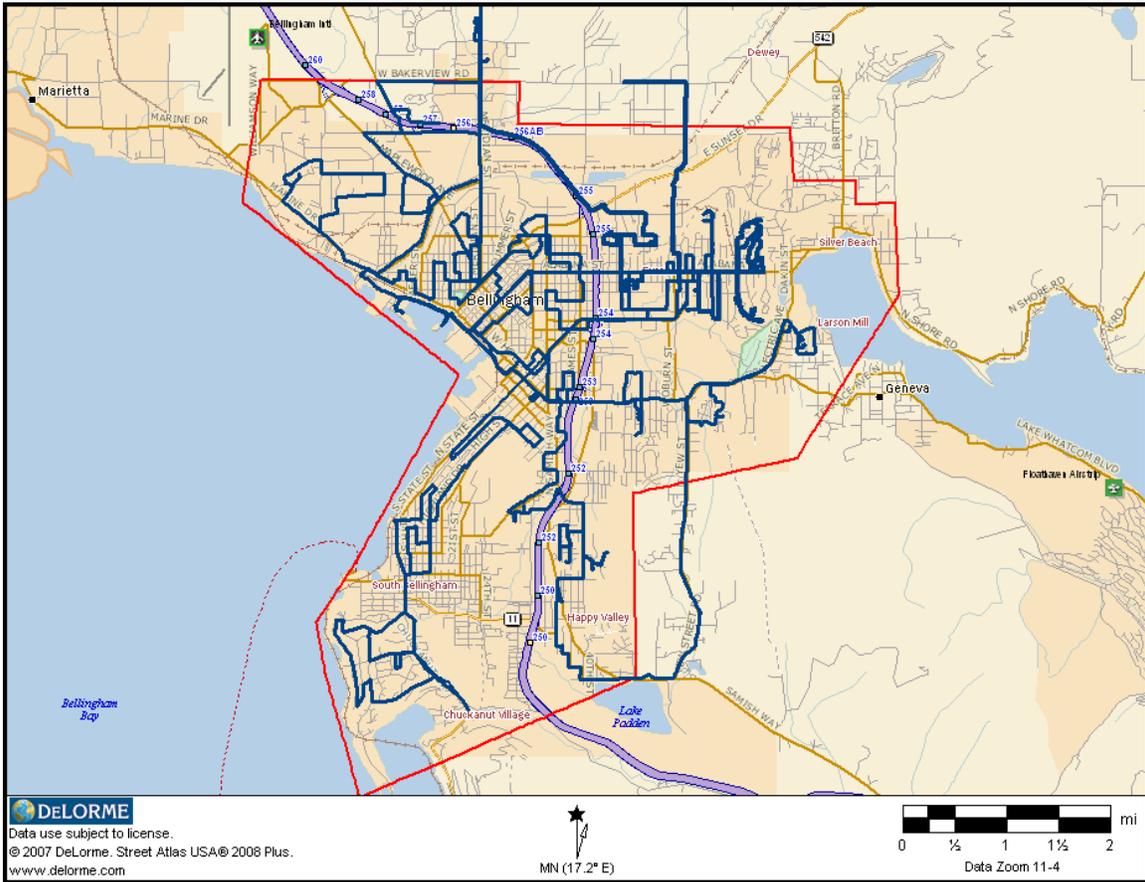


Figure 1: City of Bellingham, Washington. Drive route indicated by blue lines.



Observations and Summary

The illustration on the following page will be instructive as we discuss our findings. The illustration presents the most common violations of the National Electrical Safety Code, with regard to physical plant, as well as the National Electrical Code, as it relates to home wiring and grounding. Note that not every violation illustrated on the following page was observed in Comcast's system. The drawing is a general teaching tool we have developed to visually explain cable system construction problems.

As you read the discussion that follows the illustration, and the inspection log at Attachment A1, you may wish to refer back to the illustration to better understand the discussion and points cited.

System Description:

The cable system in the City of Bellingham, Washington, operated by Comcast Communications has been rebuilt to be a modern Fiber to the Feeder (FTTF) architecture with amplifier cascade reduction implemented through the extensive use of fiber optic transportation and optical transition nodes.²

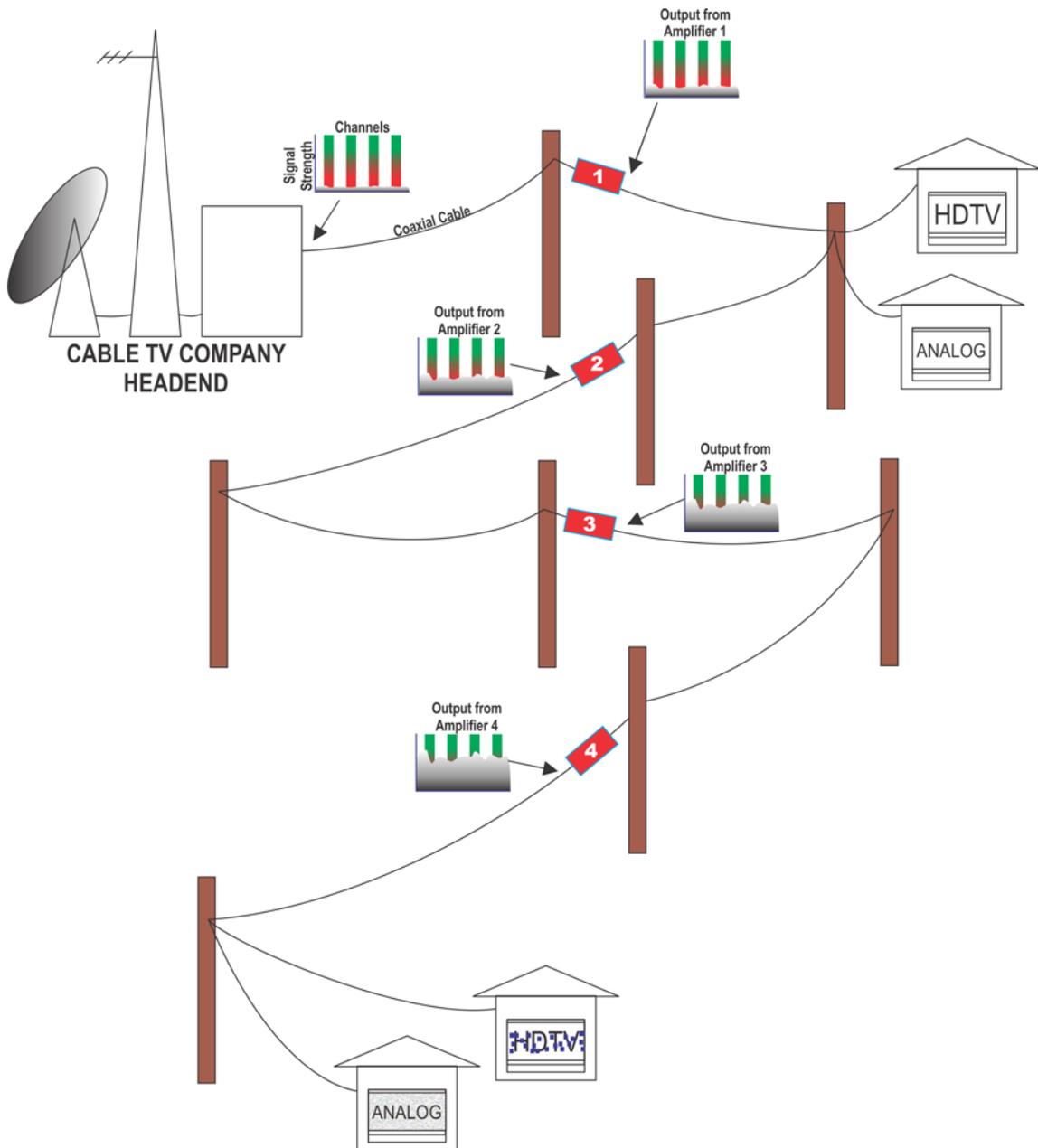
This means that instead of using long coaxial cable runs (called “cascades”) to reach the ends of the system, with the signal losses and distortions associated with repeated signal amplifications followed by coaxial cable signal losses, Comcast uses fiber optic cables to eliminate the vast majority of the signal losses and distortions associated with coaxial long distance signal distribution.

To better illustrate the differences (and benefits) from Comcast’s conversion from its legacy coaxial distribution network to its current fiber-to-the-feeder network please look at the following two illustrations.

The first illustration shows, in very simplified and exaggerated terms, Comcast’s former method of distributing its signals using coaxial cables that require repeated signal amplification to overcome the signal losses introduced by the coaxial cables.

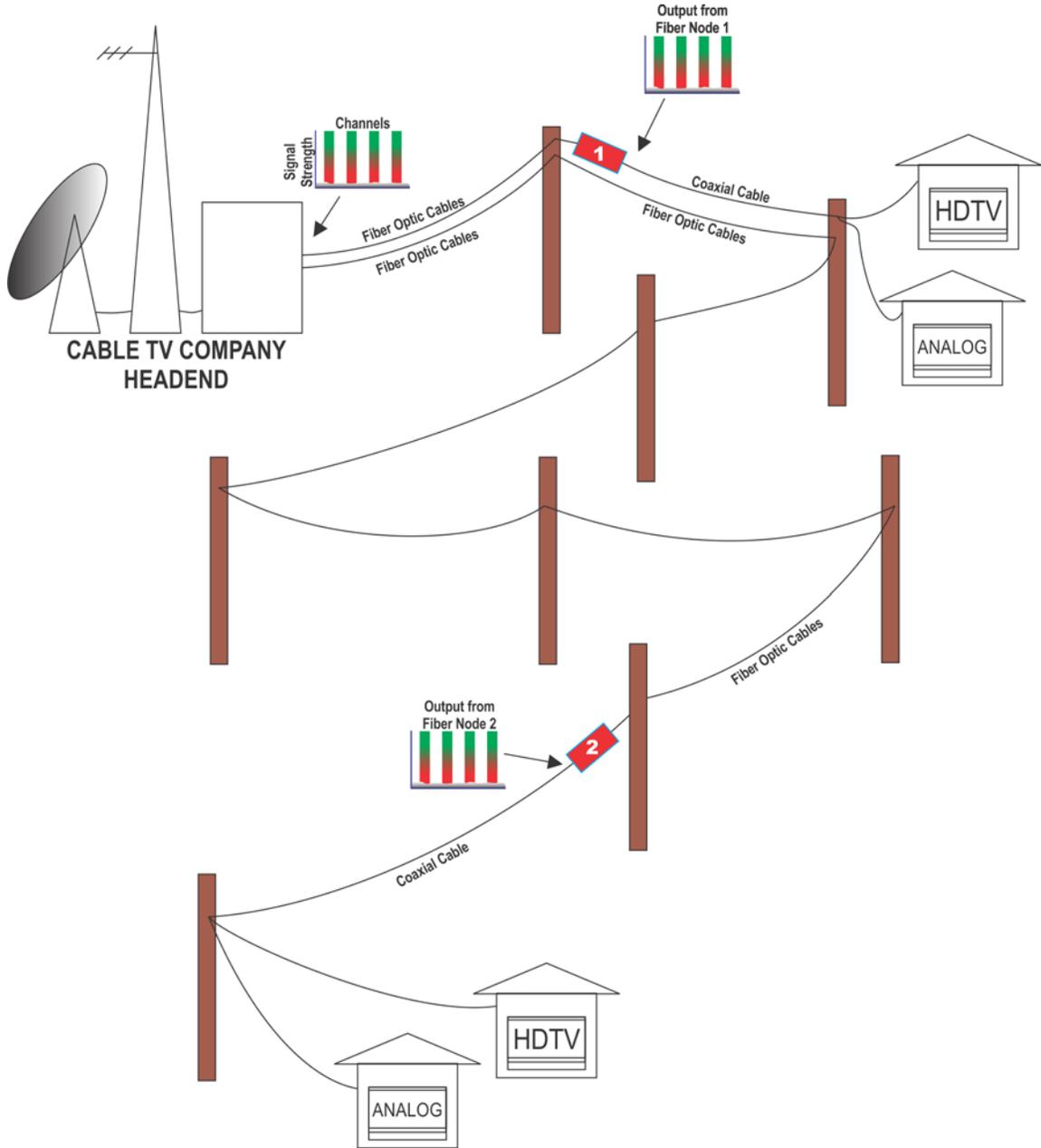
Each time the signal is amplified, naturally occurring signal distortions are introduced. Subsequent amplifiers not only amplify in the incoming signal, but they also amplify the distortions from all of the prior amplifiers, and add a bit more distortion at the same time. It was common for cable systems to amplify the signal between 30 and 50 times to reach the subscribers at the far end of the cable system, thus subscribers that were located near the cable system’s headend might have a very high quality picture, but subscribers at the far end of the system would suffer from very snowy pictures, and that might also have substantial lines in the pictures.

² A fiber optic node is the device that converts the incoming light waves, carried from Comcast’s headend via fiber optic cables, to radio frequency energy that can be transmitted to subscribers using coaxial cables. Fiber optic cables are **not** used to directly serve subscribers since virtually no subscribers have television sets that can convert light directly into video, nor does Comcast offer fiber-input set-top cable converters to its subscribers.



The illustration on the following page illustrates a modern fiber-to-the-feeder cable system that is conceptually consistent with the Comcast cable system in the City of Bellingham. The output of the headend is sent via very low signal loss fiber optic cables that do not require intermediate amplification. Near the subscribers' homes, the fiber optic cable transported signals are converted back to signals that can be sent on short lengths of coaxial cable to serve the subscribers. Use of fiber optic cables for signal distribution overcomes all of the signal distorting disadvantages of the legacy method of

coaxial cable signal distribution. Essentially, subscribers served by Node 2 have the same very high quality pictures received by subscribers served by Node 1.



The Comcast franchise area is served by a very dense network of fiber optic cables terminating in over 80 optical nodes. Each fiber optic node area is electrically (signal) isolated from all other nodes, so the loss of one fiber optic node impacts a relatively small portion of the cabled community.

Cable plant was constructed in franchised areas of the city using a combination of front easement, rear easement, alley and underground construction.

The Bellingham system is served out of the Comcast Headend located in Ferndale, Washington. Local processing and traffic grooming is done at the Comcast hub located in the Port of Bellingham industrial area.

Comcast offers what is referred to as the “Triple Play”, including video, high speed Internet and telephony.

Comcast is aggressively migrating to the new Voice-Over-Internet-Protocol (VOIP) with roll-out of this product timed with other Comcast areas. The Bellingham area was one of the markets in which AT&T Broadband, the operator prior to Comcast, offered switched digital telephone service using a system by Arris called “Cornerstone.”

System power is provided by dozens of “Alpha” brand stand-by power supplies. Each stand-by power supply is designed to provide several hours of emergency power in the event of an interruption of utility power. That capability was not tested as part of this inspection

The Comcast system in Bellingham was completely rebuilt to 750 MHz, with completion in 1999. Since that time, Comcast has undertaken a comprehensive implementation of a fiber optic backbone and the segmentation of the system into 80 smaller service areas, referred to as “nodes.” This segmentation of the larger cable plant into smaller, discrete signal distribution units permits quality and reliable high-speed Internet data service, as well as targeted commercial insertion by neighborhood and demographics. As Internet traffic (i.e., data transmission) increases, Comcast continues to segment the return path to maintain high speeds and reduce latency.

The completed rebuild was well done from a construction standpoint. Old cables requiring replacement were de-lashed or dropped to a temporary lower position as new cables were installed on top the existing network in order to keep all customers active during the rebuild. Large count fiber optic cables were routed throughout the franchise area, allowing for future network expansions and reconfigurations.

Comcast used good care during the rebuild of the system and very few construction related NESC violations were found.

While the distribution plant was constructed using great care to comply with the provisions of the NESC codes, the legacy residential drop systems providing cable service to dwellings from the poles situated in the right of way substantially fails to comply with cable related provisions of the National Electric Code (NEC) at many locations.

OBSERVATIONS

Our inspection of the cable plant in the Comcast portion of the City of Bellingham discloses the following areas of concern. The issues are divided into two categories. (1) Plant Related Concerns and (2) Subscriber Drop Concerns.

Plant Related Concerns: This area covers issues related to the presence and/or maintenance of cables and supporting structures on telephone poles or underground conduit system.

1. Riser cables not attached or supported on poles
2. Fiber optic splice enclosures and cables hanging from strand
3. Sagging cables
4. Down guys not installed

Subscriber Drop Concerns: This area covers issues related to the installation and maintenance of subscriber wiring from the telephone pole or underground pedestal to the subscriber's terminal equipment, typically the television set or computer.

1. Improper clearances from power and telephone wiring
2. Cable drops attached to power masts above the roof
3. Obsolete Arris Cornerstone Switched Digital Telephony units apparently abandoned in place on single family homes and multiple dwelling unit buildings
4. Comcast Network Grounding (Bonding)
5. Comcast Network Workmanship

DISCUSSION

Overall, the overhead plant is in better-than-average condition as a result of Comcast's substantial and generally good rebuild of the network. However, various safety code violations were observed during the inspection. Safety code violations are illustrated on a sample basis in Attachment A of this report.

Comcast has an ongoing obligation under two sections of the NESC to be continually inspecting and repairing the outside plant to ensure it is maintained in a safe manner. Broken lashing wire, down cables, and other damaged plant components present a hazard to the public and to utility employees that work in or near the Comcast plant. Comcast should review their policies and procedures with regard to identifying, documenting and repairing plant deficiencies. Many of the problems that we encountered appear to have been there for some time.

Plant Related Concerns

I. Riser cables not attached or properly supported on poles

The National Electrical Safety Code requires that riser cables be properly supported and attached to utility poles.

The NESC provides for a mixture of direct cable attachments to the pole using riser guard or conduit, as well as an alternative method using a metal stand-off bracket attached to the pole with the conduits attached to the stand-off bracket. This standoff method of support provides better access to the pole and reduces the costs of pole replacement by not requiring the removal and relocation of multiple conduits attached directly to the pole. It also provides a means of climbing the pole when it not encumbered by multiple riser conduits.

In multiple locations (estimated to exceed 100) around the Comcast service area in the City, we observed riser cables that were either loosely and improperly attached to other utility conduits in violation of the NESC or not attached at all. Examples of loose and improper cable attachments can be found in Figure 2 and 3, below. Additional photographs, including the locations, of the observed cable riser violations can be found in Attachment A1 of this report.



Figure 2: 3615 Bennett Drive. CATV cables tied to power riser conduit. Comcast Tech Ops Manager Lance Ryon shown in this photograph.



Figure 3: 2325 Vining Street

Comcast should take steps to correct the attachment problems in their service area. Improper attachment is a significant problem and negatively affects reliability of the network and customer satisfaction. Loose cables move in the wind and eventually become damaged or fail completely.

2. Fiber optic cables and splice housings hanging from strand

Throughout the City of Bellingham franchise area we observed fiber optic cables and splice housings coiled up and tied temporarily to the overhead strand (estimated to exceed 100).



Figure 4: Corner of D Street and Holly Street. Fiber coil and splice box hanging from strand.

Heavy cable coils and splice housings suspended on overhead lines pose a risk to the general public and the integrity of the cable system itself. If the lashings used to attach the temporary equipment to stand should fail, the falling equipment could cause damage to objects and individuals below. Conversely, if the strand is not strong enough to support the equipment, the weight of the hanging equipment may cause the strand to sag or break.

We observed this situation in many areas around Bellingham. Comcast asserts that they have been reconfiguring some of their fiber routes to break the system into smaller node areas, and that the splice cases are just in a temporary condition. To the best of his knowledge, the reconfiguration has been completed, and the Tech Operations Manager,

Lance Ryon will inquire of their contractor as to why the cables and splice housings have not been restored to their correct positions on the strand.

3. Sagging Cables

Several instances of cable sag were observed during this inspection. Cable sag is the condition where all or some portion of a suspended CATV line dips below the telephone cables on above ground poles.

The National Electrical Safety Code requires that CATV cables be placed at least 1 foot above Telephone cables, and that the sag remains a consistent distance (concatenation) from each other between poles. In other words, cables are permitted to sag, so long as all cables in a given segment maintain the proper separation.

Excessive sag is a violation of the National Electrical Safety Code (Section 235C2b), whereby cable is required to maintain a nominal minimum separation of 12 inches from telephone plant so as to prevent the two plants from rubbing against each other, which could cause shorts and outages. Below is an excerpt from the NESC code regarding sag limits.

From NESC Section 235C2b:

b. Sag-Related Clearances

(1) Line wires, conductors, and cables supported at different levels on the same structures shall have vertical clearances at the supporting structures adjusted so that the clearance at any point in the span shall be not less than any of the following:

(a) For voltages less than 50 kV between conductors, 75% of that required at the supports by Table 235-5.

Sag problems are often encountered when additional cables are added to an existing span increasing the weight, or poles are relocated or replaced and the cable lengths are not adjusted accordingly. This improper sag results in cables of different companies rubbing against each other and interfering with the use and maintenance of the respective cables.

While not the most prevalent plant issue observed in this inspection, sagging cables are often reliable indicators of other plant deficiencies such as missing guy wires, overbuilding, and generally poor workmanship.

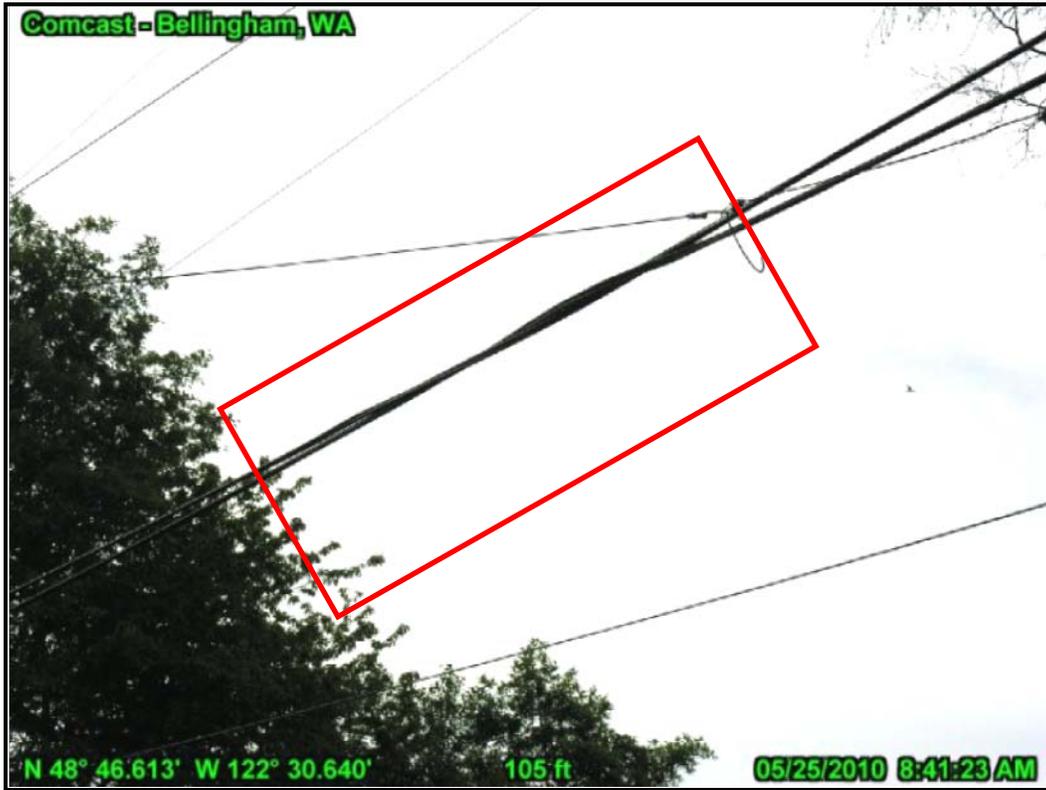


Figure 5: 3217 Cottonwood. Sagging cable lines rubbing against and intertwined with telephone cable.

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4. Missing down guys and anchors

While not a widespread issue, our inspection disclosed several missing or damaged down guys (estimated to be less than 100).



Figure 6: Corner of East Maple and Pasco Streets. Down guy loosely and unsafely wrapped around the base of the pole. Hazard to the public, and to pole line safety. Pole line load not shunted to ground.

Down guys, head guys and anchors provide a means of transferring the significant loading stresses placed on the poles by the cables and hardware to the earth. Anchors in the ground provide an offsetting tension for the weight and Stress.

Missing down guys and anchors can result in poles leaning in the direction of the tension up to and including collapse. Proper maintenance of required down guys is an essential part of a well maintained system that properly shunts the pole stresses to ground anchors. Shunting pole stresses to ground anchors is necessary to ensure that poles do not lean to one side or another because of unshunted loads as is seen in the next photograph.

Disconnected down guys wrapped around the base of poles presents a clear and obvious hazard to pedestrians and autos.



Figure 7: Corner of 20th Street and Wilson Avenue. Missing down guy causing pole to lean in direction of stress (pull).

Missing down guys should have been caught and corrected as part of normal system operations. Furthermore, what was not caught during normal system operations should have been identified and corrected during the recent system upgrade. Comcast should be directed to inspect their entire plant and to promptly correct missing down guys and anchors. They should also be directed to replace missing or broken down guy markers as required.

The down guy markers are brightly colored safety guards that are placed upon down guys to protect the public from accidental contact or injury. Some down guys can be extremely difficult to see, especially in the dark, and the guards are required to provide a visual indication of their presence.

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Subscriber Drop Concerns

I. Improper clearances from telephone and power facilities

Proper installation and maintenance of the subscriber drop is a vital part of system reliability, and public and property safety. During our inspection, we observed a general lack of attention to the maintenance of proper clearance or separation from other utility wires throughout the Bellingham franchise area. Cable drops were run over or wrapped around telephone drops at locations. Wiring at the tap interferes with telephone equipment mounted below it. Cable drops were attached to the same hook as telephone at the house, or too close to power conductors. All of these situations are violations of the NEC section 820 requirements for house attachments as it pertains to physical clearances from other utility facilities.

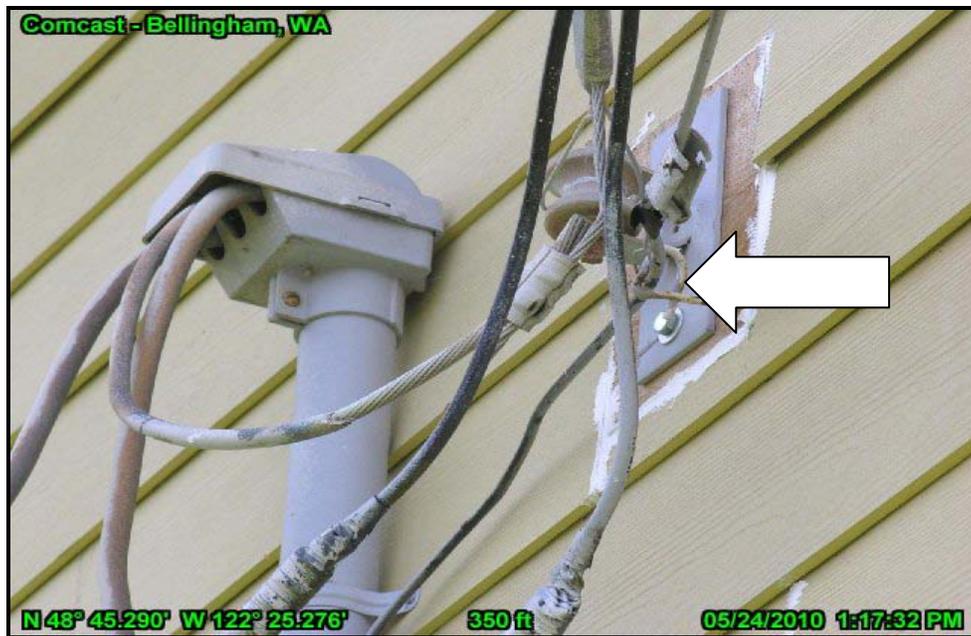


Figure 8: 1901 Ohio Street. Cable drop is installed at same point as power. Clearance violation of separation rules in NEC.



Figure 9: 2138 Virginia Street Cable drop mounted too close to power conductors. Drop wrapped around power utility drop.

The National Electrical Code in Section 820-10 requires that cable drops maintain a minimum distance of 12 inches separation from any portion of the power or telephone drop prior to the point of attachment at the dwelling. This includes drip loops on power drops. In addition to the required clearance prior to attachment to the building, the code also requires a minimum separation of 4 inches from any other utility wires on parallel runs on the building. The intent of this 4 inch separation requirement is to provide sufficient clearance from other conductors so as to provide room for maintenance or replacement without disturbing the other utility wiring.

Improper clearances and improper attachments are often the result of inadequate training and/or poor quality control procedures. In this system, we estimate the number of improper clearances and improper attachments to exceed 2,000. Comcast should examine their current training methods and curriculum and take appropriate steps to correct their installation procedures and policies. Comcast should also take immediate steps to audit their system and to identify and correct each and every clearance violation, especially as they relate to proximity to power conductors at the attachment point on the house. Cable employees and contractors are not trained or certified to work in close proximity to power conductors and the NEC requirements are designed to protect them from hazardous exposure to the limitless current potential present at the power mast. In addition to correcting the existing violations, Comcast should concurrently provide remedial training for all of its employees and subcontractors on the requirements of the National Electrical Code regarding permitted attachments and required

clearances. If remedial training and quality control is not provided, it is very likely that new clearance violations will occur on a daily basis while repair crews are busy trying to correct the old violations.

2. Cable drops attached to power masts above the roof

Comcast installers frequently make use of the electrical utility power riser above the roof for making cable drop attachments. The National Electrical Code in Section 820-10(C) prohibits the attachment of any cable drops to an above-the-roof mast containing electrical conductors. This is the most significant and wide-spread violation observed during the inspection throughout all portions of the Bellingham franchise area.



Figure 10: 3235 Firwood Street. Cable drop attached to the power mast above the roof. Cables run over the roof of the building.



Figure 11: 2904 Cherrywood. Cable drop attached to the power mast above the roof.

This method of attachment is frequently used in order to obtain sufficient height over a roadway, or because it is an easy and inviting point of attachment. As can be seen in the above pictures, telephone drops are also attached to the masts, and their presence is often interpreted as meaning that it is OK, or a recommended practice. It is not an authorized point of attachment, and in these cases, both utilities are in violation of the National Electrical Code.

As can be observed, this practice often violates the required separation from the power drop and places installation personnel in a dangerous position as they try to work in close proximity to the power conductors.

Comcast should be directed to immediately cease this practice and to correct any and all situations where this type of attachment has been made.

3. Obsolete Arris Cornerstone Switched Digital Telephony Units Apparently Abandoned in Place

Comcast and its predecessor, AT&T Broadband have apparently abandoned in place hundreds of obsolete (NIU) Network Interface Units on the sides of homes and apartment buildings following their switch to Voice-over-IP technology (VOIP). To the extent that the units are hardwired to some buildings and still attached to the power utility, some of these units may be drawing power from the affected customer's utility service. These apparently abandoned units are also occupying space on the customer's property when their presence is no longer justified and should be removed.



Figure 12: Arris Cornerstone Digital Telephone NIU. Apparently abandoned in place.

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Figure 13: 2724 West Maplewood. Apartment building. Large Gray Box. Arris Apartment MDU Cornerstone multi-customer NIU. Apparently abandoned in place.

4. Comcast Network Grounding

The Comcast system in Bellingham is unusual and exemplary in a key respect: it is one of the finest examples we have observed regarding proper system and subscriber network grounding. While not perfect, it is far above average.

The vital purpose of grounding³ is based on life and fire safety issues. If Comcast's coaxial cable entering a building is not adjusted to be at the same electrical characteristic as the building electrical ground, then there is an opportunity for electrical current to flow between the cable system and the electrical system. This flow, typically through the subscriber converter and TV set, creates an electrical shock and fire potential.

³ Grounding is actually not the technically correct term—but it is the most common term—to describe the process by which the cable system 'bonds' its coaxial cable shield wire to the ground wire of the electrical system. The technically correct term is, therefore "bonding." The purpose of bonding is explained in the body of the report.

The Bellingham cable system operated by Comcast is well above average in compliance with NEC grounding specifications at the residences. While not 100 percent compliant, we give the Bellingham system a top mark for network grounding and subscriber protection.

We did find the occasional missing or damaged ground, and those need to be corrected, but for the most part, the grounding of the system is in very good condition.

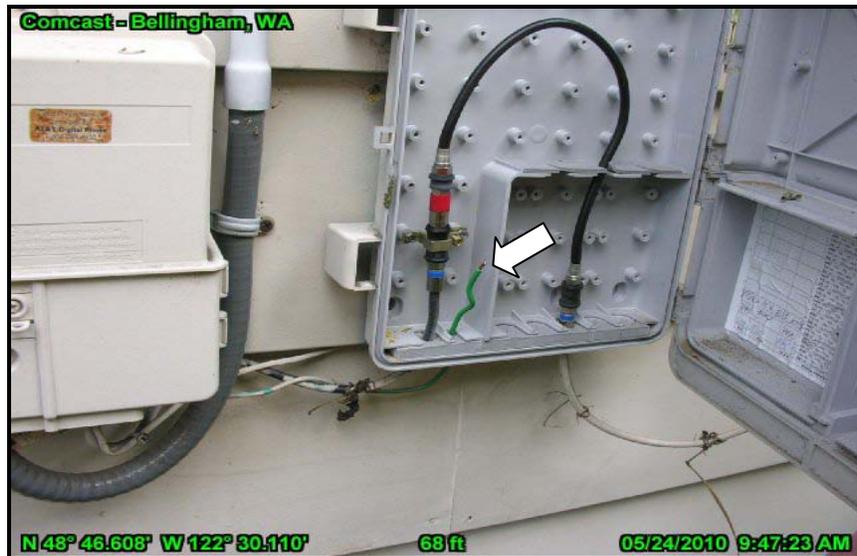


Figure 14: 2724 Maplewood. Ground wire has broken off of ground block (white arrow).

5. Comcast Network Workmanship

One of the most difficult—and important—aspects of maintaining a broadband cable system is to keep all wiring neat and orderly in a workmanlike manner. Maintaining the system in this way is not only required by code but also a benefit to overall system reliability.

As plant ages, attachments start to come apart. Lashing wire breaks, wires come loose, taps become congested and without constant effort and maintenance, the wiring begins to deteriorate or become unattached and subsequently, unreliable, or even dangerous.

Comcast is required by both the National Electrical Safety Code, as well as the National Electrical Code to construct and maintain their cable plant and installations in a neat, compliant, and workmanlike manner.

Items such as down drops, wiring on roofs, loose attachments on homes and apartment buildings, all require constant inspection and maintenance.

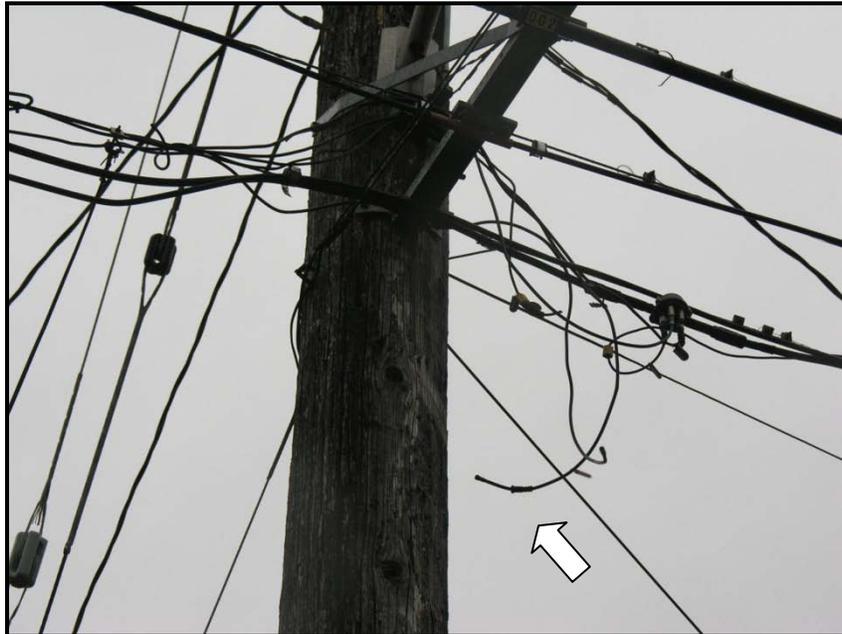


Figure 15: Loose unused cable hanging freely from overhead pole

Comcast of Bellingham has made rather extensive use of drop control boxes to secure and conceal wiring connections. This use of the drop control box makes the installations much neater. In general, Comcast does a very good job of maintaining the integrity and appearance of its wiring on buildings.



Figure 16: Example of a Drop Control Box in the Bellingham franchise plant

Workmanship is a somewhat subjective interpretation based upon industry best practices and standards. While there may be differences of opinion, an experienced tradesperson can easily recognize the difference between a quality job and one that has been done poorly.

Safety and reliability are generally the two key determinations as to whether or not a job has been done correctly. If loose wiring, improper attachments or construction could lead to an injury or a loss of service, it can hardly be deemed to be done in a workmanlike manner.

Comcast should continue to impress upon their staff the importance of high quality installation work as well as the need for high quality maintenance. Constant quality control inspections and notification of observed infractions will help to address this issue.

Conclusions and Recommendations

OVERALL CONCLUSIONS

Based on more than thirty-two years of outside Plant cable engineering expertise, over twenty-six of which have been directly related to inspection of cable television systems on behalf of government agencies such as the City, we offer the following conclusions and recommendations based on the system observations reported here.

Based on our inspection of hundreds of thousands of miles of cable plant in over 500 cabled communities around the United States over the past twenty-six years we find that the Comcast system in City of Bellingham, Washington to be ABOVE average.

We found relatively few outside distribution plant infractions, indicating a system that is well built and for the most part, properly maintained. Power supplies and distribution plant were properly bonded to the electrical network as required. Although some infractions were observed, cable sag control and grounding installation and maintenance in the Comcast system were generally superior to other comparable systems we have inspected.

While the distribution plant was generally well maintained, we found numerous subscriber installation infractions. Specifically, Comcast's use of power masts as a point of connection for their coaxial cables is of serious concern. The number of installations affected by these problems is significant and may range in the thousands. These infractions are indications of systemic problems stemming from current or past installation practices.

The list of infractions noted as Attachment A1 of this report should not be construed as complete or representing an audit of 100 percent of the system. Rather, it is a sample, and our judgments are based on nearly twenty-six years of plant inspections in hundreds of communities around the country, including other Comcast systems.

RECOMMENDATIONS

We recommend that the City of Bellingham direct Comcast Communications to make the entire outside cable plant system, including without limitation all physical plant attachments; enclosures; drops; drop grounding; and structure installations, safe and

code compliant with all applicable safety codes including the National Electrical Safety Code and the National Electric Code.

Comcast should be directed to develop a corrective action plan to address the plant and installation issues addressed in this report. We estimate that this corrective action plan should take no longer than 30 days to develop and deliver to the City for its comments or approval. We do not believe that the corrective actions required to bring Comcast's system into compliance in both outside plant and installation practices can be accomplished in the normal course of work, nor over a reasonable time without the assistance of additional outside contract help. We estimate that with a proper workforce, and an accurate audit of the plant, the violations noted in this sampling of the plant as well as the remainder of the system can be corrected in 12-18 months.

The City of Bellingham should consider the option of conducting periodic interim inspections of the work in progress to ensure compliance with legal requirements and to provide timely feedback to Comcast of discrepancies found.

As a preventive measure and to insure a continued high level of compliance, Comcast should conduct additional technical training for its field force on the requirements of the National Electrical Safety Code and the National Electric Code. Without adequate training and management oversight to insure code compliance, any effort to correct the existing deficiencies will be of limited value, as new infractions will be taking place at the same time that old infractions are being corrected.

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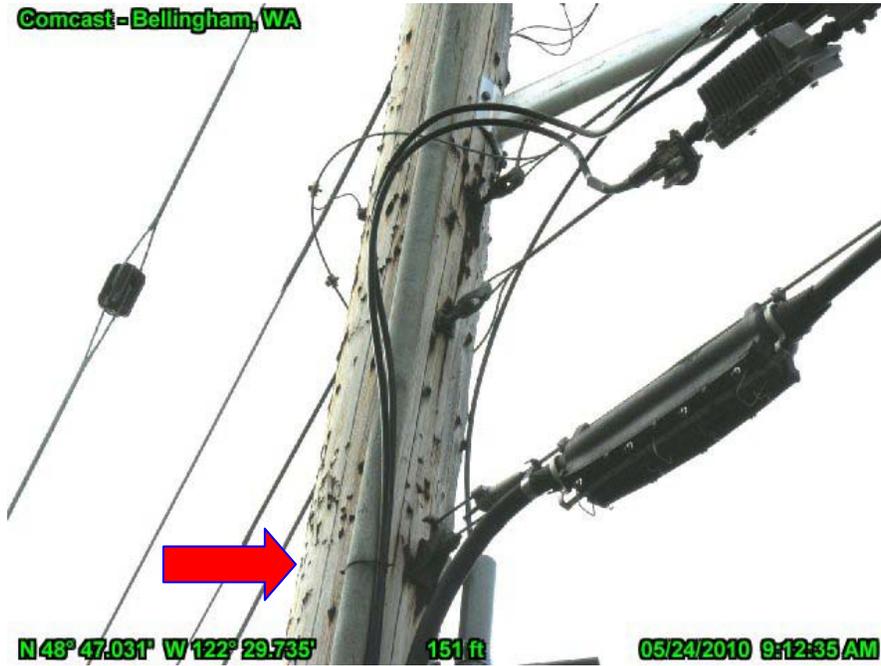
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ATTACHMENT A1

INSPECTION NOTES AND PHOTOGRAPHS

Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington

Comcast-Bellingham, WA

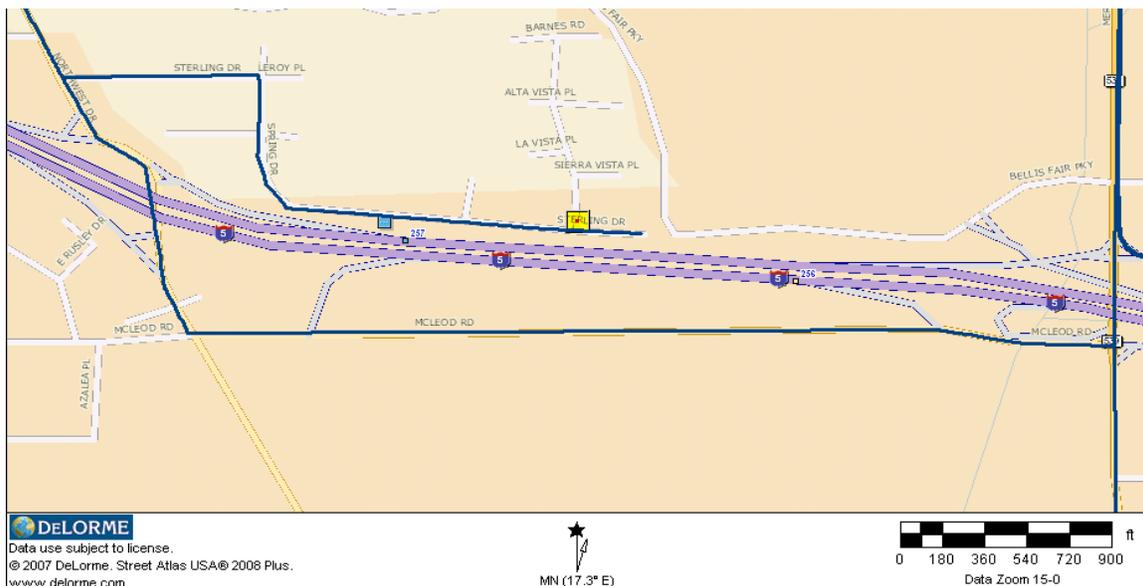


Corner of Pana Vista and Sterling Drive
Distribution cables ty-wrapped to power riser conduit.





Corner of Pana Vista and Sterling Drive
Distribution cables ty-wrapped to power riser conduit.



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Comcast - Bellingham, WA

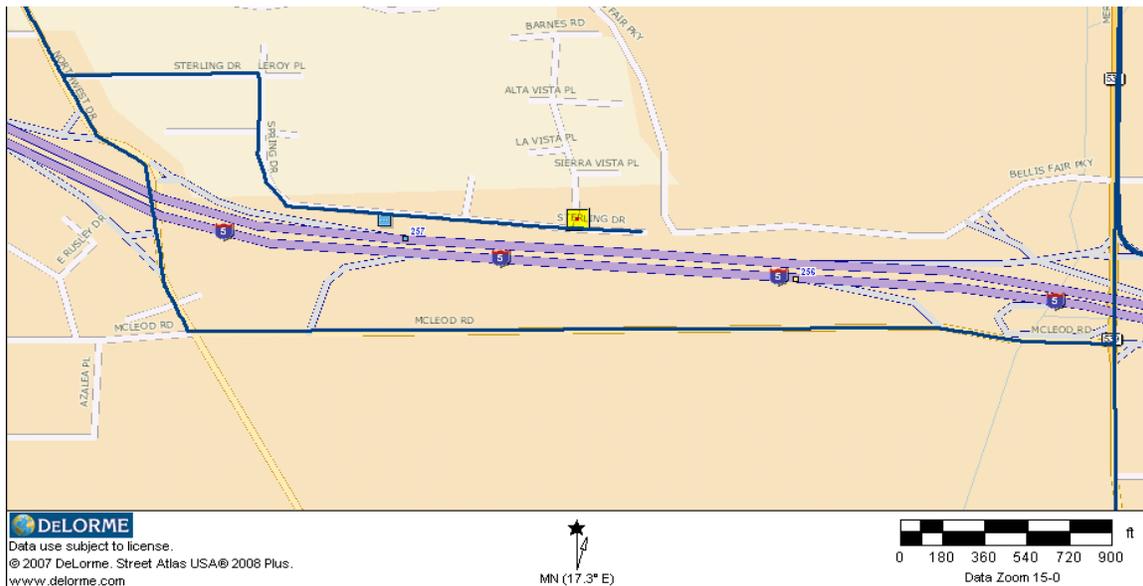


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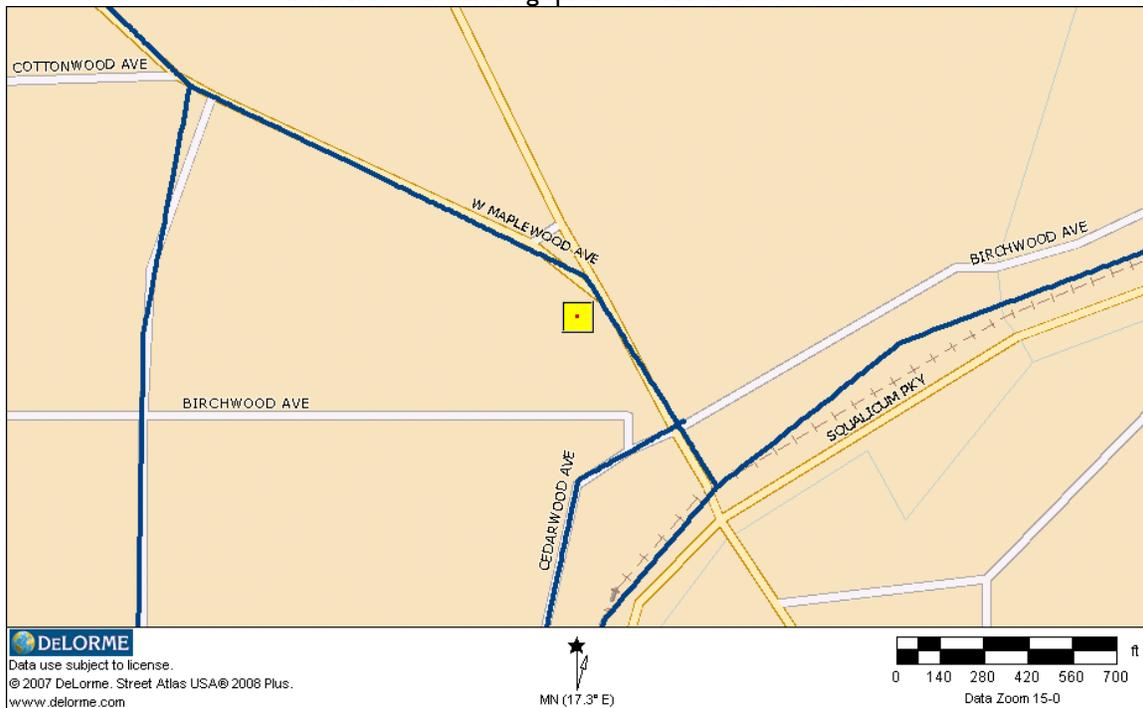
Corner of Pana Vista and Sterling Drive.
Strand wire not secured or bonded to down guy



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



3224 Northwest Avenue. Temporary drop connected to "500 to F" connector. Line is disconnected now. Interferes with climbing space. Needs to be removed.





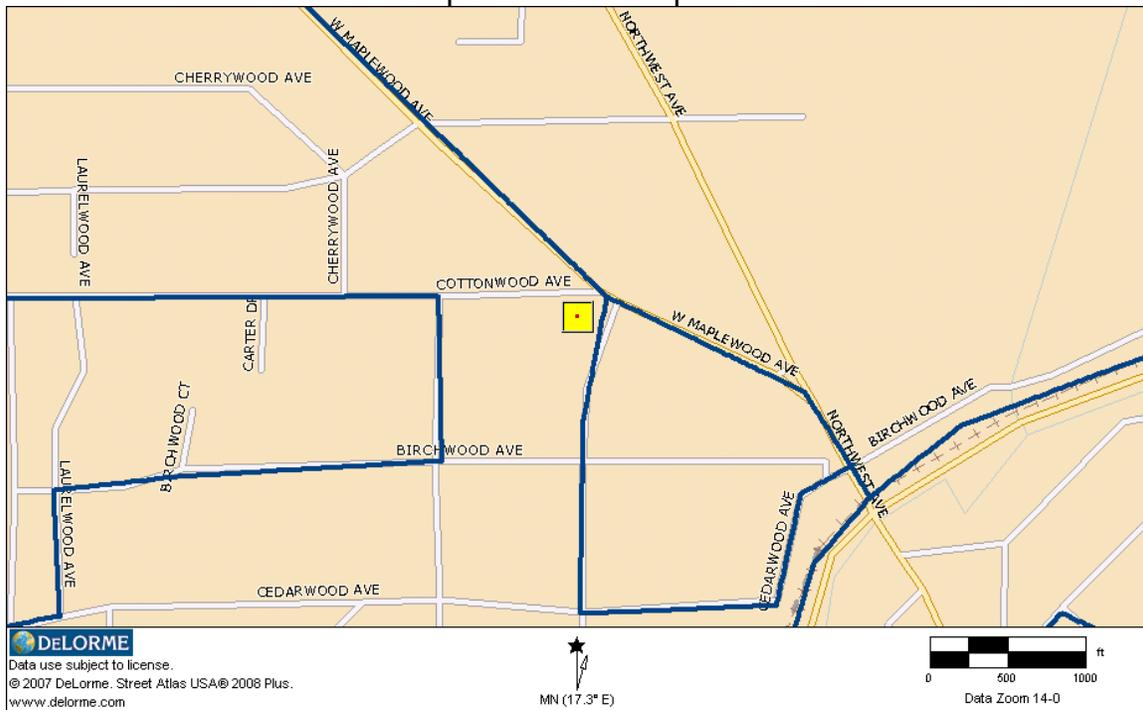
3214 Firwood
Cable drop attached to the power mast.



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in the City of Bellingham, Washington



3245 Firwood
Cable drop attached to the power mast.





2724 Maplewood
Apparently abandoned Arris Cornerstone MDU telephony unit.



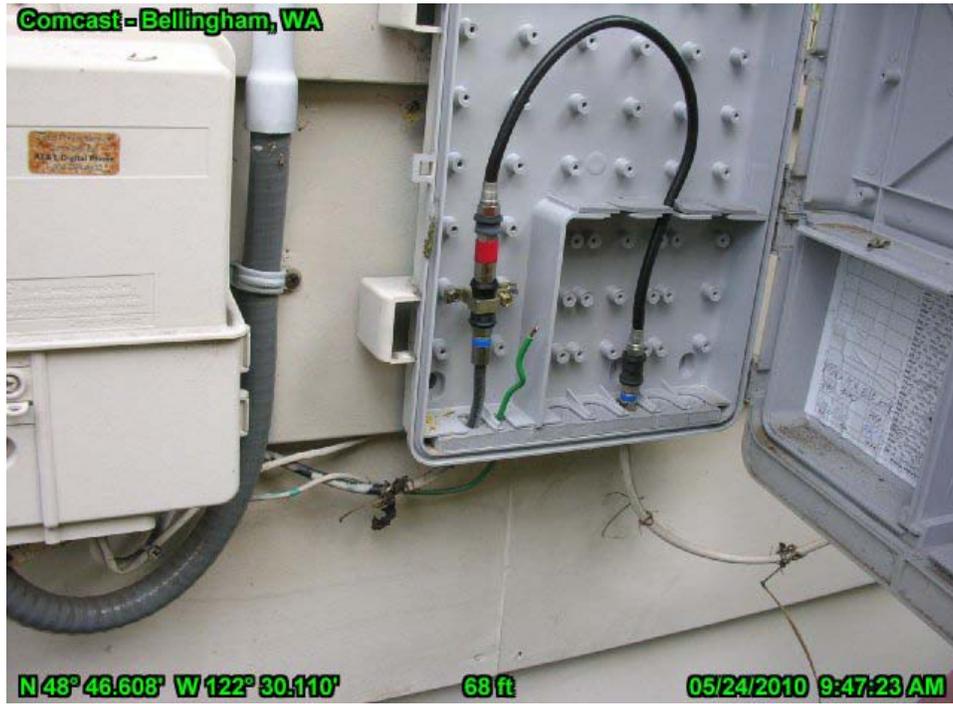


2728 Maplewood.

Apparently abandoned Arris residential cornerstone NIU. No longer in service.



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in the City of Bellingham, Washington



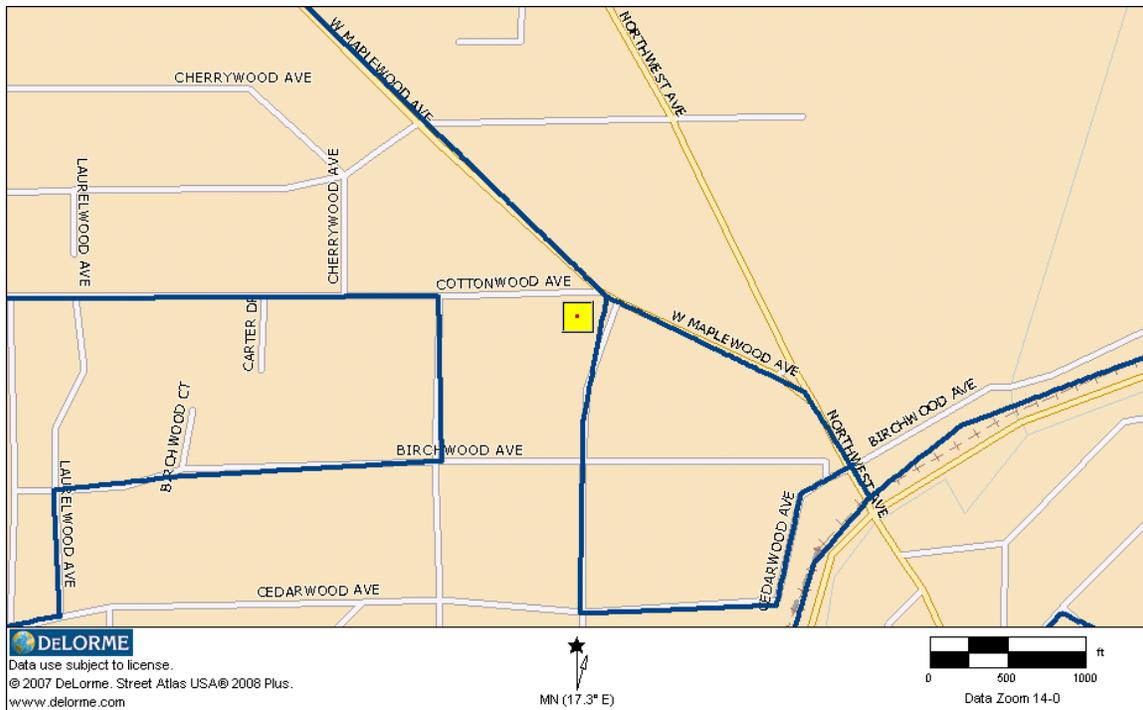
2728 Maplewood Avenue. Ground wire is broken off.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



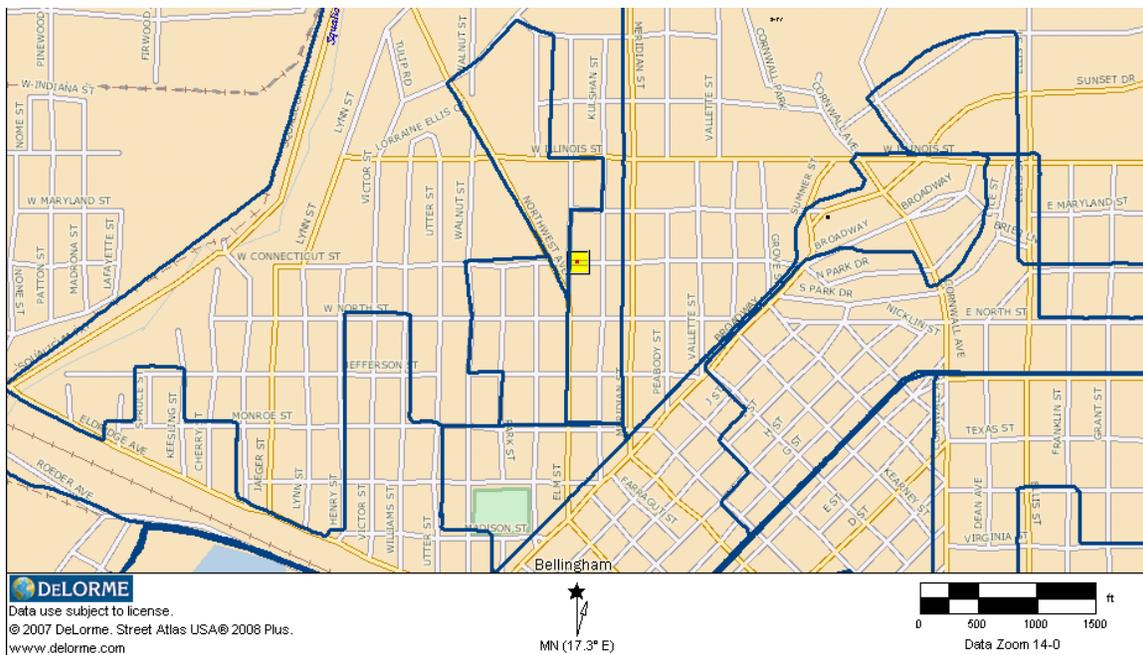
2724 Maplewood Avenue. Ground wire broken at meter clamp.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



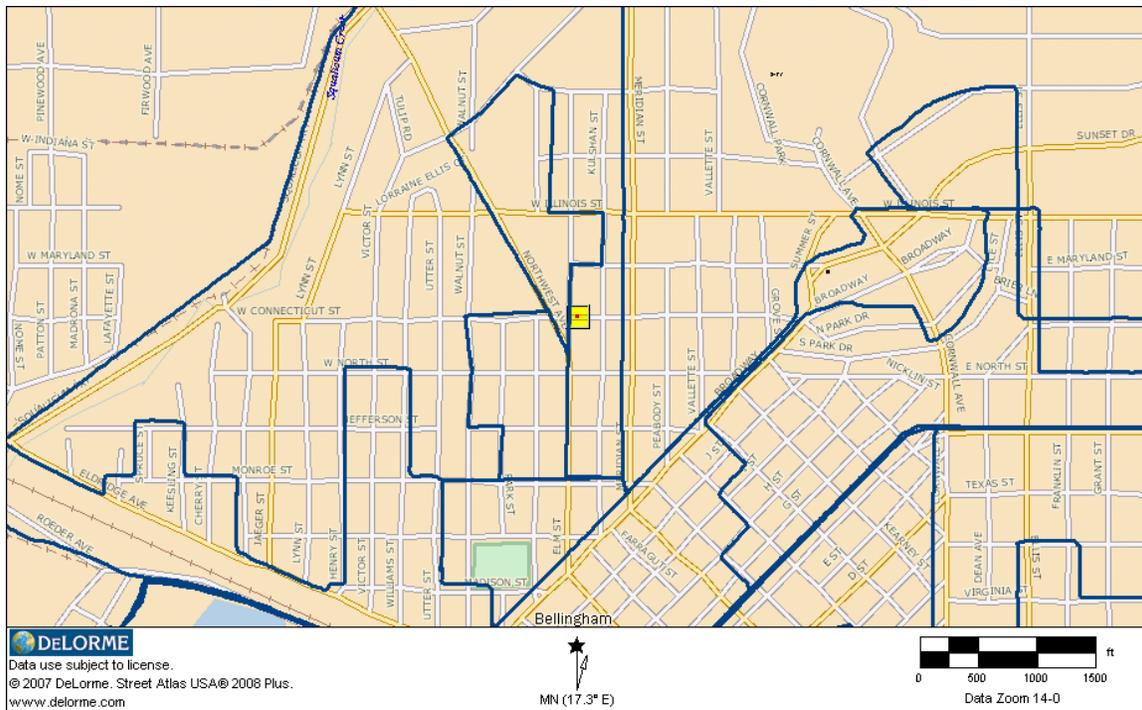
Connecticut Avenue between Elm and Kulshan in the alley
Cable crossover is lying on top of telephone. No vertical standoff.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



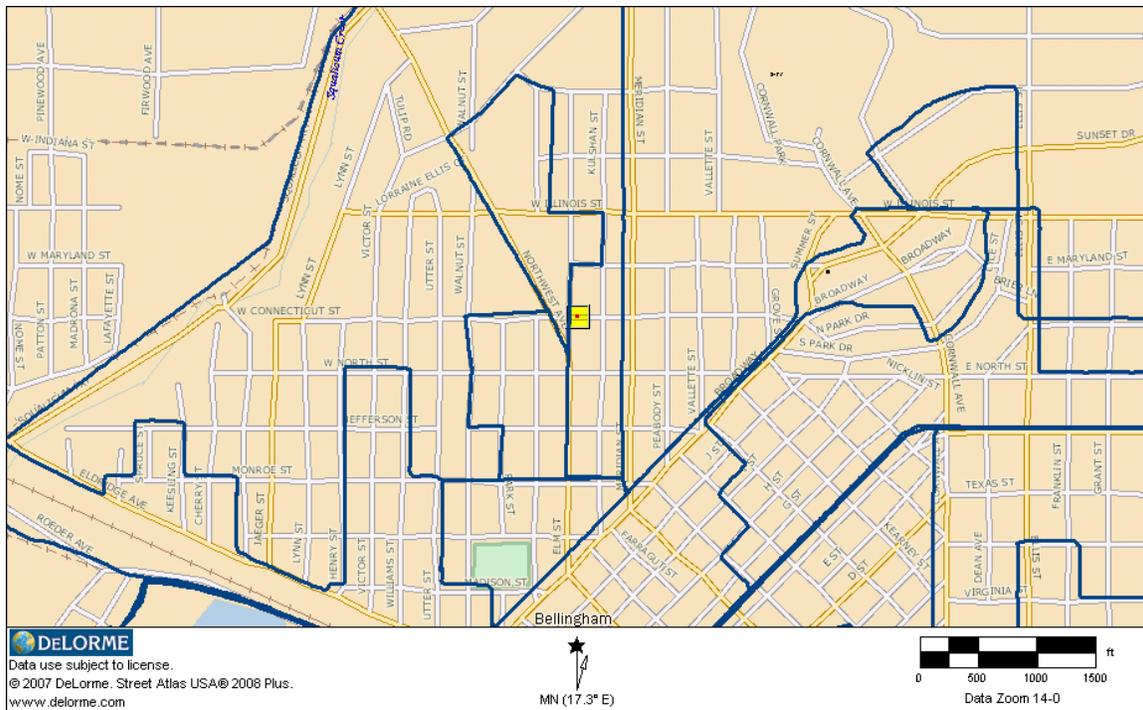
2823 Elm Street. Cable drops hit the power mast, wiring ty-wrapped to the power Mast conduit. Ground wire not secured.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



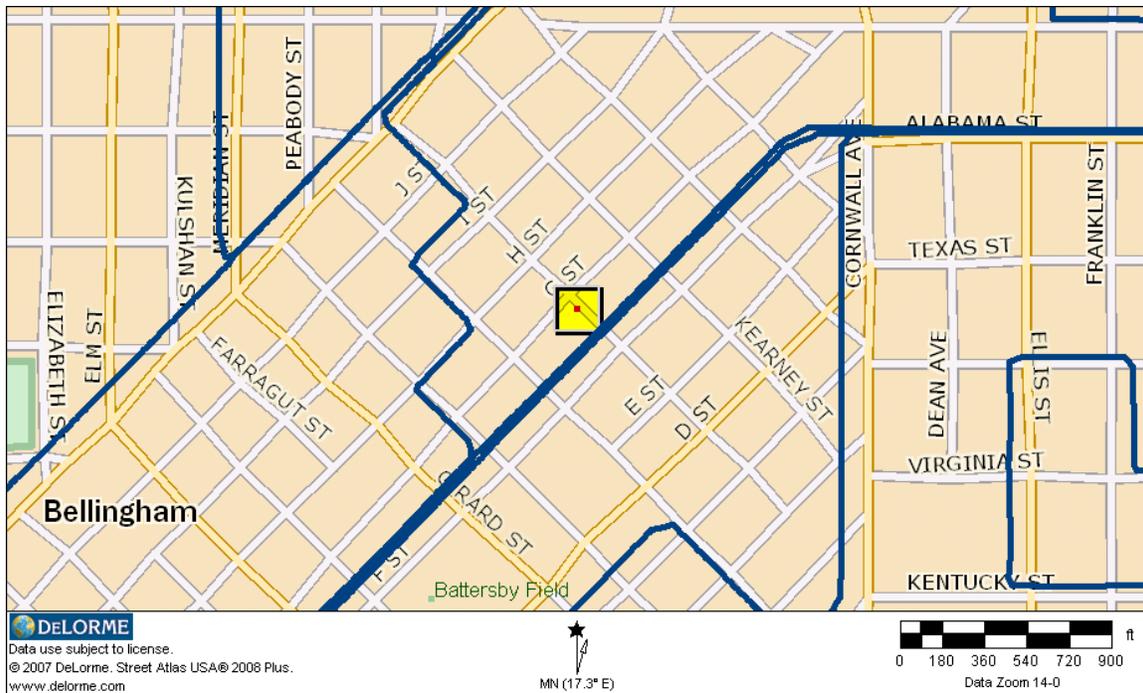
2823 Elm Street. Cable drops hit the power mast, wiring ty-wrapped to the power mast conduit. Ground wire not secured.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



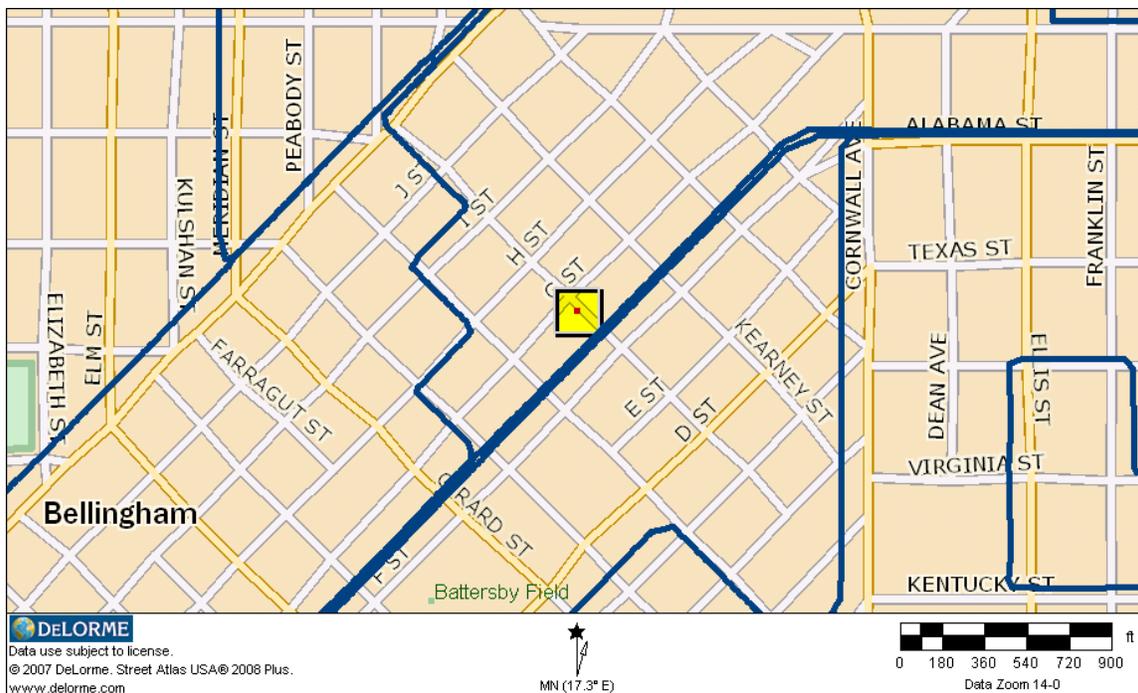
Rear of 2300 G Street. Not grounded.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington

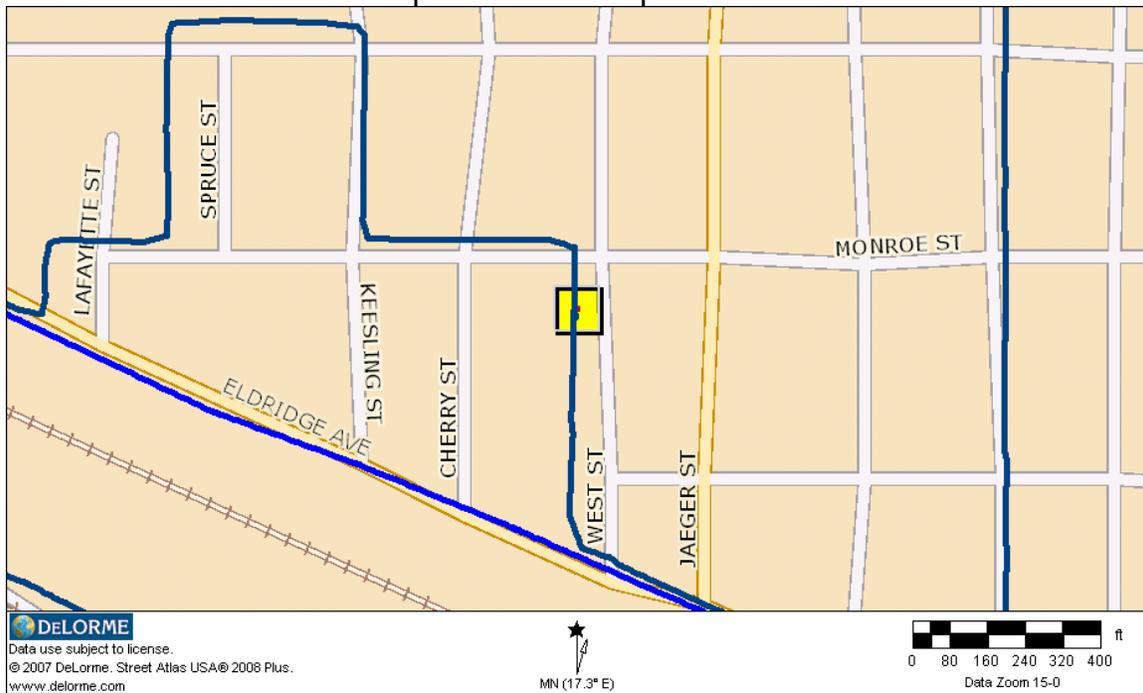


Rear of 2302 G Street. Apartment above Garage. Grounded to the power mast conduit.
Multiple pipe connections between ground and meter.





2339 West Street
Drop attached to the power mast





2410 Monroe Street
Cable drop attached to the power mast.





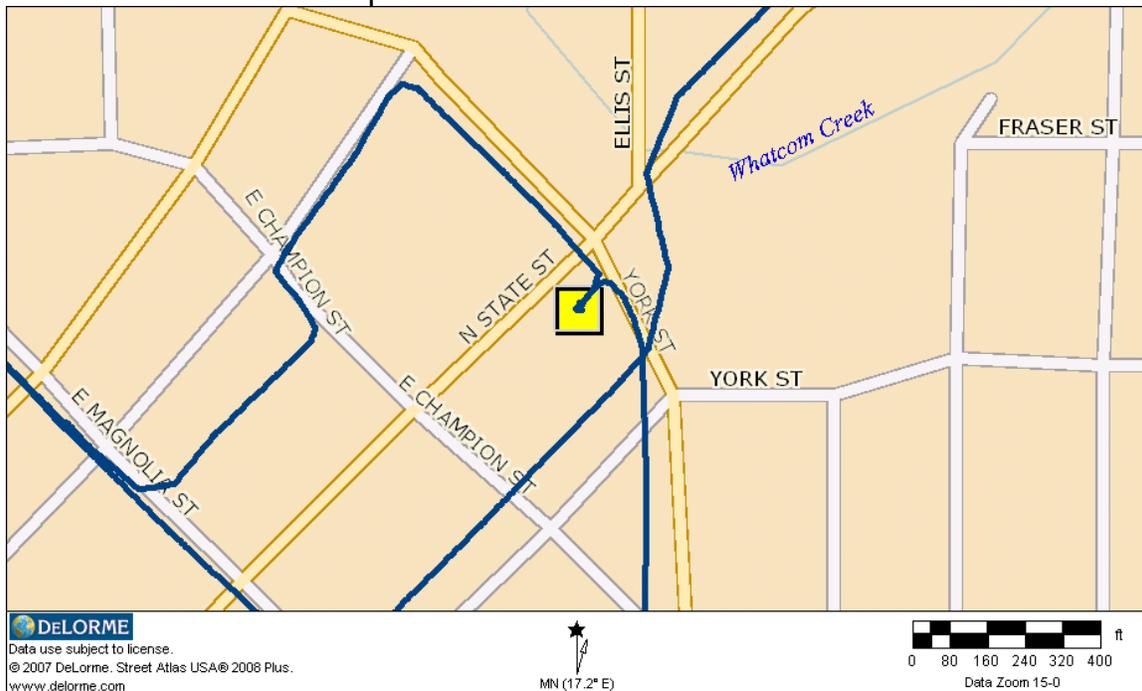
Corner of Railroad Ave and York St
Fiber optic enclosure tied up to strand.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington

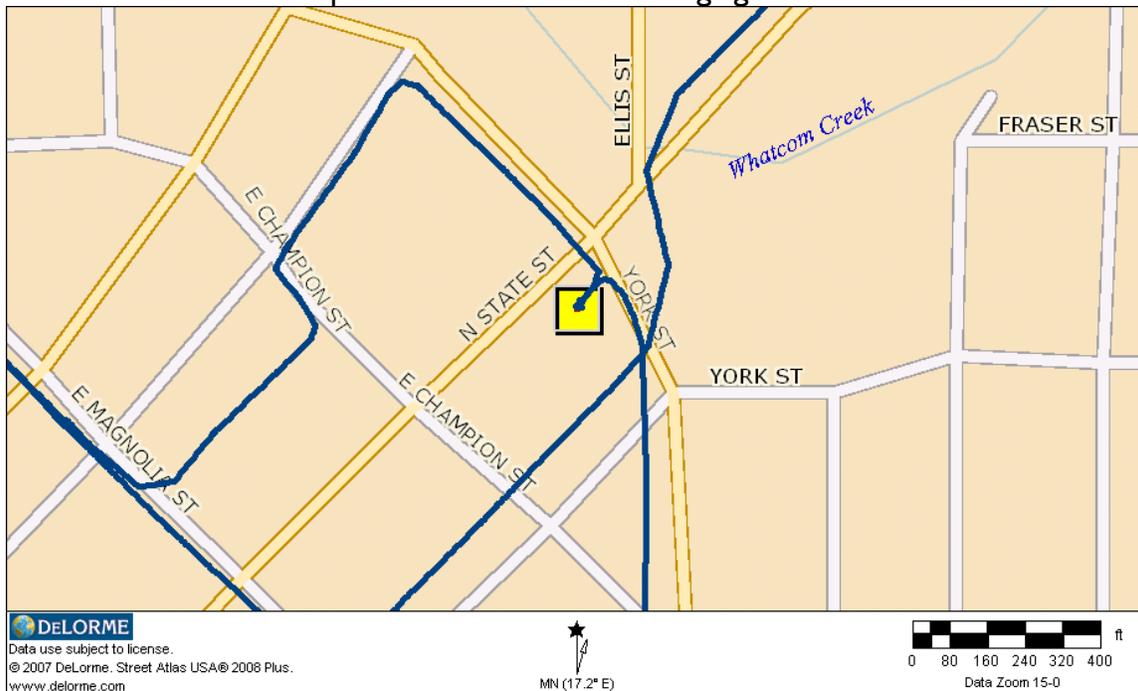


Next to the Firestone store on North State Street.
Fiber optic enclosure and cables tied to strand.





Behind the Firestone store on North State Street.
Fiber optic enclosure and fibers hanging from strand.





1521 St. Paul.

Multiple spans of cable sagging below telephone.



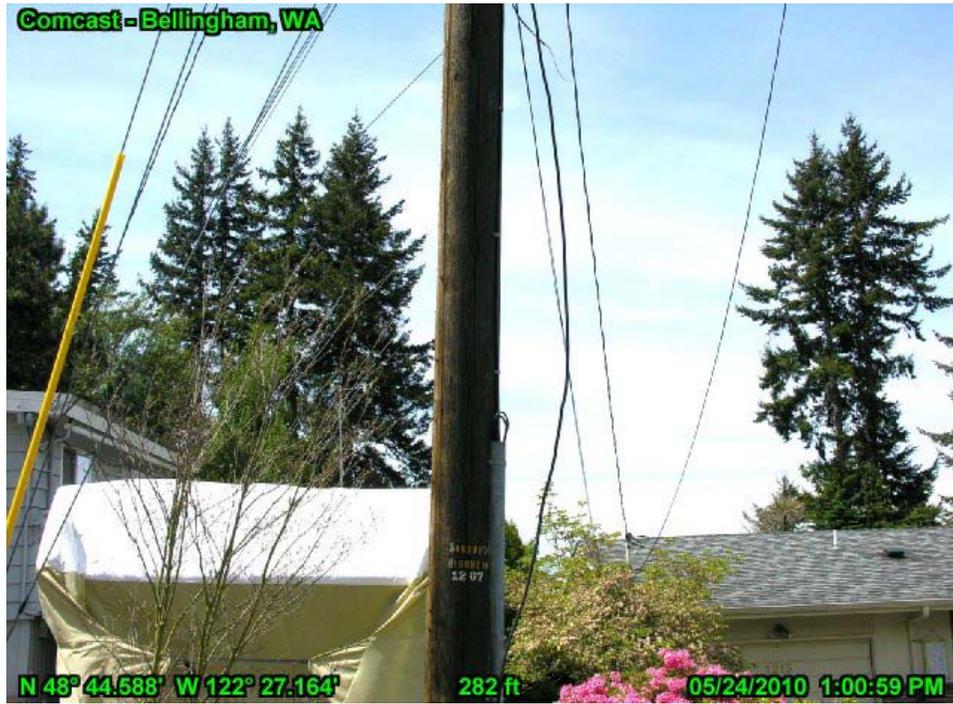


1339 St. Paul

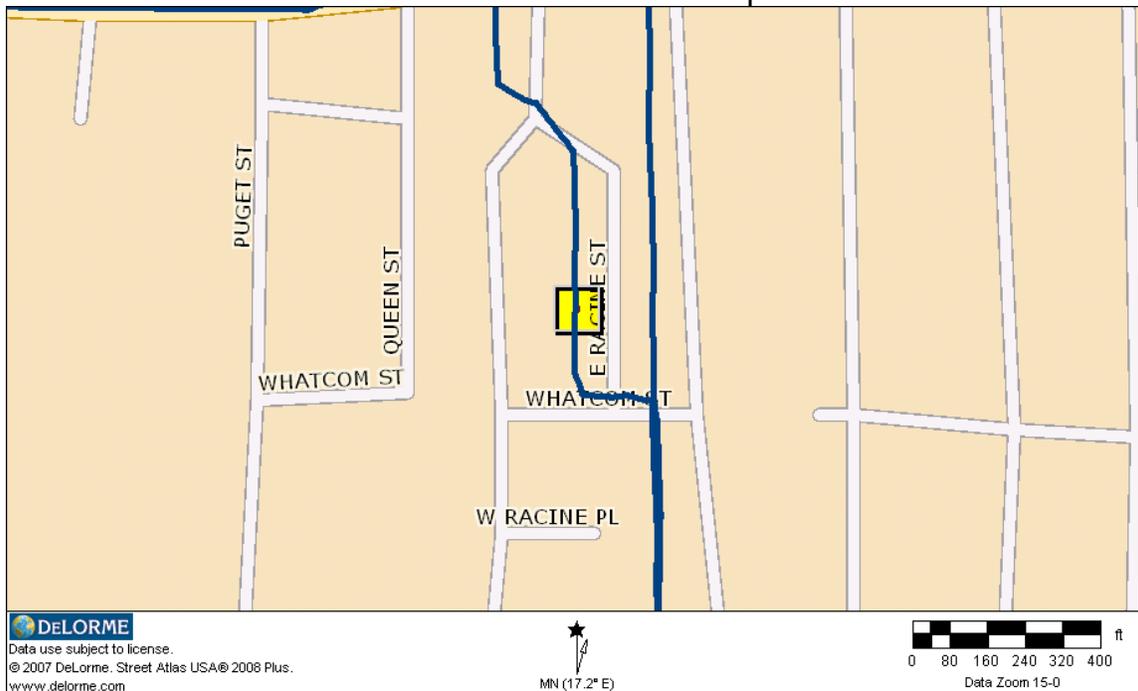
Cable drop attached to the power mast.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



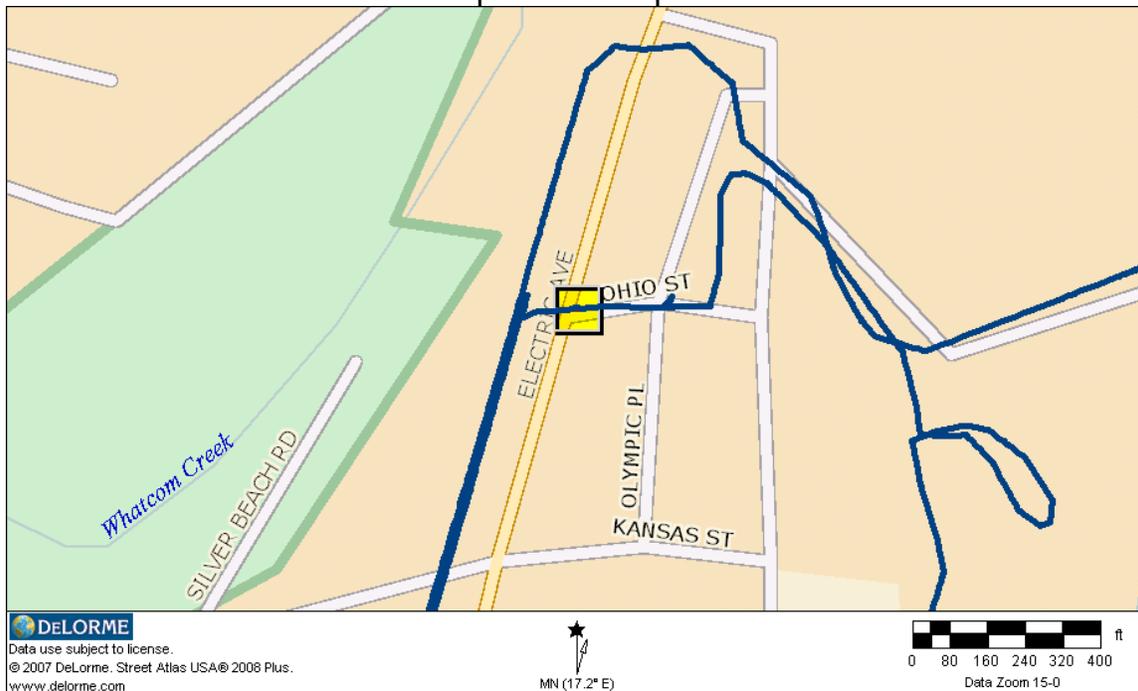
1213 East Racine Street.
Riser cables not secured to the pole.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



Corner of Electric and Ohio Streets
Cable drop attached to power riser





1901 Ohio Street.
Cable drop attached too close to power at the house.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



Corner of 37th Street and South Street
Cable riser not secured to pole.





Corner of 37th Street and South Street
Cable riser not secured to pole.





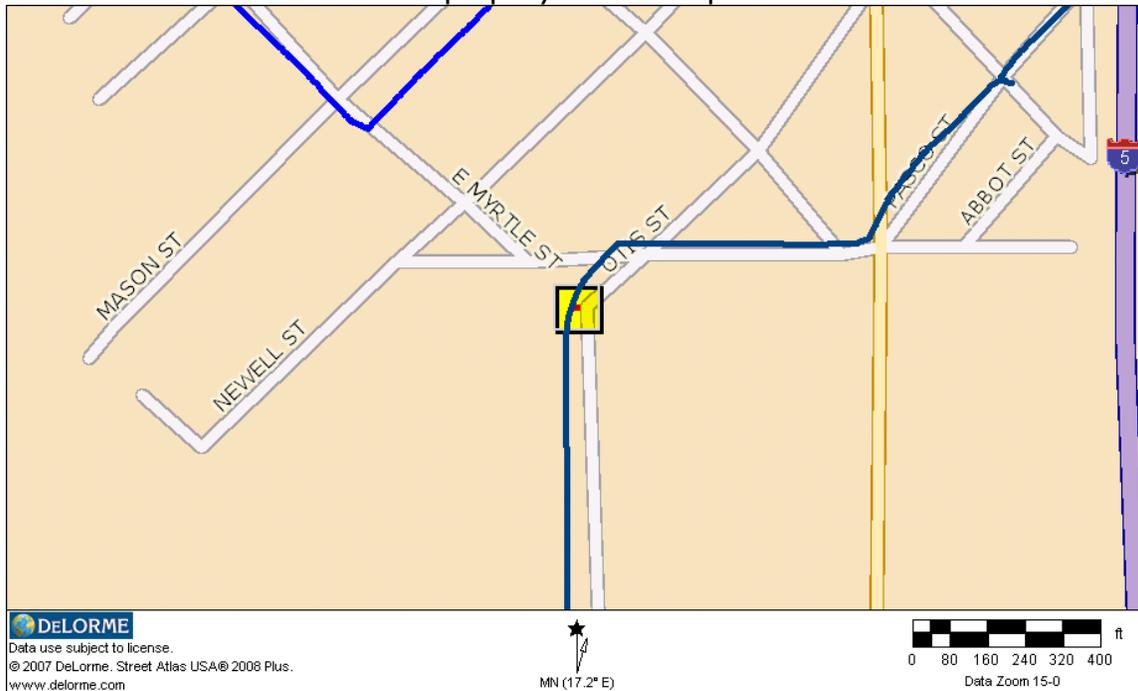
Corner of 37th Street and South Street

Poor pole change out. "Preforms" and deadens not properly attached.
Cables and connections not shrunk. Shrink tubing has slipped down the pole.





Entrance to 202 North 34th Street
0.500 cable riser improperly secured to power riser conduit





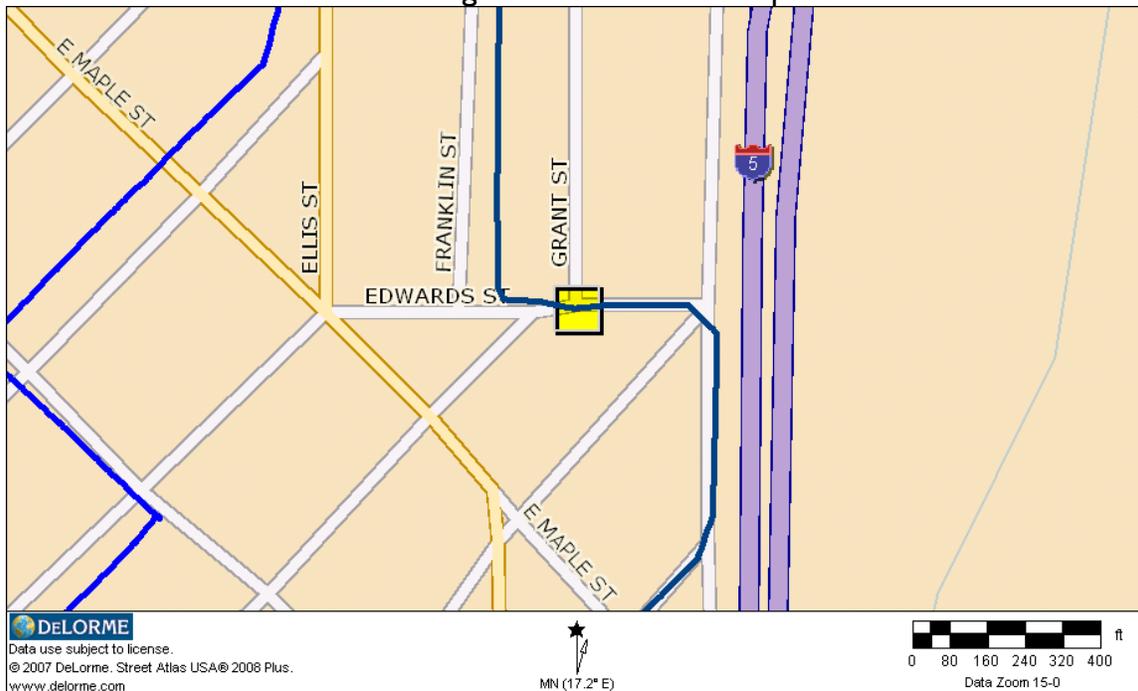
Corner of Maple St. and Pasco St.
Down guy cut and coiled up on bottom of pole



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



Corner of Grants and Edwards.
Cable wiring secured to rain downspout.





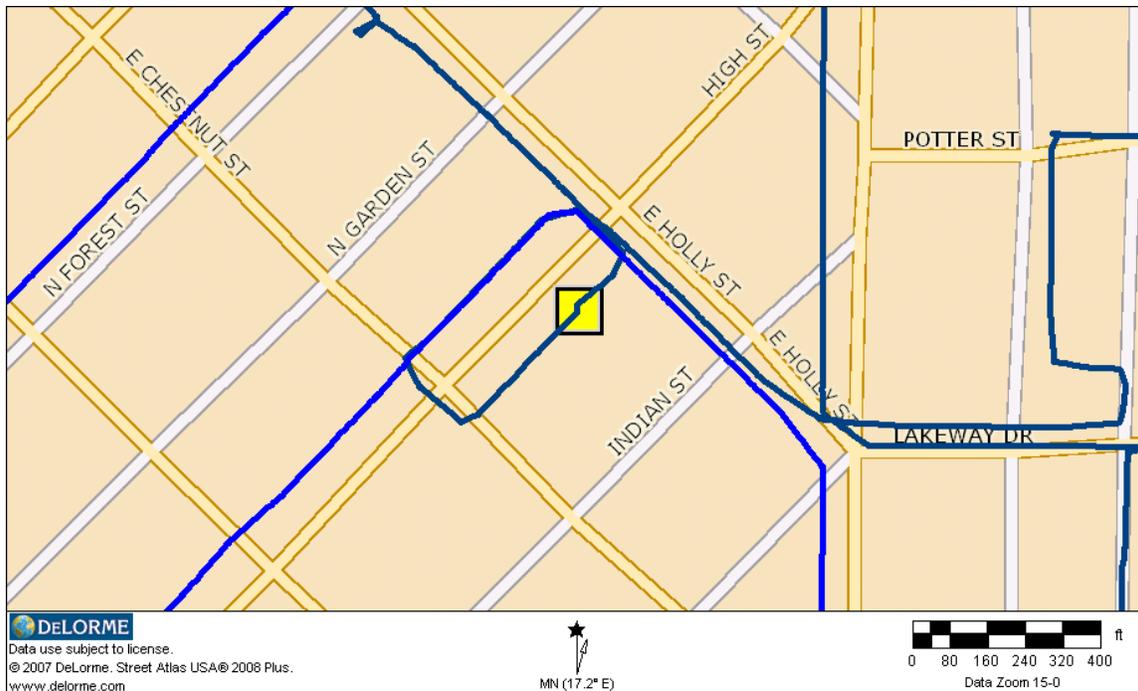
Potter between Humboldt and Grant Streets
Fiber optic coils tied up to strand. Incomplete splicing work.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



Alley between E Holly and East Chestnut South of High Street.
Fiber coil hanging from pole step.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



9223 I Street

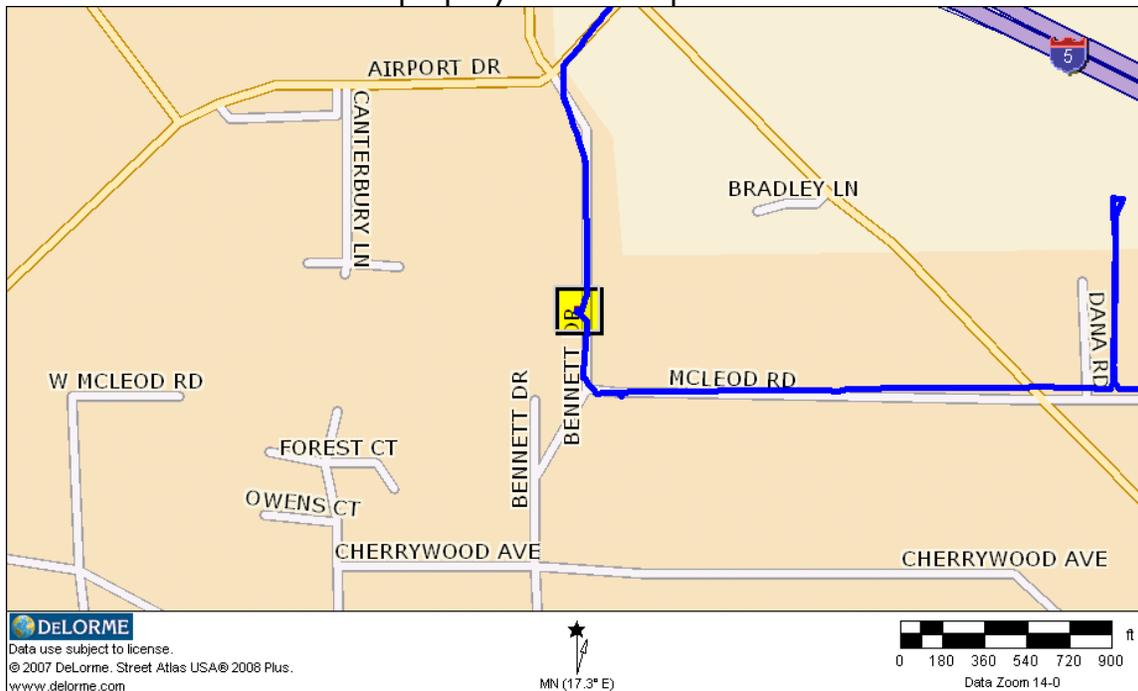
Cable wiring ty-wrapped to power riser conduits. Attachment point too close to power.





3615 Bennett Drive.

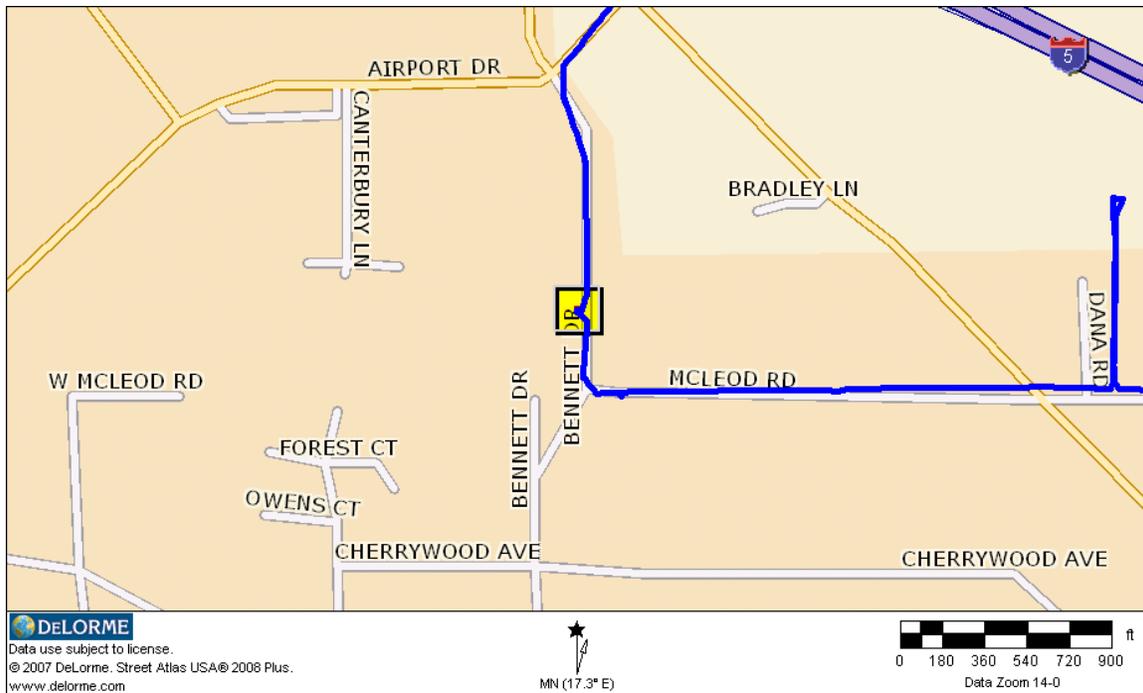
Riser cable improperly attached to power riser conduit.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



3615 Bennett Drive.





3218 McCleod Rd.
Cable drop attached to the power mast

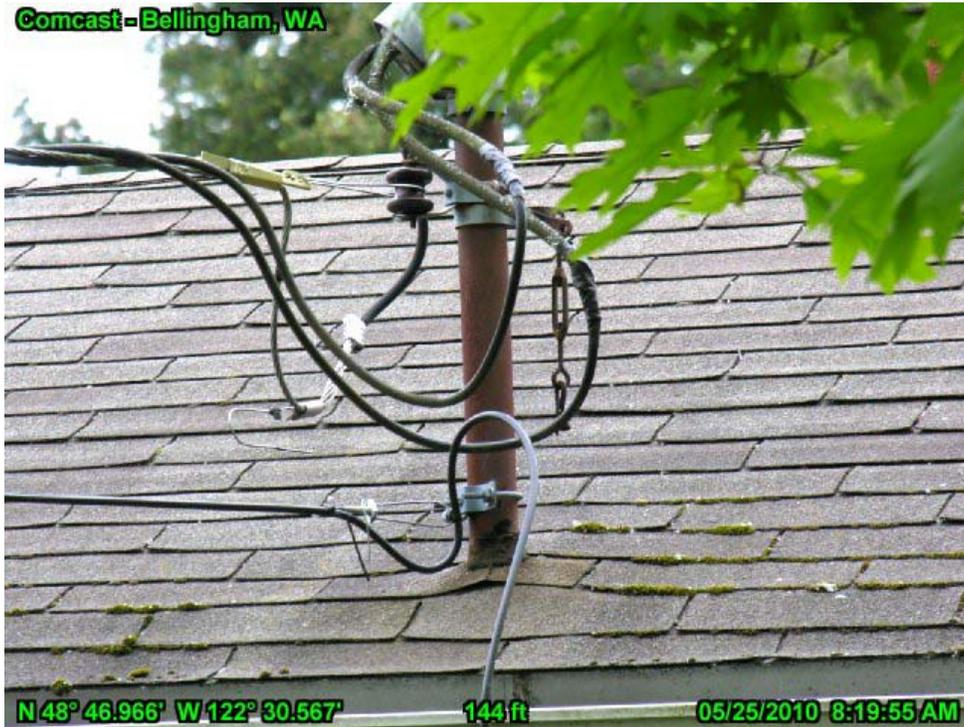


Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



2938 McCleod Road
Cable drop attached to the power mast.





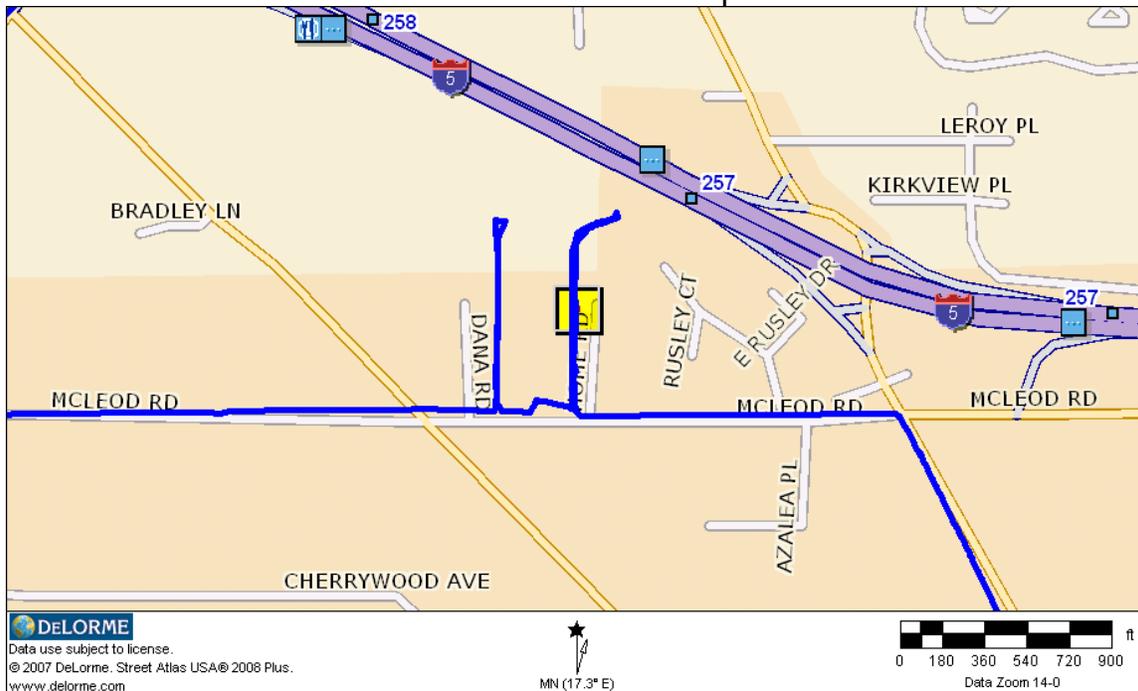
2938 McCleod Road
Cable drop attached to the power mast.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington

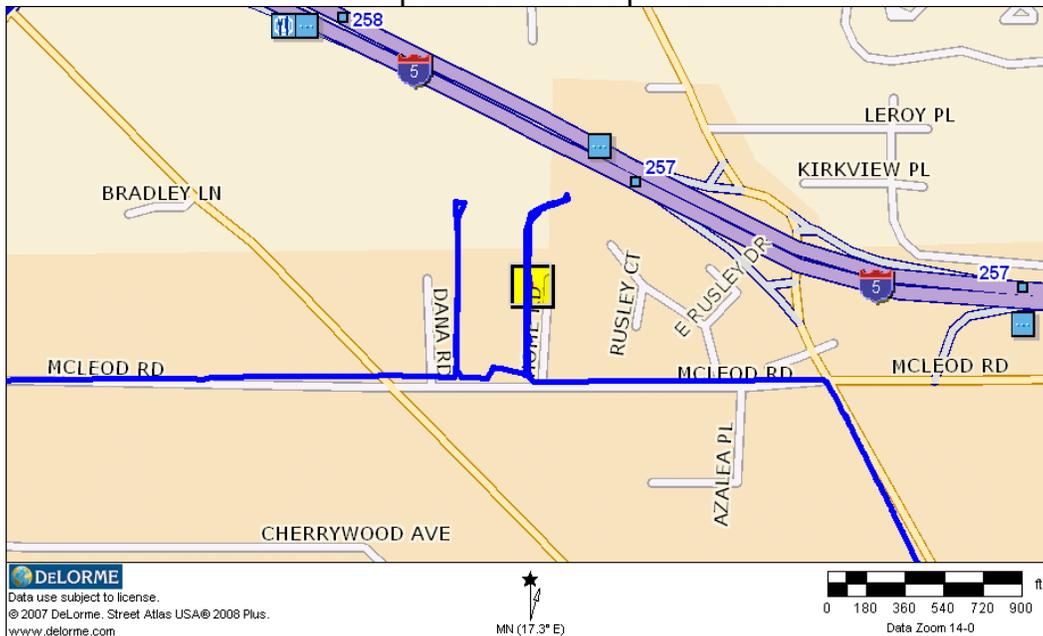


3624 Home Drive
Cable riser not attached to pole.



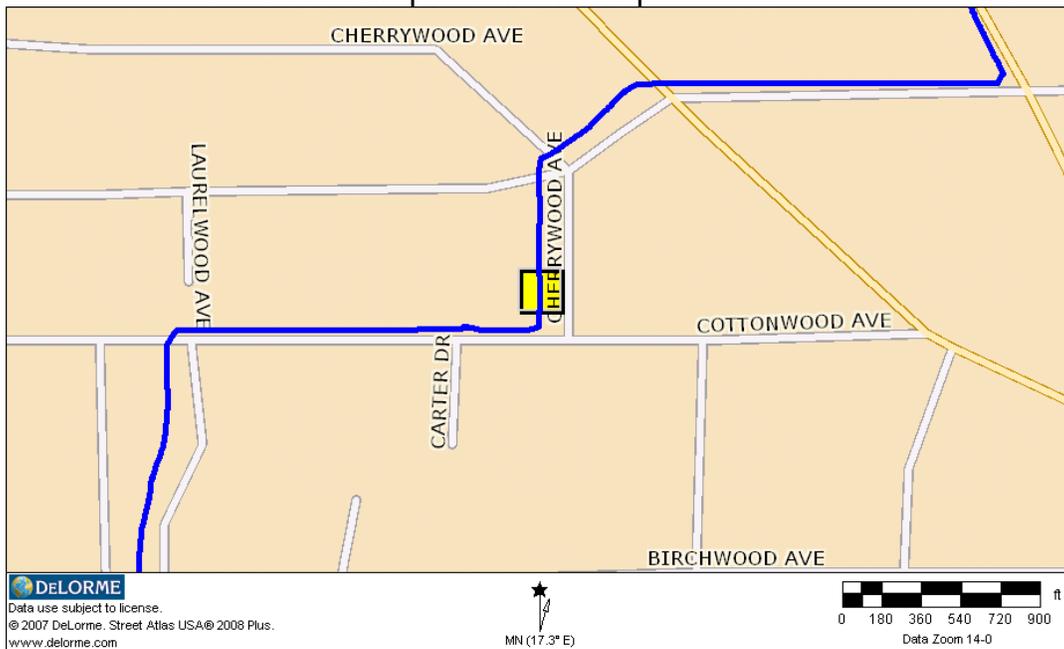


3624 Home Drive.
Cable drop attached to the power mast.



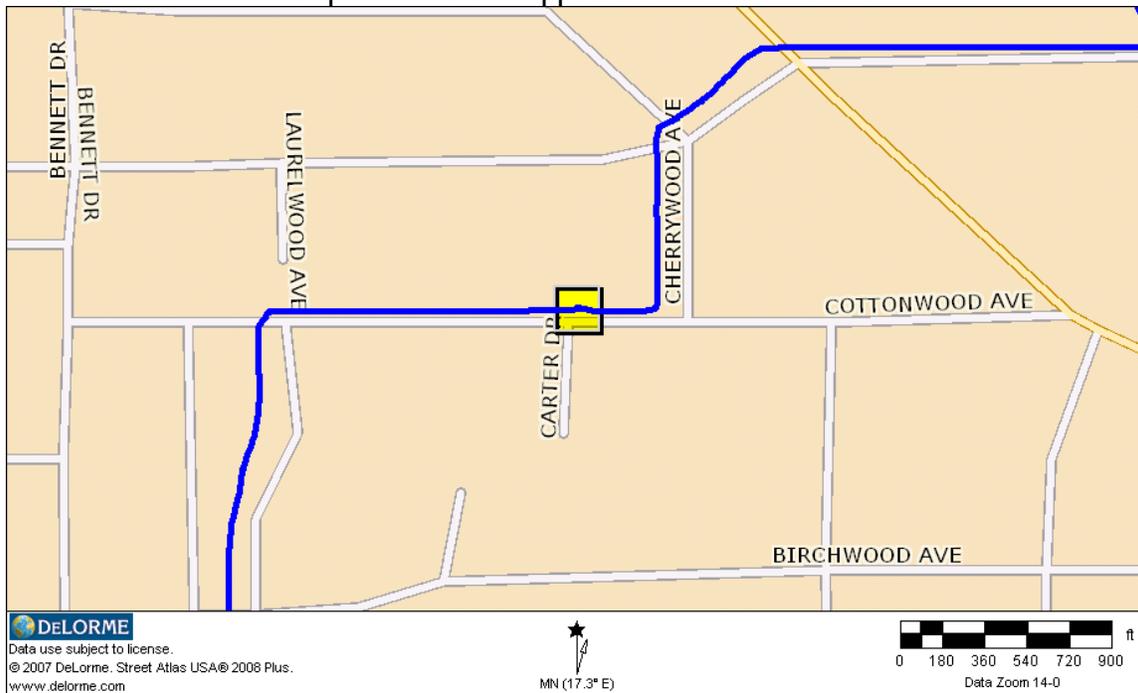


2904 Cherrywood Avenue
Cable drop attached to the power mast.





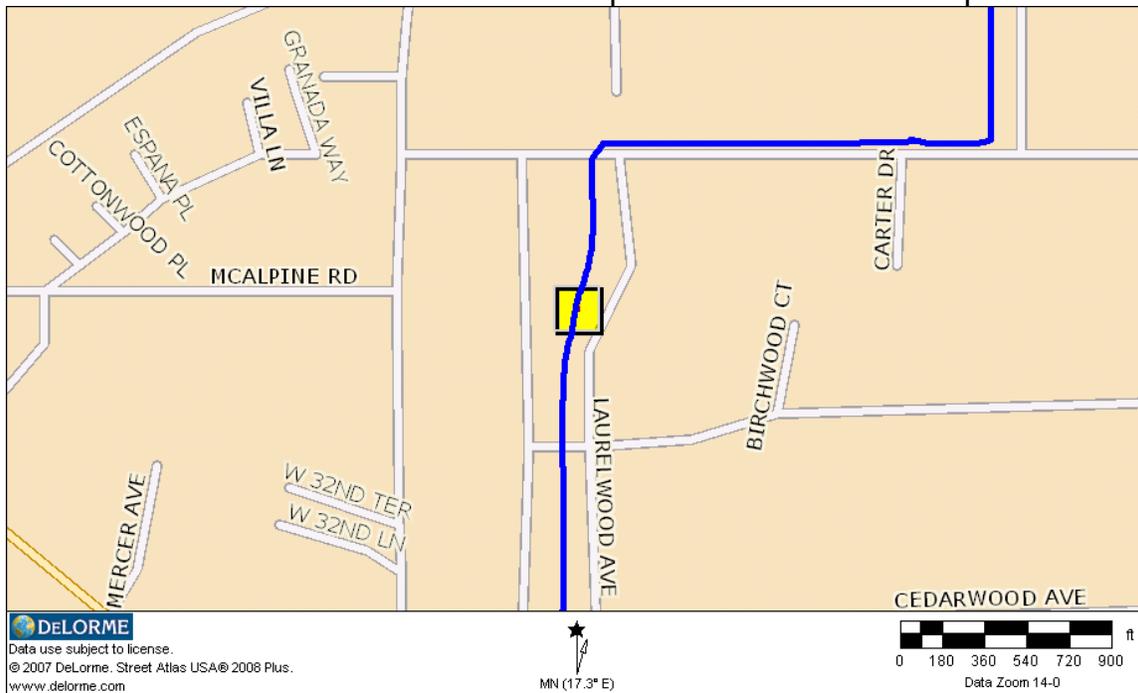
3017 Cottonwood Avenue
Telephone cable wrapped around CATV Cable.



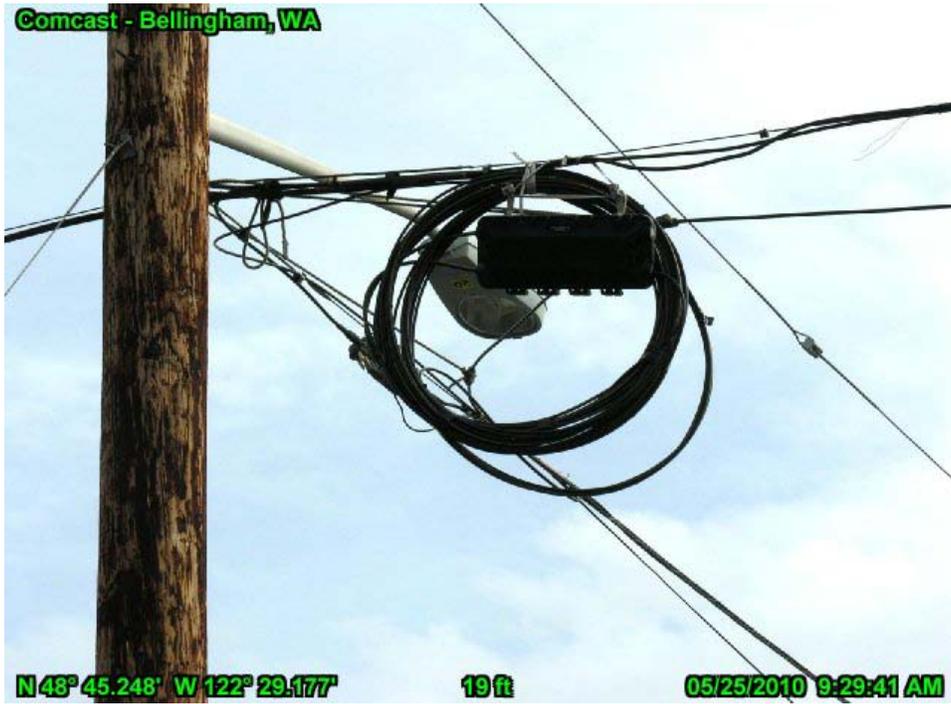


3224 Laurelwood Avenue

Cable strand mounted too close to power transformer and drops.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



Corner of D Street and Holly Street
Fiber and enclosure tied up to strand.



Physical Plant Safety Inspection
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in the City of Bellingham, Washington



721-1/2 Holly Street.

Multiple drops enter building without being grounded.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



721-1/2 Holly Street

Multiple drops enter building without being grounded.





510 Everglade Road
Drop riser not secured to pole.





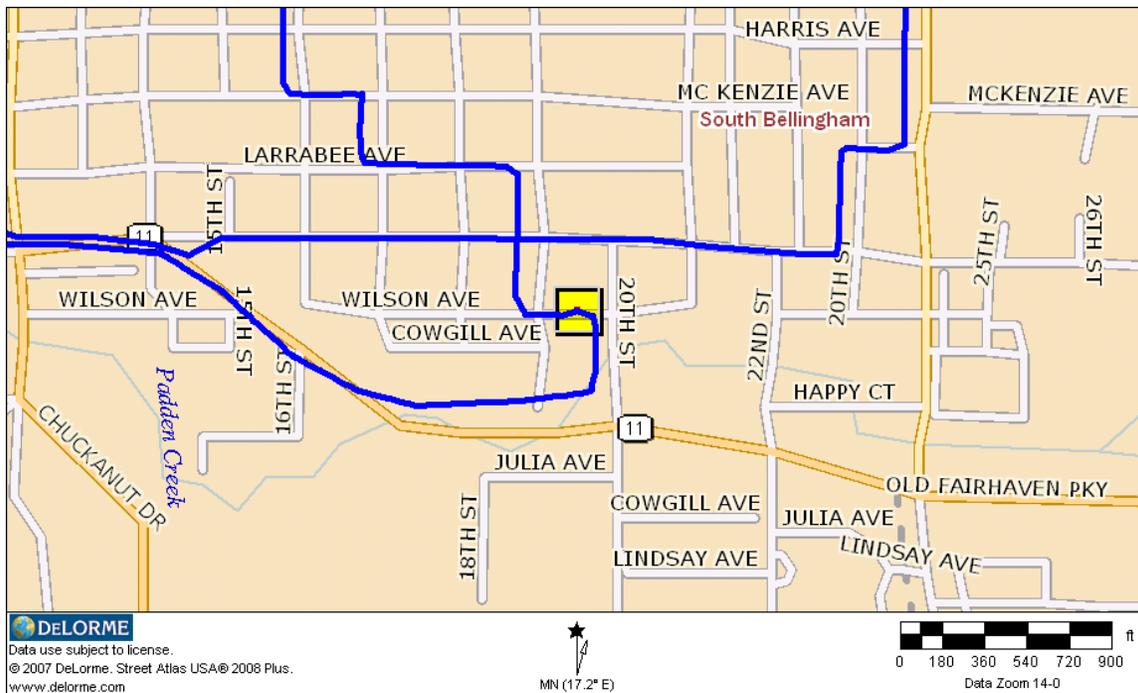
93 Hawthorn Road
Broken lashing wire.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



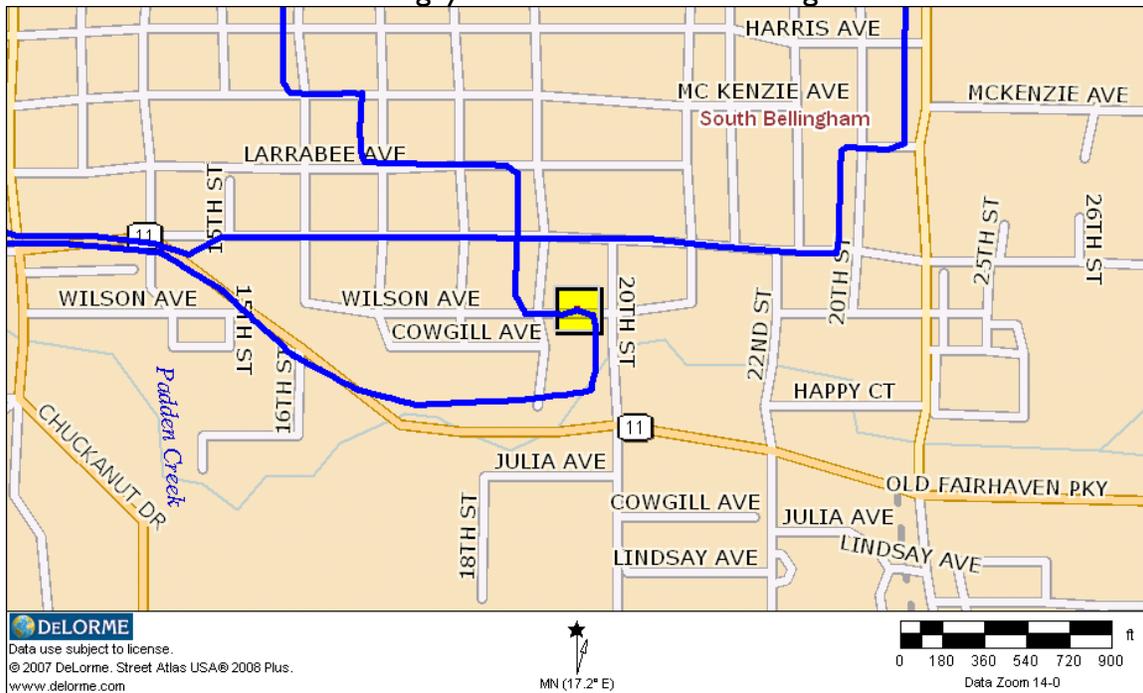
20th and Wilson.
Down guy not anchored. Pole leaning.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



20th and Wilson Rd.
Down guy not anchored. Pole leaning.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington

Comcast - Bellingham, WA

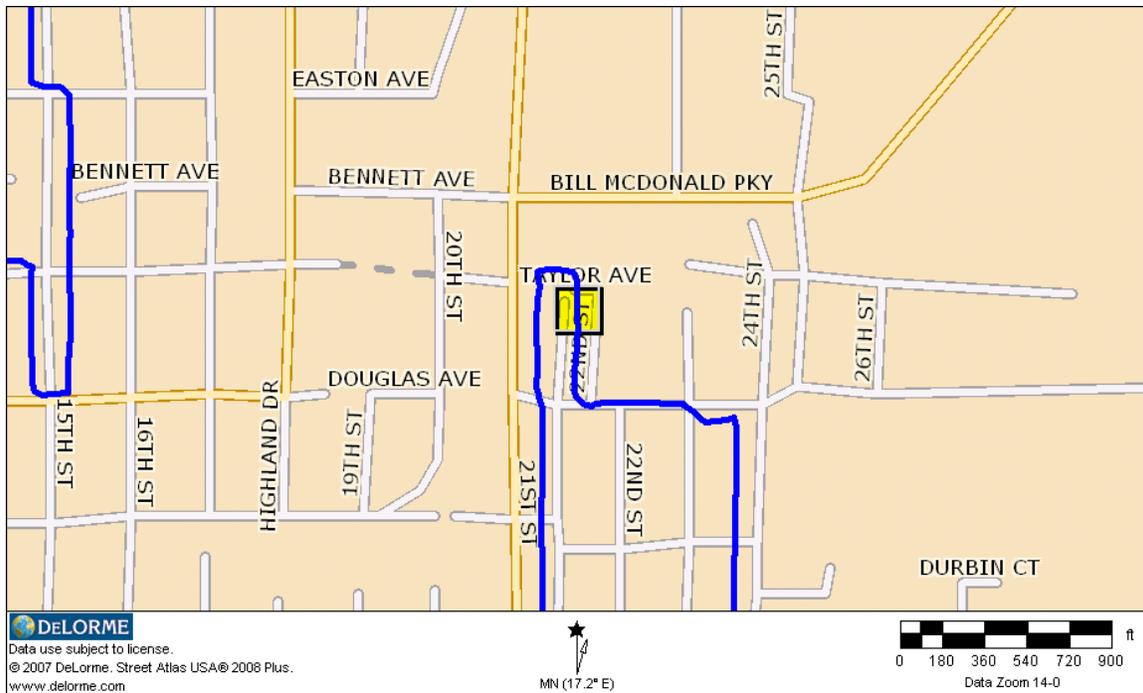


N 48° 43.495' W 122° 29.338'

190 ft

05/25/2010 11:26:10 AM

917 to 927 - 22nd Street. Damaged cable sections. Broken cables, lashing, taps.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



923 20th Street

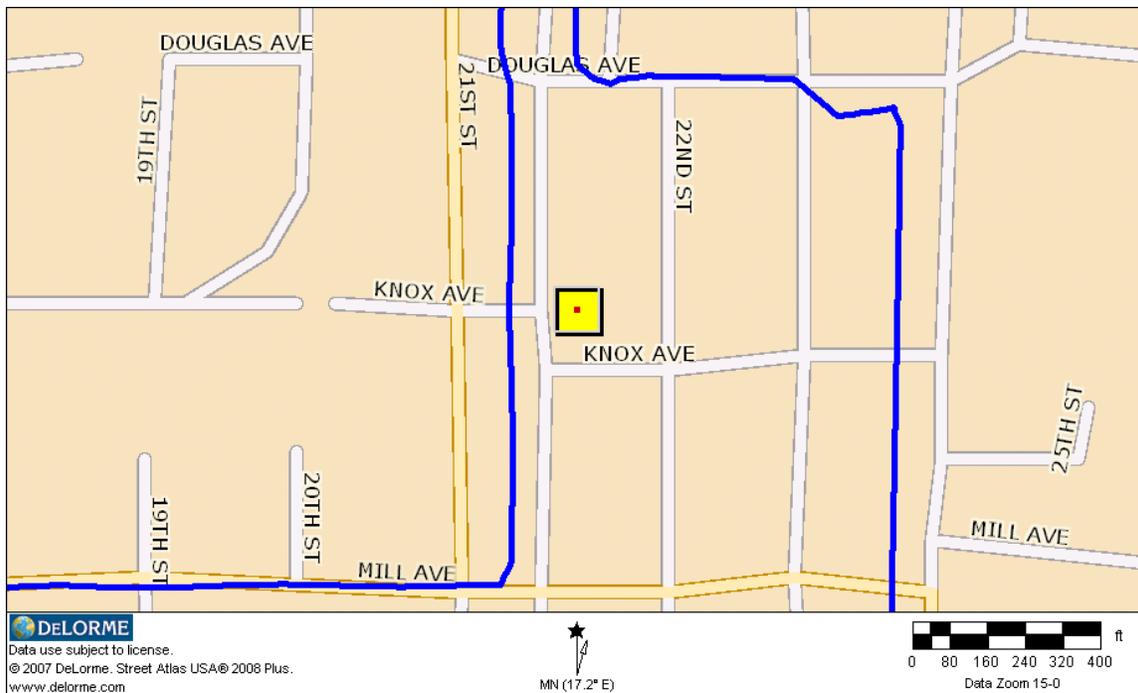
Drop wire not properly attached. Tap hanging from strand.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



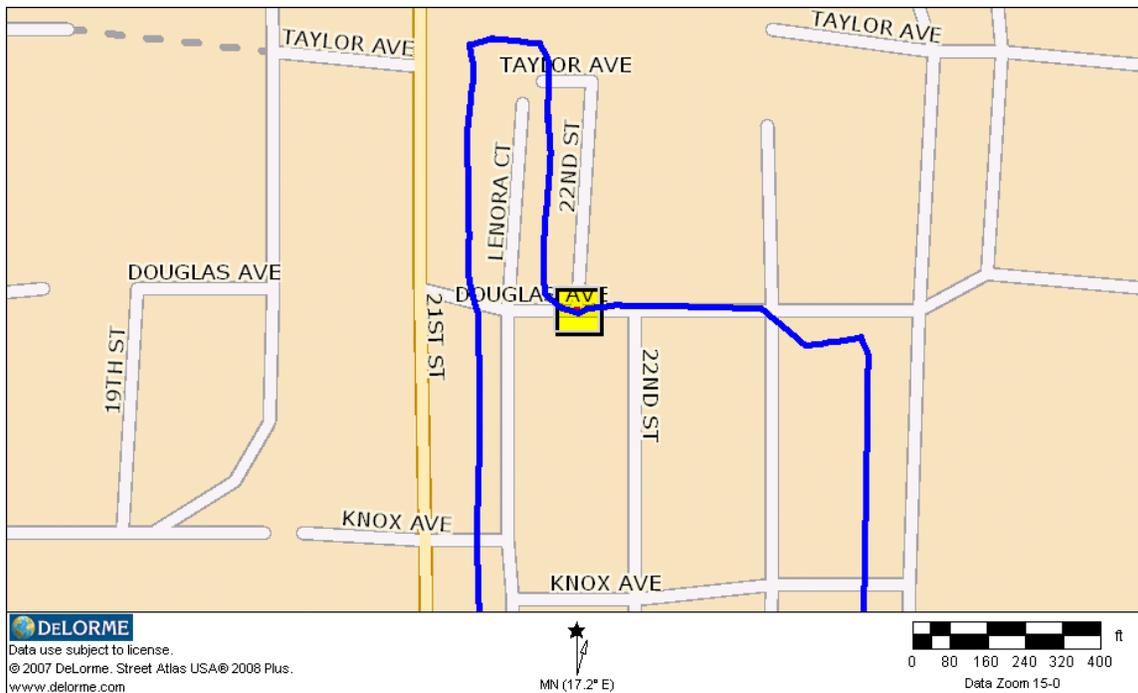
22nd and Douglas
PVC riser goes up the pole with no attachments.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington

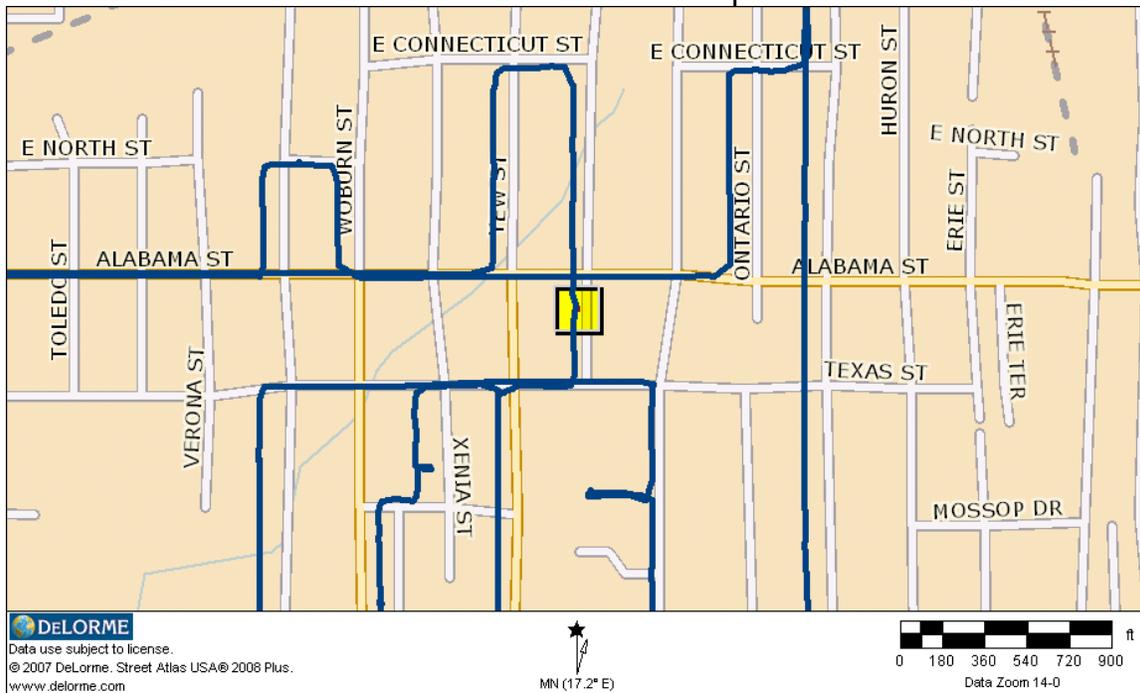


Corner of 22nd and Douglas
Apparently abandoned amplifier can and pole stub.





Superior and Alabama Streets.
Cable attachment too close to power.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



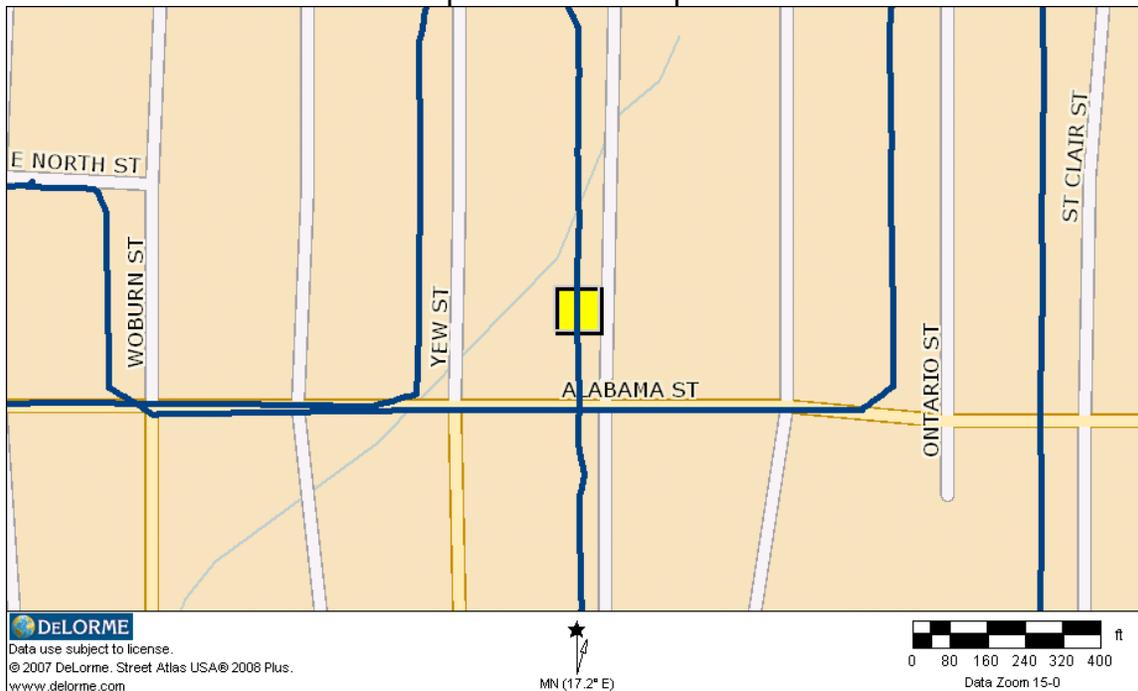
Superior Street just South of Alabama.
Cable strand mounted too close to power.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



2517 Superior Street
Cable drop attached to the power mast.



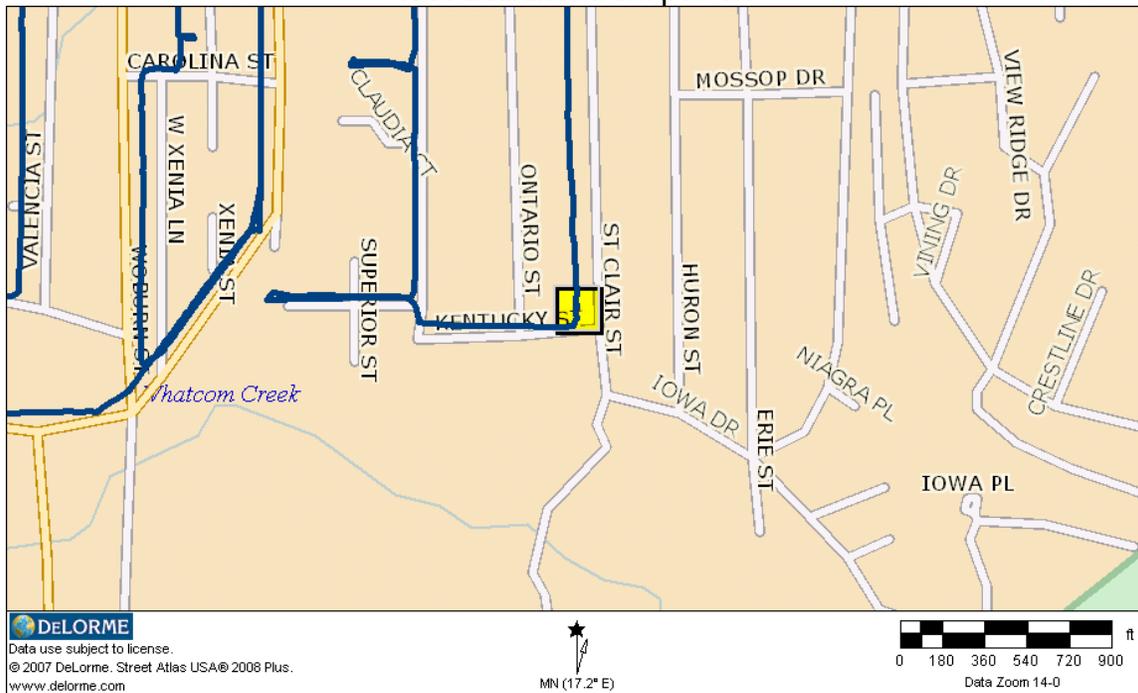


2138 Virginia Street
Old 59 drop tangled in power at the house.



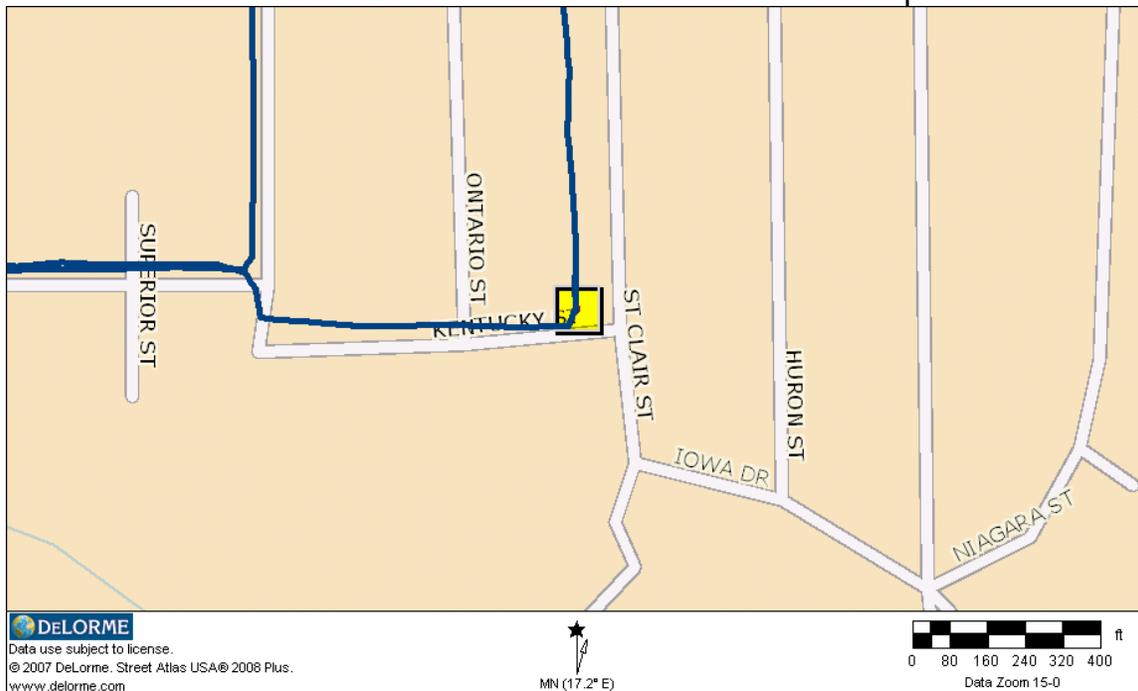


8104 St. Clair Street Cable drop attached to the power mast above the roof. Less than 1 foot clearance from power.





2032 St. Clair Street Cable drop attached to the power mast. Grounded to the cable mast above the roof line. Less than 1 foot clearance from power.



Physical Plant Safety Inspection
of Comcast Communications
in the City of Bellingham, Washington



2325 Vining Street. Cable drop risers secured to power conduit



Comcast-Bellingham, WA



N 48° 45.674' W 122° 25.900'

348 ft

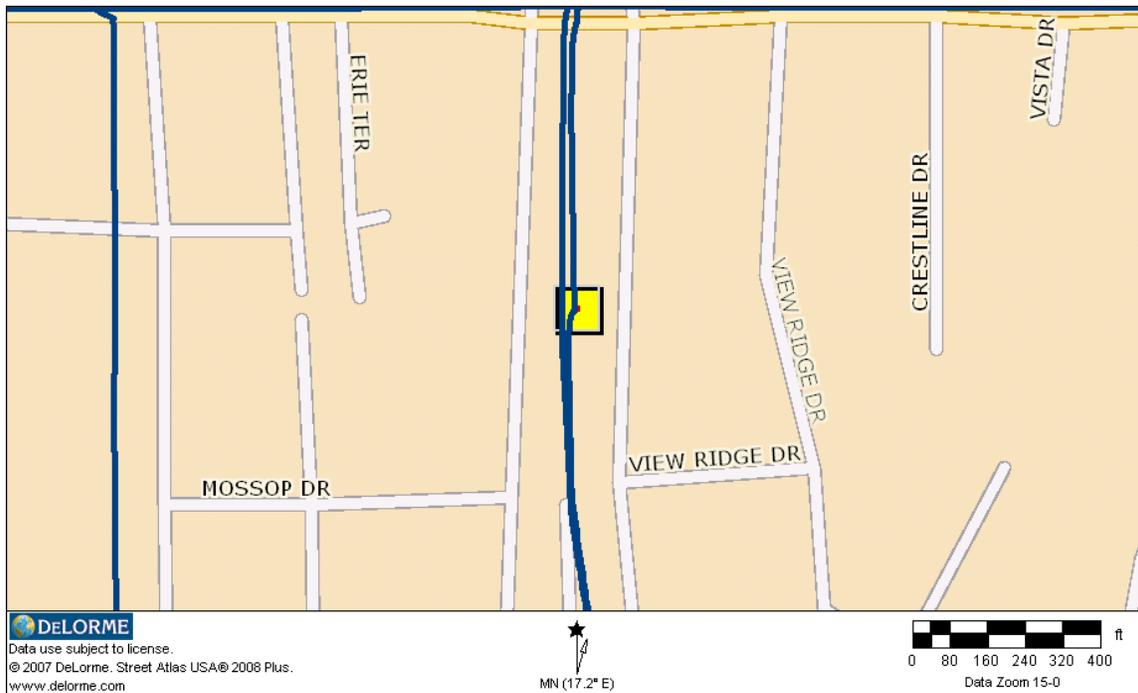
05/26/2010 10:36:06 AM

2325 Vining Street. Cable drop risers secured to power riser conduit.





2325 Vining Street. Cable drop attached to the power mast.



Attachment A2: About the Inspectors



STATEMENT OF QUALIFICATIONS AND EXPERIENCE
JONATHAN L. KRAMER, JD, FSCTE, BTS, BDS, BPS, CBT

- Licensed by the Federal Communications Commission (General Radiotelephone Operator License PG-11-35289, with Ship Radar Endorsement) (Previously licensed as a Second Class Radio Telephone Operator, September 1975; First Class Radio Telephone Operator, November 1977; General Radiotelephone Operator License, June 1987)
- Licensed by the Federal Communications Commission as an amateur radio operator since November 1970; currently licensed as an Advanced Class operator (KD6MR)
- Former National Board of Directors member, National Association of Telecommunications Officers and Advisors (NATOA), an affiliate of the National League of Cities (Terms: 1997-2000, 1992-1994)
- Former Co-chair of National Technical Standards Committee appointed by NATOA, National League of Cities, and US Conference of Mayors to develop the national technical standards for cable television systems adopted by the FCC in February 1992
- NATOA's 1997 Member of the Year (honored for information delivery to NATOA members)
- NATOA's 1991 Member of the Year (honored for achievements in developing and negotiating national cable television technical standards)
- Former Co-chair of National Technical Standards committee appointed by NATOA, National League of Cities, and US Conference of Mayors to develop the national technical standardized testing manual to determine compliance with the FCC rules
- Senior Member of Society of Cable Telecommunications Engineers (Senior Member since April 1993; Member since 1981)

- Fellow, Institute for the Advancement of Engineering (FIAE) (Nominated by Institute of Electrical and Electronics Engineers)
- Member, International Right of Way Association
- Witness before the FCC in Cable TV re-regulation hearings, March 1990, representing NATOA, et al
- Right-of-Way engineering and management expertise related to telecommunications networks and radio communications siting
- Testifying expert witness in federal and state court cases
- Technology speaker at every NATOA National Conference since 1988; Technology speaker at many regional and local NATOA meetings
- Communications technology speaker at Society of Cable Telecommunications Engineers conferences and cable industry conferences
- Published author of book and magazine articles on communications technology, Plant safety, construction, and administration
- Cable system engineering and technical management experience six years before forming firm; Chief Technician, Technical Manager, Regional Engineer.
- Former Field Engineering Representative for Motorola Communications and Electronics, Area F Program Management team — Areas of experience include microwave radio; baseband RF and audio; digital signaling; UHF and VHF two-way radio (including high stability Simulcast® radio operations); telephony; and command and control communications.

Kramer.Firm has served over 500 local governments or local government groups since 1984.

Federal Agencies National Associations States

Federal Communications Commission / U.S. Department of Justice
National Association of Telecommunications Officers and Advisors
Society of Cable Telecommunications Engineers
United States Attorney; Los Angeles
United States Army; Ft. Irwin, CA
U.S. Marine Corps; Twentynine Palms, CA
U.S. Navy; Postgraduate School, Monterey, CA
United States Conference of Mayors
National Association of Counties
National League of Cities
State of Michigan Public Utilities Commission
State of Connecticut Department of Public Utility Control

Universities, Colleges, School Districts

University of Alabama
Pepperdine University
Orange Coast College
Rancho Santiago College
Centralia School District
Oxnard Union School District

Selected Litigation

Sprint v. City of La Cañada (Expert for City in two cases)
AT&T Wireless v. City of San Diego (Expert for City)
Nextel v. City of San Diego (Expert for City)
AT&T Wireless v. City of Carlsbad (Expert for City)
Level 3 Communications v. City of Santee (Expert for City)
Comcast v. City of Thousand Oaks (Expert for City)
GTE MobileNet v. City and County of Bellingham (Expert for City and County)
Playboy Enterprises v. US (Expert for US DOJ and FCC)
US Cellular v. Peoria County (Expert for Peoria County)
Jones Intercable v. Chula Vista (Expert for City of Chula Vista)
West Covina v. Comcast Cable (Expert for City of West Covina)
Sierra East Television v. Westar Cable (Expert for Sierra East Television)
Booth American v. US (Expert for US DOJ)
D. B. Cable v. Kalma Busk (Expert for Kalma Busk)

Selected Lectures

International Right of Way Association
Virginia Association of Cities
NATOA National Conference (Every conference since 1988)
NATOA Southern Virginia and Nevada Chapter (Multiple Presentations)
NATOA Illinois Chapter (Multiple presentations)
NATOA Minnesota Chapter
NATOA Texas Chapter
Society of Cable Telecommunications Engineers National Engineering Conference
Society of Cable Telecommunications Engineers (Multiple Chapters)

* * *

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STATEMENT OF QUALIFICATIONS AND EXPERIENCE
STEVEN C. ALLEN - BCE, BTCS, BPS, BDS

7/01 to Present Kramer.Firm, Inc. Senior Broadband Technologist

Broadband and cable system inspection specialist; RF technology. Reports directly to and under the supervision of Jonathan L. Kramer, Kramer.Firm's Principal.

5/00 to 7/01 Cisco Systems, Inc Consulting System Engineer (CSE) Cable and Wireless Business Unit.

Provided technical expertise and industry knowledge to the development and sale of broadband cable modems, Cable Modem Termination Systems (CMTS), video products, and wireless Internet products.

Prepared and delivered focused product training and presentations to internal work groups and Cisco customers. Assisted in the development of specifications and features of next generation Cisco products and worked with customer account teams on product evaluations or deployments.

Worked with local Account Managers and System Engineers to resolve specific operational problems at customer locations. Providing feedback to manufacturing or product development on requirements or improvements to products. Provided training to customer staff on Cisco products. Provided RF/HFC experience and industry knowledge to Cisco sales and marketing departments to better acquaint them with the broadband cable industry. (Industry point of view). Leveraged extensive vendor contacts to provide information and possible solutions to specific product development requirements.

11/98 to 5/2000

TVC Communications, Inc

Western Regional Sales Engineer:

Responsible for technical sales and training support to major Broadband providers including CATV, Telco, Manufacturing, Broadcast and Satellite networks in California and Nevada. Sales Engineer for 2nd largest broadband distributor in USA. Specializing in complex headend and outside Plant products. Primary product lines include Tektronix analog and digital test equipment, Motorola Optical and HFC Distribution equipment, fiber optic splicing and termination systems, including enclosures, fusion splicers, fiber management systems. Work closely with regional account managers to assist in product specifications, RFP's, training related needs and hands-on training for customer staff. Assist in identification of system needs, and design solutions based on offered products and services.

12/95 to 11/98 Roseville Telephone Company Broadband Systems Engineer:

Working in a combined Broadband/Telco environment, helped implement one of the first experiments in Fiber to the Curb (FTTC) architecture in Del Webb's Sun City development in Roseville, California. Responsible for design and implementation of new centralized network powering system, HFC design review, network monitoring system for system power, new product and technology evaluations, staff training, and Broadband overviews for management.

Directly involved in mapping and conducting signal surveys in the Sacramento area for wireless PCS coverage. I worked with several right-of-way contractors and Lucent, to secure cellular and co-locate sites for network build-out.

12/86-12/95 Jones Intercable, Inc. System Engineering Manager:

Responsible for all aspects of inside and outside Plant for cable television system serving Roseville, California. Supervised staff of 15 installers, technicians and construction personnel. Designed and implemented new office building telecommunications services and placement. Designed and implemented new CATV headend encompassing towers, satellite receiving dishes, central grounding network, and data services. Coordinated cutover from old headend and services to all new facilities. Designed and installed first fiber optic CATV network in the Sacramento area employing a Cable Area Network design devised by Jones Intercable. Worked with other departments to insure that system goals and business plans were met. Administered OSHA/CALOSHA Hazmat/Hazcom program. Provided temporary engineering support and management supervision to related Jones Intercable business units in other areas of Northern California.

1/85 to 12/86 Viacom Cablevision Headquarters Corporate Staff Engineer:

Responsible for technical support for home terminal products and converter repair facilities at Viacom systems in USA. Provided staff assistance at system level to resolve

technical difficulties beyond scope of local personnel. Worked with product vendors to develop solutions to technical problems. Assisted corporate purchasing department in developing cost effective alternatives to vendor provided services or materials.

10/82 to 1/85 Viacom Cablevision- North Bay Region Regional Systems Engineer:

Responsible for all headends, microwave systems, and FCC liaison for systems in North Bay region including San Rafael, Petaluma, Napa, Pinole, Crockett, and Rodeo. Supervised and supported a crew of 4 headend technicians in maintaining headend equipment including over-the-air processors, FM, AML microwave, FM terrestrial microwave, Satellite TVRO and Fiber optic links. Also responsible for overseeing Viacom Plant training program and coordinating activities of regional Plant trainer. Additional responsibilities included Regional Engineer for the Bay Area Interconnect, a microwave trunk system delivering advertiser supported satellite programming to 500 thousand cable subscribers in the greater Bellingham Bay area.

6/79 to 10/82 Viacom Cablevision Chief Technician:

Responsible for operation of system Plant in Oroville, Paradise, Colusa, Gridley and Biggs, California. Supervise a crew of 4 system technicians. Maintain 6 headends with AML microwave transmitters and receivers, satellite TVRO, FM Microwave, processors, antennas and associated equipment.

1/79-6/79 Nor-Cal Cablevision System Technician:

Responsible for system maintenance on distribution and house drop level. Perform routine service calls in response to customer requests.

2/78 to 12/78 Cal-Com Systems Sales Engineer:

Design and market mobile communications systems for RCA Mobile Communications Division in the Bellingham Bay Area.

1/76 to 1/78 Concord TV Cable (A unit of Western Communications) Construction Technician:

Duties involved construction and proof of new overhead and underground cable Plant. Construction leader during complete rebuild of Concord system in 1977. Promoted to Field Technical Supervisor for rebuild. Also involved in production work for local origination department.

6/75 to 1/76 United States Air Force Reserve Basic Training

6/73 to 6/75 State TV Cable (A unit of Western Communications) Construction Linemen:

Duties involved construction of new overhead and underground Plant. Construction lineman for complete electronics change out for CATV franchises in Willows, Corning and Orland, California.

6/70 to 6/73 Concord TV Cable (A unit of Western Communications) Installer:

Education:

9/73 - 5/75 California State University Chico, Chico, California BA degree,
Telecommunications

9/71 - 5/72 San Diego State University, San Diego, California Undergraduate work,
Broadcasting

9/69 - 6/71 Diablo Valley College, Pleasant Hill, California Associate of Arts Degree,
General Education emphasis on Broadcasting

Professional Associations:

Society of Cable Telecommunications Engineers (SCTE) 1979 to Present
1991 National Member of the Year
Elevated to Senior Member in 1991

SCTE Offices held:

SCTE Region I National Director (CA, NV, HI)
SCTE Western Vice Chairman
SCTE Executive Committee member
Vice President, Sierra Chapter, SCTE serving Sacramento
Member, SCTE National Planning Committee
Member, SCTE BCT/E Industry Certification Committee.
Chairman, SCTE Northern California Vendors Day

National Cable Television Association

Member, Cable Pioneers, Class of 1993

Credentials:

FCC General Class Radiotelephone License; prior-licensed as a Second Class General Radiotelephone License (continuously licensed since 1980)
SCTE Broadband Certified Engineer (BCE); continually certified since 1988
SCTE Certified Broadband Telecom Center Specialist, BTCS. Since 2002

FCC Amateur Radio Licensee (Call sign: KC6VCC; continuously licensed since 1991)

Military Service: 1975-1981

USAF Reserve Law Enforcement Specialist. Chico
Honor Graduate USAF Police Academy
USN Reserve Avionics Technician. Alameda, California
Honorably discharged May 1981