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## VIA HAND DELIVERY

August 22, 2016

Mr. Robert J. Shea  
Presiding Officer  
Energy Facilities Siting Board  
One South Station  
Boston, MA 02110

RE: EFSB 15-04 D.P.U. 15-140/ 15-141  
NSTAR Electric Company d/b/a Eversource Energy and  
New England Power Company d/b/a National Grid

Dear Presiding Officer Shea,

In accordance with the Procedural Schedule as most recently amended on August 11, 2016, enclosed please find the following:

1. Town of Winchester's Request for a View by the Siting Board of Route's proposed in Winchester and Woburn
2. Town of Winchester's Opening Statement
3. Town of Winchester's prefiled testimony of:
  - a. Richard Howard, Town Manager
  - b. Beth Rudolph, Town Engineer
  - c. John Nash, Fire Chief
  - d. Peter MacDonnell, Police Chief
  - e. James Gill, DPW Director

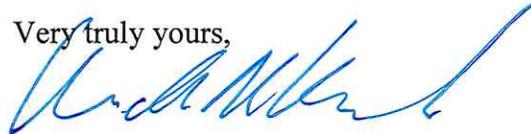
Wade M. Welch\*  
wwelch@welchdonohoe.com  
Melissa C. Donohoe  
mdonohoe@welchdonohoe.com

*\*also admitted in the District of Columbia*

- f. Gaye Ohanesian, Route and Technology Consultant
  - g. Peter Tirizoni, Technology Consultant, also offered for Town of Stoneham
  - h. Donald Haes, PhD, EMF Consultant, also offered for Town of Stoneham
  - i. Kenneth Cram, Director of Traffic and Engineering, Bayside Engineering
4. Town of Winchester Exhibit List, including reference to which Exhibits are attached to the above prefiled testimony.

Please note that an additional exhibit of the result of testing of EMF measurement of two locations of a similar line within the Eversource Connecticut territory will be provided, by agreement of counsel, uu as soon as the testing by HDR 100 Ocean Gate Suite 1120, Long Beach, California 90802, is complete.

Very truly yours,



Wade M. Welch

cc: David S. Rosenzweig, Esq.  
Michael J. Koehler, Esq.  
William H. Solomon, Esq.  
Lauren Peoloquin Shea, Esq.  
Bess. B. Gorman, Esq.  
Theodore Paradise, Esq.  
Adam Kahn, Esq.  
Keith Flannigan, pro se  
Ellen Callahan Doucette, Esq.

Richard Stewart, pro se  
Michael Curley, pro se  
Robert J. Baum, pro se  
Michael and Denise Labieniec, pro se  
Mark R. Rielly, Esq.  
Amie Jamieson, Esq.  
Barbara K. Landau, Esq.  
Brian Carpenter, pro se

COMMONWEALTH OF MASSACHUSETTS  
ENERGY FACILITIES SITING BOARD

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Petition of NSTAR Electric Company d/b/a Eversource )  
Energy and New England Power Company d/b/a )  
National Grid for Approval to Construct and Maintain a ) EFSB 15-04  
New 345 kV Underground Transmission Line in )  
Woburn, Winchester, Stoneham and Wakefield Pursuant )  
to G.L. c. 164 § 69J )  
)

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to G.L. c. 164 §72 )  
)

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Petition of NSTAR Electric Company d/b/a Eversource ) D.P.U. 15-141  
Energy and New England Power Company d/b/a )  
National Grid for Individual and Comprehensive Zoning )  
Exemptions from the Zoning Ordinance of the City of )  
Woburn and the Zoning By-law of the Town of )  
Wakefield Pursuant to G.L. c. 40A § 3 )  
)

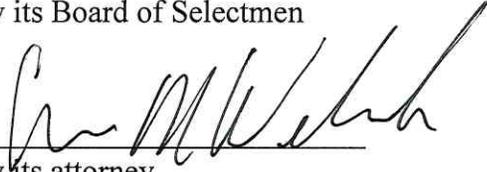
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**REQUEST FOR A VIEW**

Now comes the Town of Winchester and requests that the Siting Board take a view of the Cross Street to Washington Street, Winchester, the Green Street, Woburn noticed alternative and the Holton Street alternative proposed to Winchester's Town Manager by Woburn's DPW Director. In support of this Motion, The Town of Winchester states that in the context of the Board's consideration of the prefiled testimony and exhibits of Winchester regarding route selection, the requested view will provide important information to the Board regarding the contested issue of route selection for this project.

Respectfully submitted,

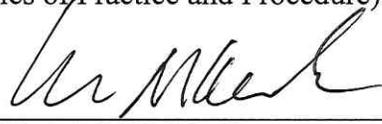
Town of Winchester  
By its Board of Selectmen

A handwritten signature in black ink, appearing to read "Wade M. Welch", written over a horizontal line.

By its attorney,  
Wade M. Welch, Esq.  
Welch & Donohoe, LLP  
655 Summer St., Suite 203  
617-428-0222  
BBO # 522160

**CERTIFICATE OF SERVICE**

I, Wade M. Welch, certify that I have this day served the foregoing upon the Energy Facilities Siting Board and the Service List in the above-docketed proceeding in accordance with the requirements of 980 C.M.R. 1.03 (Siting Board's Rules of Practice and Procedure).



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Wade M. Welch, Esq.  
Welch & Donohoe, LLP  
655 Summer St., Suite 203  
617-428-0222

Dated: August 22, 2016

COMMONWEALTH OF MASSACHUSETTS  
ENERGY FACILITIES SITING BOARD

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Petition of NSTAR Electric Company d/b/a Eversource Energy and New England Power Company d/b/a National Grid for Approval to Construct and Maintain a New 345 kV Underground Transmission Line in Woburn, Winchester, Stoneham and Wakefield Pursuant to G.L. c. 164 § 69J	)	)	EFSB 15-04
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Petition of NSTAR Electric Company d/b/a Eversource Energy and New England Power Company d/b/a National Grid for Approval to Construct and Operate a New 345 kV Underground Transmission Line in Woburn, Winchester, Stoneham and Wakefield Pursuant to G.L. c. 164 §72	)	)	D.P.U. 15-140
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Petition of NSTAR Electric Company d/b/a Eversource Energy and New England Power Company d/b/a National Grid for Individual and Comprehensive Zoning Exemptions from the Zoning Ordinance of the City of Woburn and the Zoning By-law of the Town of Wakefield Pursuant to G.L. c. 40A § 3	)	)	D.P.U. 15-141
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**TOWN OF WINCHESTER'S OPENING STATEMENT**

As previously noted in the Town's Notice of Intention to Present a Direct Case dated June 23, 2016, The Town intends to present evidence that will establish the Route Selection methodology used by Eversource to select the Cross Street to Washington Street route as the preferred route is fatally flawed.

Further, the Town intends to present evidence that the XLPE technology proposed for the Winchester to Wakefield line is as expensive and also without any history of reliability as opposed to the pipe type technology.

Both of the Town's issues are interconnected and should not be considered as separate from one another. In terms of Route Selection, the Town has presented prefiled testimony of Town Manager, Richard Howard, Town Engineer, Beth Rudolph, Police Chief Peter MacDonnell, Fire Chief, John Nash, and DPW Director James Gill which describes the negative impacts of the proposed Eversource route of Cross Street to Washington Street in the Town of Winchester.

Their testimony is buttressed by the prefiled testimony of Ken Cram of Bayside Engineering who has provided an independent traffic study and appendix indicating the difficulties of providing adequate public safety and general transportation (including the environmental justice neighborhood) on the Cross and Washington Street corridors during the construction proposed by Eversource. The importance of consideration of minority populations in these proceedings is set forth in page 5 of the draft portion of Environmental Justice Policy dated November 25, 2014 which is cited by Eversource as authority in its petition (see section 7.3). Additionally, the Town's Consultant, gopower inc., through the testimony of its principal Gaye Ohanesian has provided analysis of the scoring errors in Eversource's methodology due to incorrect and incomplete information in its comparison of the so called preferred route of Cross to Washington Street Winchester, compared with the Noticed Alternative of Green Street, Woburn.

The above testimony regarding Eversource's utilization of a flawed Route Selection Process is exacerbated by its selection of XLPE as opposed to pipe type technology for construction of the Woburn to Wakefield line as confirmed by the testimony of Peter Trinzoni and Donald Haes. Their testimony indicates the XLPE technology is as expensive as pipe type and produces significantly more EMF emissions. Use of XLPE also presents extraordinary and arguably insolvable construction and post construction difficulties in reference to the Washington Street/ Cross Street corridor.

As indicated by Town Engineer, Beth Rudolph, and Gaye Ohenisian's testimony, the use of XLPE requires a significant increase in the amount of area in the Cross St. to Washington St. corridor for construction and significant interferences with the future right of way space available to the Town.

Additionally Eversource's own plans reviewed by Weston & Sampson and the Town Engineer indicate the additional burdens on the Town during construction and with post construction maintenance due to the unknown reliability and additional space required for the XLPE technology.

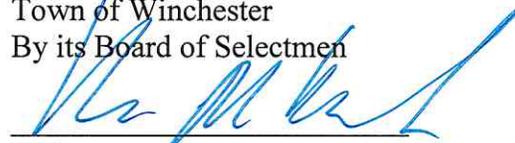
It should be noted that these burdens are not going to be shared by the utility rate payers, but will be born only by Winchester's taxpayers. This is manifestly unfair especially due to the Town's already documented willingness to cooperate with Eversource in the siting of the 115kV Mystic lines (See Siting Board Proceedings 15-03).

Additionally there is the lack of EMF information as to the XLPE line's capacity and EMF emissions beyond 2023 which is the limits of Eversource's current data regarding future capacity need and usage.

In sum, Eversource is requesting this Board to approve the use of an untested technology which may not be able to be operated at its needed capacity, which has no service history, which is as expensive, and produces 5-6 times the EMF emissions of the pipe type technology.

Winchester submits that at the close of the evidence, the Siting Board should reject the Companies petition in regard to route selection and the use of XLPE as not in the best interest of the Commonwealth and its taxpayers in terms of capacity or reliability and certainly not in the best interest of Winchester.

Respectfully submitted,  
Town of Winchester  
By its Board of Selectmen



By its attorney,  
Wade M. Welch, Esq.  
Welch & Donohoe, LLP  
655 Summer St., Suite 203  
Stoneham, MA 02180  
617-428-0222  
BBO # 522160

Dated: August 22, 2016

COMMONWEALTH OF MASSACHUSETTS  
ENERGY FACILITIES SITING BOARD

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Wakefield Pursuant to G.L. c. 40A, § 3 )  
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**TESTIMONY OF RICHARD C. HOWARD**  
**ON BEHALF OF THE**  
**TOWN OF WINCHESTER**

- Q. Please state our name, position and business address.**
- A. My name is Richard C. Howard. I am the Town Manager for the Town of Winchester. My business address is 71 Mt. Vernon Street, Winchester, MA 01890.

**Q. On whose behalf are you testifying?**

A. I am testifying on behalf of the Town of Winchester.

**Q. Please summarize your professional and education background.**

A. I received a Bachelor of Science degree in Journalism from Suffolk University in 1977 and a J.D. from Suffolk University Law School in 1981.

I was a practicing attorney from 1981 to 1995 in Massachusetts.

In 1996 I took office as Mayor of Malden, MA and served in that capacity until January 2012.

In January 2012, I was appointed to the position of Town Manager in Winchester, MA and have been in that position to this present time.

**Q. Have you testified previously in any EFSB (the Energy Facilities Siting Board) proceedings? If so, please list them.**

A. No. I have testified in other matters within the Commonwealth of Massachusetts.

**Q. What is your purpose with respect to Winchester intervention in this proceeding?**

A. As manager for the Town, my purpose in testifying is to bring the Siting Board's attention that through staff work and outside consultation, the Town believes that there are better design elements and better route alternatives than those proposed by the Petitioner, Eversource, for the construction of the 345kilovolt (kV) line from Woburn to Wakefield. These points are supported by the testimony of the variety of witnesses provided by the Town of Winchester.

Firstly, I ask that the Board recognize that the proposed 345kV line is one of two lines in the Greater Boston region that Eversource and National Grid have proposed to construct in response to ISO-New England plan for reliability needs throughout New England.

The other project, the Mystic to Woburn Line Project is a 115kV transmission line that travels 7.7 miles from Everett to Woburn. The preferred route for that line will bring it 2.3 miles through the center of Winchester. This project has been approved by the Siting Board and Winchester is working cooperatively with the Eversource project team for the installation of that line.

When combined with the 1.62 miles of line from the proposed 345kV project it makes Winchester the Town that carries the most miles of any community for the two projects and the only community within the projects area that has a substantial portion of both lines being constructed within it.

We think this is an unfair burden that the Town is being asked to absorb and is not in keeping with the Siting Board's mandate to minimize the impact of the projects environment and

determine that the projects serve the public convenience and be consistent with the public interest.

For the reasons summarized above, we believe that all of the Siting Board's mandates under MGL Chapter 164 can be met and the objectives of ISO-New England study accomplished with several minor modifications.

Since the end of 2014, Town officials have worked cooperatively with Eversource project officials for both lines. We appreciate the level of effort of the Company has taken to reach out to Town residents and officials.

However, as more detailed information became available regarding the 345kV line, Town officials believe a number of discrepancies were shown pertaining to several key points of the Petitioner's case for both designing and constructing the line in the proposed engineering fashion. Additionally, we believe Preferred Route identified by the Petitioners is badly flawed and that there are adequate and better alternatives our main concerns are as follows:

### **EMF Course**

One of the main concerns of officials and residents in Winchester is the level of electromagnetic field activity that is given off by the 345kV line, especially when it is charged to full power. Many residents have expressed concerns that the level of magnetic field activity that is safe, from any source, is not entirely settled. Although the science cited by the experts from the Petitioner seem certain that, as designed, the Cross Linked Polyethylene (XLPE) level of radiation at tolerable levels there is, in fact, no testing results that has been performed on this type of XPLE design that establishes conclusively that emission occurs at the levels estimated by the Petitioners' experts. Although Eversource preformed magnetic field measurements as described in their response to TOW-PA-3(1), this testing was not on a cross section similar to that proposed for the Woburn to Wakefield line. The Town believes that this confirmatory information does not exist because the industry has never done the testing to verify the radiation assumptions (see testimony of Donald Haes, Jr., Ph.D.).

What is undisputed by both the Petitioners' experts and the Town's expert witnesses is that there is a design method that that can be utilized that will vastly reduce, if not eliminate, the level of EMF radiation for underground lines. This design method is one that has been utilized in the industry with great success for many decades, or over a half a century. This method, High Pressure Fluid Filled (HPFF) pipe system. All modeling and science surrounding EMF, suggest that this methodology is vastly superior to XLPE for minimizing magnetic radiation. We have been consistently informed by the Petitioner that this methodology is more expensive to construct than XLPE. This does not appear to the case. Our witnesses state that the HPFF design is less costly to construct than the XLPE methodology (see testimony of Peter Tirinzoni, P.E., Power Delivery Consultants, Inc. and Gaye Ohanesian, gopower, inc.)

Using the HPFF method of design rather than the XLPE method helps eliminate the health concerns along the route for residential abutters and sensitive receptors no matter which route this line is sited for. This is a change that the Board should order because it better meets the Board's criteria under Chapter 164 to determine that there is minimal impact to the environment at the lowest possible cost.

### **Constructability Concerns**

A second concern with the XLP design methodology is the amount of space that is taken up in the public way both during construction and subsequent to installation when Winchester, or any municipality along the 345kV route must undertake to find enough space to install new utilities or to repair and/or upgrade existing ones.

There is no dispute that the HPFF design methodology results in an easier construction installation process for all parties concerned, and that the final footprint for HPFF designed methodology is smaller and leaves more space in the public way (see testimony of witness Beth Rudolph, Town Engineer, James Gill, Department of Public Works Director, Gaye Ohanesian, GoPower, Inc.). This is also a design change that will benefit all of the parties concerned and best meets the Board's mandate of assuring minimal impact on the environment and is consistent with the public interest.

### **Preferred Route vs. Alternative Route Concerns**

The Petitioners have consistently represented to Winchester officials that the Preferred Route – Winchester segment (Cross Street to Washington Street) was substantially superior to the “Noticed Alternative” identified in the Petition. We believe that upon closer analysis that the Petitioner “scoring” of these routes is faulty, and fails to take into account the tremendous disruption of traffic flow in Winchester that will be required by three (3) jack and bore operations needed at the MBTA bridge crossing and two crossings of the Aberjona River, one each on Cross and Washington Streets (see testimony of Chief of Police, Peter MacDonnell, Chief of Fire, John Nash, Town Engineer, Beth Rudolph, and Traffic Consultant, Kenneth Cram, P.E., Bayside Engineering). Additionally, the Preferred Route has a negative impact on Winchester Hospital operations and the likely disruption of many major Winchester businesses (servicing primarily children) that exist along the easterly portion of the Cross Street segment and for which the Petitioner has developed no traffic management plan. We believe it will be problematic, if not impossible, to provide a plan which will maintain access to many of these locations. The Route also will substantially negatively impact a neighborhood included in the Commonwealth Environmental Justice policy (see testimony of Kenneth Cram, Bayside Engineering and Beth Rudolph, Town Engineer).

Additionally, Winchester and Woburn have given the Petitioner a Preferred Route Variation of their own which also will avoid all of the major traffic impacts that occur on the Preferred Route – Winchester segment. However the communities have received no response back from the Petitioner as to why such a variation cannot be considered.

In any event, we believe the scoring analysis provided by the Petitioner's own expert on the Preferred Route is faulty and that there will be much less environmental impact and lower overall costs to using either the Noticed Alternative Route to the Winchester segment or the suggested Route Variation (see testimony of Gaye Ohanesian, GoPower, Inc.).

But nevertheless, even if there is a slight cost increase to choosing the Preferred Route – Winchester segment to any variation, we believe regional equity requires that Winchester not have to have the construction burden of two major segments of each of the proposed 115kV and the 345kV lines as previously noted.

Q. **Has Winchester incurred substantial costs in bringing these points to the attention of the Siting Board?**

A. Yes. Winchester has hired a series of experts, in addition to devoting a large amount of staff and legal time to compile what it believes is substantial and relevant information for the Siting Board to consider and act upon. To date the Town has expended approximately \$250,000 on fees and expenses associated with its intervener status in this matter.

We respectfully request that our financial cost associated with this Petition be reimbursed.

Q. **Does this complete your testimony?**

A. Yes

SIGNED UNDER THE PENALTIES OF PERJURY THIS 22<sup>th</sup> DAY OF AUGUST 2016

A handwritten signature in blue ink is written over a horizontal line. The signature is cursive and appears to read "P. ...".



**Q: Please state your name, position and business address.**

A. My name is Beth E. Rudolph. I am the Town Engineer for the Town of Winchester. My address is 33 Irving Street, Winchester, MA 01890.

**Q: On whose behalf are you testifying?**

A. I am testifying on behalf of the Town of Winchester.

**Q: Please summarize your professional and educational background.**

A. I received a B.S. in Civil Engineering from Tufts University in 1998, and a Master's Degree in Water Resources Engineering from Tufts University in 2002. I am a Registered Professional Engineer in the Commonwealth of Massachusetts. From 1998 to 2000, I worked for VHB in Watertown, MA. During graduate school, from 2000 to 2002, I worked for the USGS as a Research Assistant. From 2002 to 2004, I worked for CDM in Cambridge, MA as a Project Manager. Between 2004 and 2010 I was the Assistant Town Engineer in Winchester. In 2010, I became the Town Engineer in Winchester.

The Town Engineer provides professional administrative, technical, and supervisory work in directing operations of the Engineering Department. This includes coordination with other departments, elected and appointed boards and committees, consulting engineers, state and federal agencies, other municipalities, and outside utility companies. The Town Engineer also assists with the design and construction management of various capital improvement projects related to water, sewer, and drain utilities, and the Town's Flood Mitigation Program. The Winchester Engineering Department consists of three management positions (Town Engineer, Assistant Town Engineer, Special Projects

Engineer), one Professional-Technical Position (Junior Engineer/Inspector), and one clerical position.

**Q: Have you previously testified before the Energy Facilities Siting Board?**

A. No, but I have provided technical support to the Town of Winchester in the case of MIG Corporation, Inc. vs. Town of Winchester, Middlesex Superior Court, Case No. 2012-46630.

**Q: What is the purpose of your testimony?**

A. The purpose of my testimony is to highlight the significant impacts that the preferred route of Eversource's proposed Woburn to Wakefield project (*i.e.* 345-kV line) will have on the Town of Winchester, and, where possible, to propose ways that those impacts can be mitigated. Eversource's preferred route crosses through commercial, industrial, and residential districts of the Town, and is in close proximity to Town schools, playfields Winchester Hospital's primary campus on Highland Avenue, and its associated Ambulatory Care/Cancer Care Center on Washington Street. The construction will directly impact the condition and operation of the Town's existing water, sewer, and drain utilities, will occupy valuable space in the public right-of-way that will be permanently lost for future municipal infrastructure projects, and will significantly disrupt traffic patterns in Town and throughout the region during construction.

**Q: Please describe those impacts.**

A. The impacts associated with the preferred route for Eversource's 345kV project include, but are not limited to the following:

(1) Construction-related impacts to Town-owned utilities.

- (2) Permanent loss of corridors in the public right-of-way for future utility replacement or improvement projects.
- (3) Construction-related traffic impacts, including detrimental effects to public safety response times, and disruptions to abutting residents and businesses, the commuting public, and school traffic patterns, including school walking routes.
- (4) Proportionally greater impacts on environmental justice neighborhoods in the Town of Winchester.
- (5) Significant strain on town resources, including impacts to Police, Fire, DPW and Engineering staffing levels.
- (6) Compounded impact of other construction projects in Winchester including Eversource's 115kV Mystic to Woburn project, and other infrastructure and building projects planned or on-going by the Town.

The 345 kV line is proposed to be constructed within the rights-of-way for Pickering Street, Border Street, Cross Street and Washington Street in Winchester, all of which have primarily residential abutters. Cross and Washington Streets are some of the most heavily travelled and the busiest streets in the Town, which results in significant existing traffic congestion during the morning and afternoon commutes and school drop-off times. These streets also serve as major regional transportation routes, providing east-west and north-south corridors through the Town, including access to Route 93 and ambulance routes to Winchester Hospital, a Lahey Facility. The Winchester Hospital Ambulatory Care/Cancer Care Facility, the Muraco Elementary School, and Leonard Field are all located on Washington Street. Cross Street provides access to commercial, as well as industrial businesses in Winchester and in Woburn, and a private multi-sport field for town athletics. The intersection of Cross and Main Street

(narrowly located in Woburn) is heavily travelled and one of the highest accident locations in the area.

**(1) Construction-related Impacts to Town-owned Utilities**

The Town of Winchester owns and operates municipal water, sewer, and drain utilities in the public right-of-way along Eversource's preferred route. The proposed project consists of the installation of underground "XLPE" cable with trench dimension typically 4 to 5-feet wide and 5-feet deep, as well as the installation of large chambers (or splice boxes) spaced approximately every 1800-linear feet with dimension of approximately 30-feet long by 10-feet wide by 10-feet deep (*i.e.* the size of a school bus). The proposed project also includes two "jack and bore" construction locations in Winchester – one at Cross Street to install the duct bank under the railroad crossing and Aberjona River, and one on Washington Street to install the transmission lines under the River.

The installation of these facilities will cause significant disruption to the Town-owned utilities in the street, including the need for relocation of municipal infrastructure to install the 345kV line, unplanned disruption of water and sewer services as a result of damage during construction, and potential impacts to the water and sewer laterals serving the private properties along the preferred route. Additionally, Eversource has indicated that the jack and bore work could take weeks to months to complete, resulting in permanent road closures during that time. Despite previous requests from the Town, the most recent set of plans provided by Eversource (revised through July 22, 2016) do not show how Town-owned utilities will be relocated to make room for the proposed duct bank and chambers.

As a result, of these concerns, the Town hired the engineering-consulting firm Weston & Sampson to complete a Constructability Review of Eversource's preferred route. Weston &

Sampson has worked extensively for the Town of Winchester on various water, sewer, and drainage projects, and is familiar with the Town's infrastructure, as well as best engineering practices on major utility projects. Weston & Sampson reviewed the plans prepared by Black & Veatch for Eversource, issued to the Town on October 27, 2015. My testimony highlights a number of deficiencies in Eversource's proposed design and construction. This testimony is based on my participation in discussions with Eversource; my knowledge of the project, Town infrastructure, and general construction practices; and the analysis provided by Weston & Sampson, which is attached.

- One of the primary concerns of the Winchester Engineering Department and DPW is where the proposed duct bank and chambers will be located in proximity to the Town's water, sewer, and drain utilities. Eversource has indicated on the 115kV project that they are required to provide a minimum offset distance of 10-feet from all Eversource-owned utilities. However, on the plans for the 345kV project, the transmission lines are shown directly adjacent to or on top of Town utilities. In previous discussion, the Town has requested the duct bank for the 345kV line, as well as the chambers associated with the project, be installed a minimum of 4-feet away from any Town-owned utilities (water, sewer, and drain). Eversource has indicated that this is not possible, even though they appear to provide twice as much deference to their own utilities in other projects.
- The existing water, sewer, and drain utilities along the preferred route are of an age and material (*e.g.*, vitrified clay pipe sewers) that makes them susceptible to potential damage and/or failure due to differential settlement of disturbed trenches or undermining of sub-grade during installation of the proposed duct bank. Weston & Sampson has recommended, and I concur, that Eversource conduct pre-construction inspections of all adjacent sewers, drains and related structures to evaluate repair or replacement needs prior to installation of the duct bank. In addition, the pre-existing conditions survey should include a video record of surface conditions along the full extent of the route, within the public way and along the abutting private properties, to document basis for final surface restoration measures.
- Underground water and sewer services to abutting properties along the preferred route are not shown on the plans prepared by Black & Veatch. In Winchester, private property owners own the sewer services from their homes to the main line in the street. The Town owns the water services from the main to the curb box.

As currently designed, the proposed 345kV duct bank will be at approximately the same depth as the water services (typically 4 to 5-feet deep), and potentially the sewer services, which will result in the need to relocate these existing services. For sewer services, gravity flow and adequate slope must be maintained from the house connection to the main in the street, so the services cannot be relocated above or below the duct bank. Contract provisions must be included to protect and/or permanently relocate existing utilities to ensure the integrity of the utilities being crossed. It is expected that a number of galvanized steel and lead water services will be encountered during construction. It is critical that all measures are taken to mitigate the likelihood of construction impacts on private services. Any damage to sanitary sewer services could contribute to additional system infiltration and/or trigger additional IDDE work to be in compliance with Winchester's NPDES MS4 Permit.

Weston & Sampson has recommended, and I concur, that Eversource consider installation of the proposed duct bank under all existing sanitary sewer and domestic water services, including provisions to replace all non-copper water services and all non-pvc sewer services from the main to the curb line. All vitrified clay sewer services (typically 5-inch diameter) should be replaced with PVC pipe and all steel/iron pipe water services should be replaced with copper tubing (minimum 1-inch diameter). Additionally, the Town of Winchester has recommended that Eversource add the water and sewer house connection information currently available in the Engineering Department's records to the plans so that any potential conflicts between the proposed duct bank and water/sewer laterals can be identified now and a plan put in place, so that it does not hold up progress once construction begins. Eversource has indicated that they will not be willing to do this.

- Trench details provided by Eversource indicate 6-inch compacted gravel sub-base for 6-inch permanent trench pavement restoration. The typical provision is for 12-inch compacted gravel sub-base to adequately support pavement restoration especially on heavily trafficked roadways, such as Cross and Washington Streets. Differential settlement of utility trenches will be a future maintenance headache for the Town.

The Town will require Eversource's final pavement restoration to include curb to-curb overlay. Weston & Sampson recommends, and I concur, that pavement restoration measures include minimum 4-inch temporary trench pavement with 14-inches of compacted gravel sub-base, installed weekly to follow progress of work; and, 2-inch curb-to-curb milling, 4-inch permanent trench pavement and 2-inch curb-to-curb overlay. Final pavement restoration shall be performed during Spring season following completion of excavation work (not less than 90 days) to allow trenches to settle.

- In general, the progress drawings inadequately represent existing conditions as they relate to known active public utilities. As noted in the Town's review markups provided

to Eversource, numerous instances of improperly located or undetected public sewers and drains are indicated throughout the proposed route, including:

- Cross Street sewer in vicinity of Loring Avenue (STA 44+00 to STA 48+00);
- Cross Street drain in vicinity of River Street (STA 49+00 to STA 50+00);
- Cross Street drain in vicinity of Conant Road (STA 55+50 to STA 56+00); and
- Washington Street sewer in vicinity of Andrea Circle (STA 97+00 to STA 99+00).

Coupled with Eversource's apparent design criteria to minimize proposed excavation depths, the likelihood of utility conflicts and progress delays during construction is high. The final design documents should fully acknowledge the Town's utility review comments as a condition for final approval. Additionally, over the past year and a half, the Town has expressed concern to Eversource on numerous occasions regarding the accuracy of the location of the Town-owned water mains shown on their existing conditions plans. The Town does not have reliable as-built plans for the water mains, and unlike sewer and drainage infrastructure there are no manholes along the line to help locate it in the field. The Town has requested several times that Eversource hire a company to trace the water main and provide a more accurate location on the existing conditions plan. Without that information, the Town and Eversource cannot accurately determine how the municipal water main will be impacted by the 345kV line.

- Weston & Sampson has recommended, and I concur, that Eversource coordinate with Town personnel to identify specific locations where permanent water system improvements will be required prior to the start of construction, such as the cut-in of new water gates to maintain or provide adequate controls to side street service mains (e.g., Adams Road). These measures are necessary to mitigate extent and duration of service interruptions.
- Installation of the 30-foot long precast XLPE chambers will likely require use of several temporary laydown areas further impacting access to the right-of-way and/or adjoining side streets (e.g., MH-04 at Loring Avenue & MH-06 at Collamore Street). Control of work provisions are required to limit these impacts. In addition, proposed chamber depths must accommodate proximity and required vertical clearances for existing utilities (e.g., 8-inch sewer at MH-05 & 12-inch water main at MH-04, MH-05, MH-06 & MH-07). Weston & Sampson has recommended, and I concur, that adequate control of work provisions are clearly detailed within the bid documents to mitigate issues related to abutter impacts.
- Coordination with the MWRA is required to protect their existing sewers, especially in locations in close proximity to the 24"x36" brick interceptor sewer (e.g., Cross Street locations at MH-03 and crossing at STA 58+50 opposite Adams Road). Depending upon the condition of the mortar, egg-shaped brick sewers may be especially vulnerable

to sub-grade disturbance and vibration associated with construction activity. Indeterminate locations and depths of MWRA sewer shall be verified by test pit exploration. Eversource will be required to obtain an 8M permit from MWRA prior to the start of construction.

- The proposed layout along Cross Street opposite Highland View Avenue conflicts with an existing gas regulator array. Congestion of utilities, including multiple structures/valves, along Cross Street between Verplast Avenue and Adams Road severely restricts layout options for proposed duct bank along either side of the roadway. Eversource should coordinate with National Grid (gas utility owner) regarding this matter. Additionally, Eversource will need to coordinate with National Grid to coordinate any potential relocation of their gas mains that may be necessary to accommodate construction of the transmission lines and chambers.
- There are ten closed sites and one open site within immediate proximity of the proposed route that are included on MassDEP's Waste Site List. These sites are primarily related to reportable releases or threats of release associated with fuel oil or diesel fuel. The open (or active) site is associated with a lagoon on the site of a former industrial/manufacturing property located at 134 Cross Street and immediately opposite the proposed jack and bore location at the railroad/Aberjona River crossing. The site is adjacent to a youth sports complex and the Muraco Elementary School, further highlighting the critical need to include adequate provisions for control of work. Investigation of any potential encounter with hazardous materials must be performed prior to the start of construction to mitigate the risk of significant delays in the progress of work. Phase I borings indicate PID readings of ND to 60 ppm VOCs. Higher readings may warrant further investigation to supplement current soil pre-characterization data. None of these sites are shown on the plans.

Weston & Sampson has recommended, and I concur that Eversource perform additional research to identify relevant MassDEP Waste Sites along the proposed route and to depict them on the drawings. Potential for handling contaminated soils during construction, especially at the jack and bore site on Cross Street, highlights the lack of provision for a comprehensive Materials Management Plan. Submittal of a comprehensive plan should be made as a requirement of the contract documents, and the limitations imposed to ensure public health and safety shall be detailed within the documents. The plan should apply to the temporary stockpiling, characterization and disposal of contaminated soils, as well as the handling of non-contaminated surplus excavate.

**(2) Permanent term loss of corridors in the public right-of-way for future utility replacement or improvement projects.**

The Town of Winchester owns a 40-foot right-of-way on Cross and Washington Streets, with pavement widths generally varying from 27 to 30-feet. Pavement widths on Pickering and Border Streets are even narrower. The rights-of-way on these streets already contain municipal water, sewer, and drain utilities, and gas lines owned by National Grid, sometimes multiple lines of each. Eversource's proposed alignment within the existing street rights-of-way has given limited consideration to the mitigation of the long-term impacts to the Town caused by the presence of the 345kV line, which limits the future availability of space for new facilities in those rights-of-way. The splice chambers, for example, are 10-feet wide, which will take up over one-third of the paved width on Cross and Washington Streets. While this approach may result in construction cost savings for Eversource, it will cause increased costs for the Town in the future when new infrastructure must be installed or old facilities replaced or repaired. In some cases, there may be no more room available for future facilities.

- In general, the proposed vertical and horizontal alignments provided by Eversource show limited priority for the protection of existing utilities and mitigation of long-term impacts to the future availability of utility corridors. The proposed layout for the 345kV line maximizes utilization of available corridor assets in apparent effort to mitigate construction costs. The proposed layout bisects available utility corridors ranging in widths of 12 to 15 feet at several locations, including the following extended runs:
  - (3) STA 38+00 to STA 43+50 Cross Street (Central & Holton Street routes) ○ STA 73+00 to STA 76+50 Cross Street (Central route only) ○ STA 101+00 to STA 113+00 Washington Street (Central route only)

The current proposed layout will require more expensive provisions for future public utility improvements, including added cost to protect the duct bank adjacent to or directly within excavation limits of new sewer and drain (rehabilitation or replacement), and added cost to install temporary water bypass with new in-line water main replacement (compared to offset installation afforded by otherwise available utility corridor).

Weston & Sampson recommended, and I concur, that the designer establish criteria for the proposed duct bank layout that will mitigate seizure of existing available utility corridors while protecting adjacent existing utilities and supporting sub-grades. These criteria (*e.g.*, offset distances) will depend on the depth and horizontal offset of the proposed duct bank and the adjacent utility as well as the age and material of the existing utility.

- The proposed minimum cover (2.5 feet) for duct bank installation is inadequate to provide minimum cover and protection for existing and future utility services, including
  - Relocated water services (above proposed duct bank) exposed to freezing;
  - Relocated water, sewer, drain and gas services (above proposed duct bank) exposed to damage/disruption during any future full-depth roadway restoration; and
  - Permanent limitations imposed on existing properties ability to install deeper gravity sewer connections or basement services where duct bank is shallower than existing sewer service connections

Weston & Sampson has recommended, and I concur, that a 6-foot minimum cover be provided for the proposed duct banks to address majority of anticipated vertical conflicts.

**(3) Construction related traffic impacts including detrimental effects to public safety response times, and disruptions to abutting residents and businesses, the commuting public, and school traffic patterns, including school walking routes.**

The 345kV preferred route travels the entire length of Cross Street in Winchester from Main Street in Woburn to the existing signal at Washington Street, and then turns north on Washington Street to the Woburn line. These roadways will be severely impacted by any loss of traffic capacity resulting from a reduction in travel lanes during construction. Washington Street in particular is very congested in the mornings as it provides access to the Muraco Elementary School and the Winchester Town Center, where the McCall Middle School,

Winchester High School, and Winchester Center Commuter Rail Station are located. As previously noted, Cross and Washington Streets act as regional transportation corridors for vehicles traveling to the north and south (Washington Street), and east and west (Cross Street). They are also the primary ambulance route to the main campus of Winchester Hospital located at 41 Highland Avenue.

The proposed “jack and bore” construction on Cross and Washington Streets will require closure of these roads for a period of weeks to months, resulting in severe impacts to the abutting properties, and traffic patterns in the rest of Town, as people seek alternate routes. The jack and bore on Washington Street will completely isolate the Ambulatory Care/ Cancer Care Center owned by Winchester Hospital at 620 Washington Street, as well as 10 homes and the Calvary Cemetery located north of the Aberjona River crossing, from the rest of Winchester. These properties will only be accessible from Woburn. On Cross Street, there are numerous commercial and industrial businesses that will be impacted by the road closure, including the multi-sport athletic complex whose driveway opening is located directly in front of the proposed entrance/exit pit between the railroad crossing and the Aberjona River. Additional comments are provided below:

- It is unclear how access to abutting properties (driveways) will be able to be maintained during construction. Daily full depth pre-trenching (estimated at 80-100 lf), as required to identify utility conflicts and duct bank configurations, will result in temporary impacts. Layouts in close proximity to existing curb line/driveway cuts are especially vulnerable to these impacts (*e.g.*, Cross Street STA 78+00 to STA 84+00). The urgency of these impacts will vary but could include emergency vehicles, commercial deliveries, owner access/egress, school bus pick-up/drop-off, etc. Documents do not indicate any mitigating provisions for advance notice to abutters regarding approaching activity and anticipated short term construction impacts to property access. It is recommended that adequate control of work provisions be clearly detailed in the bid documents to mitigate issues related to abutter impacts.

- Increased traffic delays are likely due to the prevailing requirement for alternating one-lane roadway access during construction activity. Additional delays will include the following:
  - Disruption and delays to scheduled school bus route(s) are likely. For the 2015 – 2016 school year, there were eight school bus stops on Cross Street, and three school bus stops on Washington Street along the preferred route. Reduced working hours may be required to limit impacts during school drop-off hours.
  - Disruption and delays to emergency vehicle access routes to Winchester Hospital will require coordination with local emergency management services to comply with prevailing regulations.
  - HASP/Control of Work provisions shall comply with any related regulations governing access along emergency evacuation routes.
  - Impacts on available resources for traffic details will be significant, likely overwhelming local police capacities

Weston & Sampson has recommended, and I concur that a comprehensive analysis of daily traffic control is needed based on anticipated construction means and methods and prevailing work hour limitations. Identifying staffing capacities and anticipated shortfalls will be required to adequately address secondary resources. Otherwise, project may jeopardize sufficient enforcement of public safety during construction.

- Holton Street at Cross Street acts as direct access for bulk deliveries to commercial/industrial properties in Winchester and Woburn. Work in this vicinity will have a direct impact on available turning radii for up to 53-foot trailers. The location impact emphasizes the need for adequate controls (notices, signage, police details, etc.) to mitigate impacts to local businesses throughout the proposed route. Reduced or modified working hours may be required.

The Town has retained Ken Cram of Bayside Engineering, Inc. to provide a traffic analysis of the construction related impacts on the Washington/Cross Street corridor. The Winchester Police and Fire Chief's will be providing testimony regarding the traffic related public safety impacts, which will be included in Mr. Cram's review. Despite multiple requests, the Town has not received any Traffic Management Plans from Eversource that would define the extent of lane reductions or road closures.

**(4) Proportionally greater impacts on environmental justice neighborhoods.**

On April 4, 2016, I accessed the “Environment Justice Viewer” available from MassGIS at the following website: [http://maps.massgis.state.ma.us/map\\_ol/ej.php](http://maps.massgis.state.ma.us/map_ol/ej.php) to obtain a map of the Environmental Justice areas in Winchester, as defined by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA). The map shows that the area along both sides of Cross Street and the west side of Washington Street is identified as an Environmental Justice population that meets the following criteria: “25% or more of the residents are a minority”.

As previously testified, Washington Street provides the primary access to Winchester Center, which includes the Winchester High School and McCall Middle School campuses. Washington and Cross Street also provide the primary, and in some cases, the only practical access for students attending the Muraco Elementary School. During the jack and bore work, and trench excavation, the Environmental Justice population will be severely affected by the temporary and permanent road closures. I am advised that there is no consideration in the route scoring, or any discussion by Eversource in its filings of the major impacts to the Environmental Justice neighborhood.

**(5) Significant strain to town resources, including impacts to Police, Fire, DPW and Engineering staffing levels.**

The project will require extensive oversight by DPW and Engineering staff during construction to insure that Town-owned water, sewer and drain utilities are protected, and to provide Eversource’s contractor with information regarding the location and type of municipal utilities. This will likely require use of overtime for Town employees, which will come at a cost

to the Town and will not be reimbursed by Eversource. The Engineering Department has only one full-time inspector to review on-going public and private projects. The Town of Winchester is not part of DigSafe; therefore, the Town will be providing mark-outs of all town owned utilities during construction, which is a time consuming a laborious task. In previous meetings with Eversource, the Town has requested that they pay for full-time inspection services that will report to the Town of Winchester during construction. This will not eliminate the need for involvement of Town staff, but will ensure that Engineering and DPW staff are not required to be on-site full time.

Additionally, as Town Engineer, I am concerned how field changes will be communicated to the Town by Eversource's contractor so we can insure that our utilities are adequately protected. DPW and Engineering are also concerned that adequate and reliable service is provided to abutting properties at all times during construction.

The Engineering Department reiterates the concerns expressed by the Police, Fire and DPW regarding the impacts to public safety that will result from the construction-related road closures and detours. Specifically, the closures of Cross and Washington Streets at the location of the proposed jack and bore operations, which will require extended road closures for a matter of weeks to months, as indicated in conversations with Eversource. These closures will impact response time to those neighborhoods north of the closure on Washington Street, and will impact overall response times as a result of traffic congestion and detours. These issues will be further discussed in testimony provided by the Police and Fire Departments.

**(6) Compounded impact of other construction projects in Winchester, including Eversource's 115kV Mystic to Woburn project, and other infrastructure and building projects planned or on-going by the Town.**

The Town of Winchester is the only community in the region impacted by both the 115kV Mystic to Woburn project and the 345kV Woburn to Wakefield project. The fact that both of these projects will be moving forward simultaneously will place a significant burden on Town resources (Police, Fire, DPW, and Engineering), and will result in even more extreme traffic impacts and congestion. In addition, there are a number of on-going or planned state and local capital improvements that will coincide with the Eversource construction work, as outlined below:

- Traffic calming improvements at four locations – Cross Street at Holton Street, Cross Street at Forest Street, Forest Street at Brookside Avenue, and Forest Street at Clematis Street. Work is funded through MassDOT's Complete Streets Program and is required to be complete by June 30, 2017.
- Tri-Community Bikeway Project (MassDOT) – Construction of bikeway that will intersect the proposed Eversource project at multiple locations on Cross and Washington Streets. Work is paid for and managed by MassDOT. Construction is expected to start in Spring 2017.
- Town of Winchester Flood Mitigation Projects:
  - Skillings Field Culvert Project – Work is on-going and is scheduled to be complete by fall 2017.

- Mount Vernon Street Bridge Culvert Project – Work is scheduled to start in September 2016, with a one-year construction duration. Mount Vernon Street will be open to one-way traffic only during construction.
- Scalley Dam Improvement Project at outlet to Horn Pond – Work is in Woburn, but funded and managed by the Town of Winchester. Expected to start in fall 2016.
- Swanton Street Bridge Culvert Project – Design is currently underway, with construction start likely in summer/fall 2017.
- Culvert at railroad bridge near the Muraco School – Design is currently underway, with construction start likely in fall 2017.
- Winchester High School Renovation – Work is on-going and is scheduled to be complete by September 2017.
- Four intersection re-construction project (MassDOT)– Cambridge Street at Pond Street, Cambridge Street at Church/High Street, Cambridge Street at Everett Avenue, and intersection of Church, Bacon, Fletcher Streets. MassDOT is the project lead overseeing construction. Expected completion is summer 2017.
- Winchester Center Commuter Rail Station Reconstruction (MBTA) – Project is currently in 30% design phase. Construction funding is programmed by the MBTA’s for FY18.

**Conclusion**

The Town of Winchester has been meeting with Eversource to discuss this project since October 2014, long before they filed their petition with the Energy Facilities Siting Board (EFSB). However, at this stage in the proceeding, many aspects of the design and proposed construction along the preferred route in Winchester still appear to be in the preliminary stages,

including: (1) lack of a Traffic Management Plan, (2) incomplete and incorrect information regarding existing conditions information for Town-owned water, sewer, and drain utilities, and gas mains; and (3) lack of information on how Town-owned utilities and private water and sewer laterals will be relocated or adjusted to make room for the 345kV line in the right-of-way. The Engineering Department has spent countless hours researching existing conditions, reviewing Eversource's plans and meeting with Eversource over the past year and a half. In some cases, we have found that factual errors and omissions identified by Town staff and brought to the attention of Eversource have not been included or corrected on the plans. In fact, information provided to me by the Town's consultant GoPower revealed that the proposed manhole locations were beyond the pull length of the cable and, therefore, incorrectly located on the plans.

As previously noted, the Engineering Department and DPW have requested that Eversource hire a company to trace the location of the Town's water main along the preferred route; however, Eversource has not provided this information. Additionally, the Town has offered to provide water and sewer connection information for private properties along the preferred route to Eversource, and Eversource has not accepted this offer. The goal of these efforts is to minimize field changes and utility impacts during construction that will slow down the projects, inconvenience town residents, and require additional attention by town staff.

While I understand that Eversource has an obligation to its rate payers to construct a project that is cost effective, the current design and design process does not do enough to protect the existing infrastructure in the Town-owned roadway where the new 345kV line be located, nor does it compensate the Town in any way for the permanent loss of space in the right-of-way that will impact the future ability of the Town to relocate or reconstruction our own utilities.

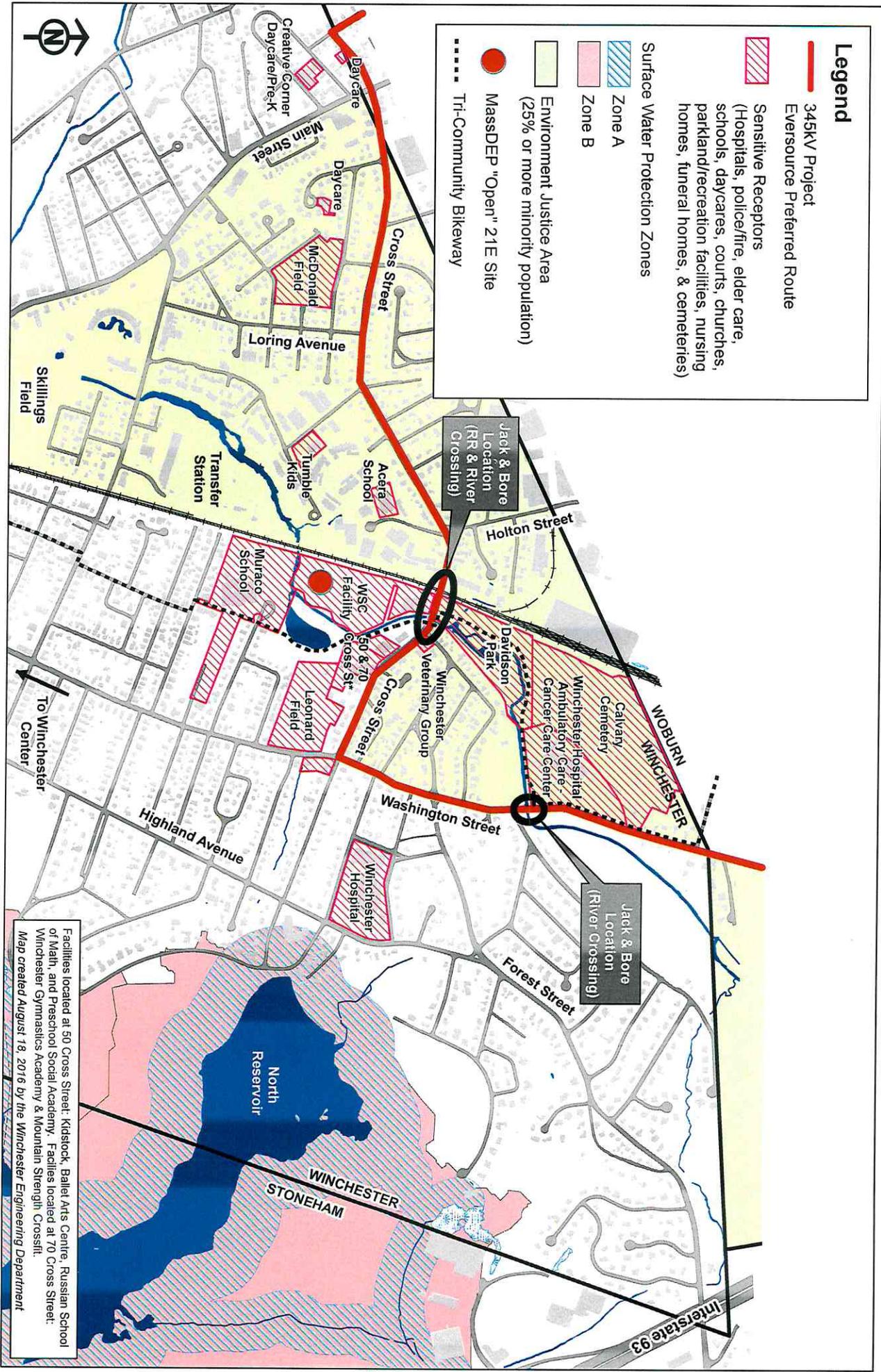
**Q: Does this complete your testimony?**

**A. Yes.**

Signed under the penalties of perjury, this 21<sup>st</sup> day of August, 2016.

  
\_\_\_\_\_

Beth E. Rudolph, P.E.  
Town Engineer



**Legend**

- 345kV Project
  - Eversource Preferred Route
  - Sensitive Receptors  
(Hospitals, police/fire, elder care, schools, daycares, courts, churches, parkland/recreation facilities, nursing homes, funeral homes, & cemeteries)
  - Environment Justice Area  
(25% or more minority population)
  - MassDEP "Open" 21E Site
  - Tri-Community Bikeway
- Surface Water Protection Zones
- Zone A
  - Zone B

Facilities located at 50 Cross Street: Kidstock, Ballet Arts Centre, Russian School of Math, and Preschool Social Academy. Facilities located at 70 Cross Street: Winchester Gymnastics Academy & Mountain Strength Crossfit.  
 Map created August 18, 2016 by the Winchester Engineering Department



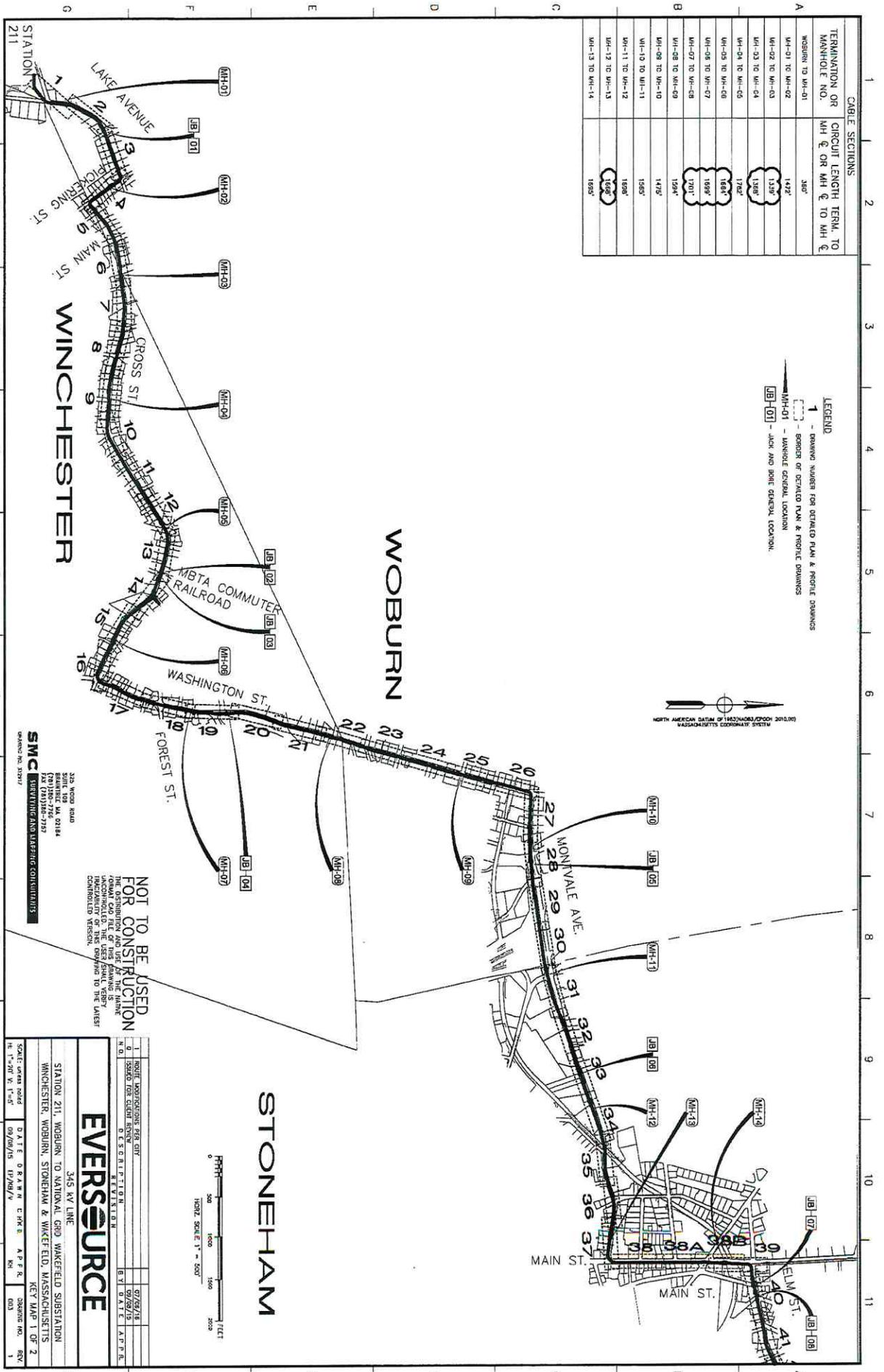
CABLE SECTIONS	TERMINATION OR MANHOLE NO.	CIRCUIT LENGTH, TERM. TO MH ♀ OR MH ♀ TO MH ♀
A	WOBBURN TO MH-01	388'
	MH-01 TO MH-02	142'
	MH-02 TO MH-03	133'
	MH-03 TO MH-04	136'
	MH-04 TO MH-05	176'
	MH-05 TO MH-06	168'
	MH-06 TO MH-07	169'
	MH-07 TO MH-08	270'
	MH-08 TO MH-09	194'
B	MH-09 TO MH-10	147'
	MH-10 TO MH-11	156'
	MH-11 TO MH-12	186'
	MH-12 TO MH-13	166'
	MH-13 TO MH-14	185'

**LEGEND**

1 - DRAWING NUMBER FOR DETAILED PLAN & PROFILE DRAWINGS

MH-01 - MANHOLE GENERAL LOCATION

JB-01 - JACK AND BONE GENERAL LOCATION



325 WOOD ROAD  
 BRAINTON, MA 02184  
 781-831-2121  
**SMC SURVEYING AND MAPPING CONSULTANTS**  
 DRAWING NO. 25127

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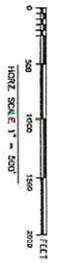
1	ROUTE MODIFICATION PER CITY	07/09/15	APP.R
2	ISSUED FOR BIDDING PER SPECIFICATION	07/09/15	APP.R
3	REVISION	07/09/15	APP.R
4	REVISION	07/09/15	APP.R
5	REVISION	07/09/15	APP.R

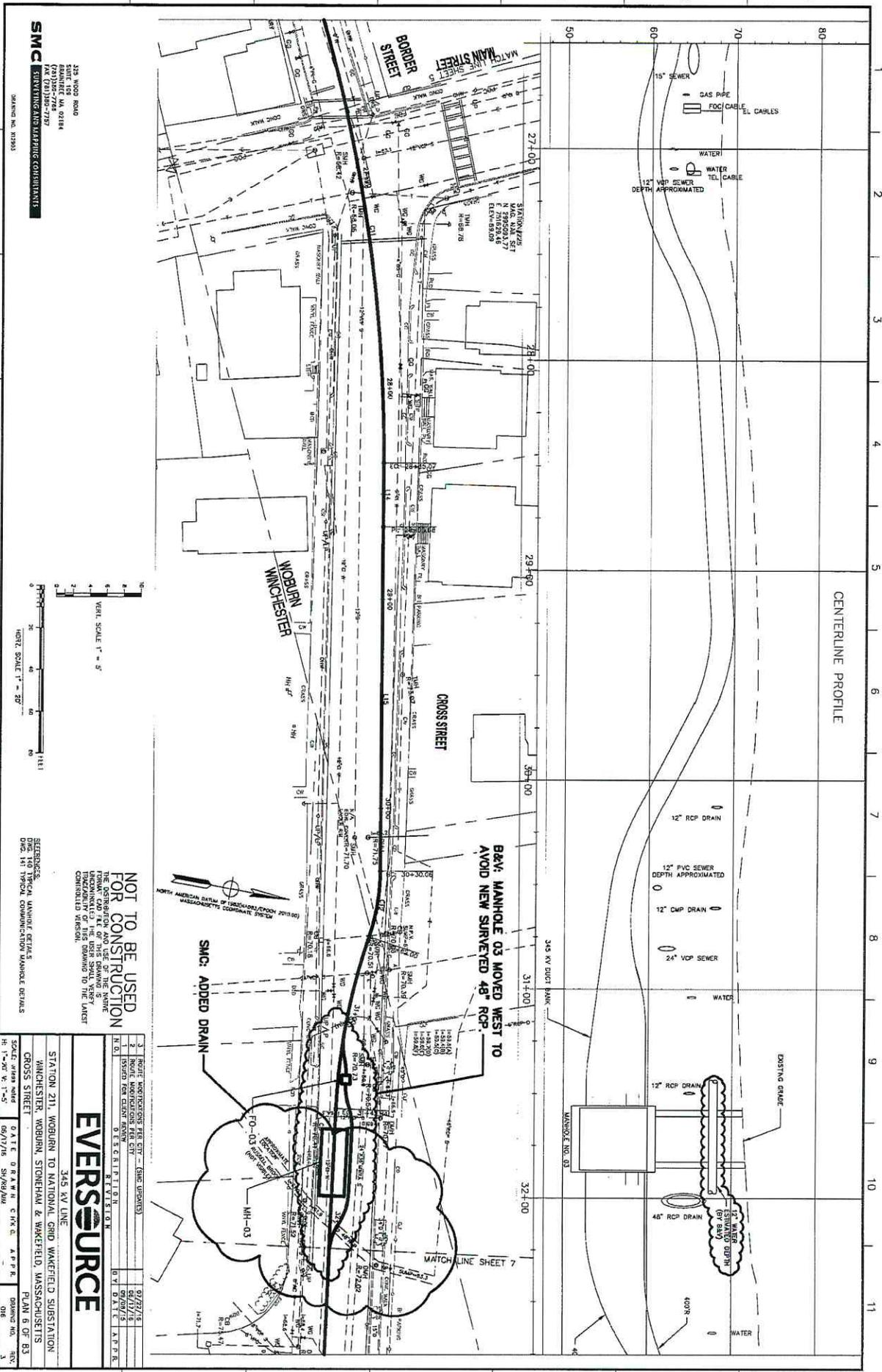
STATION 211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 WINCHESTER, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 KEY MAP 1 OF 2

SCALE: AS SHOWN  
 DATE: 09/09/15  
 DRAWN: C.M.B.  
 CHECKED: A.P.F.  
 APPR: A.P.F.  
 SCALE: 1" = 100'

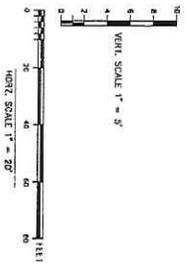
**EVERSOURCE**

345 HV LINE  
 WAKEFIELD SUBSTATION





**SMC** SURVEYING AND MAPPING CONSULTANTS  
 325 WOOD ROAD  
 SUITE 102  
 WILMINGTON, MA 01897  
 (781) 938-7788  
 FAX (781) 938-7787  
 SHANNON, MA 01930

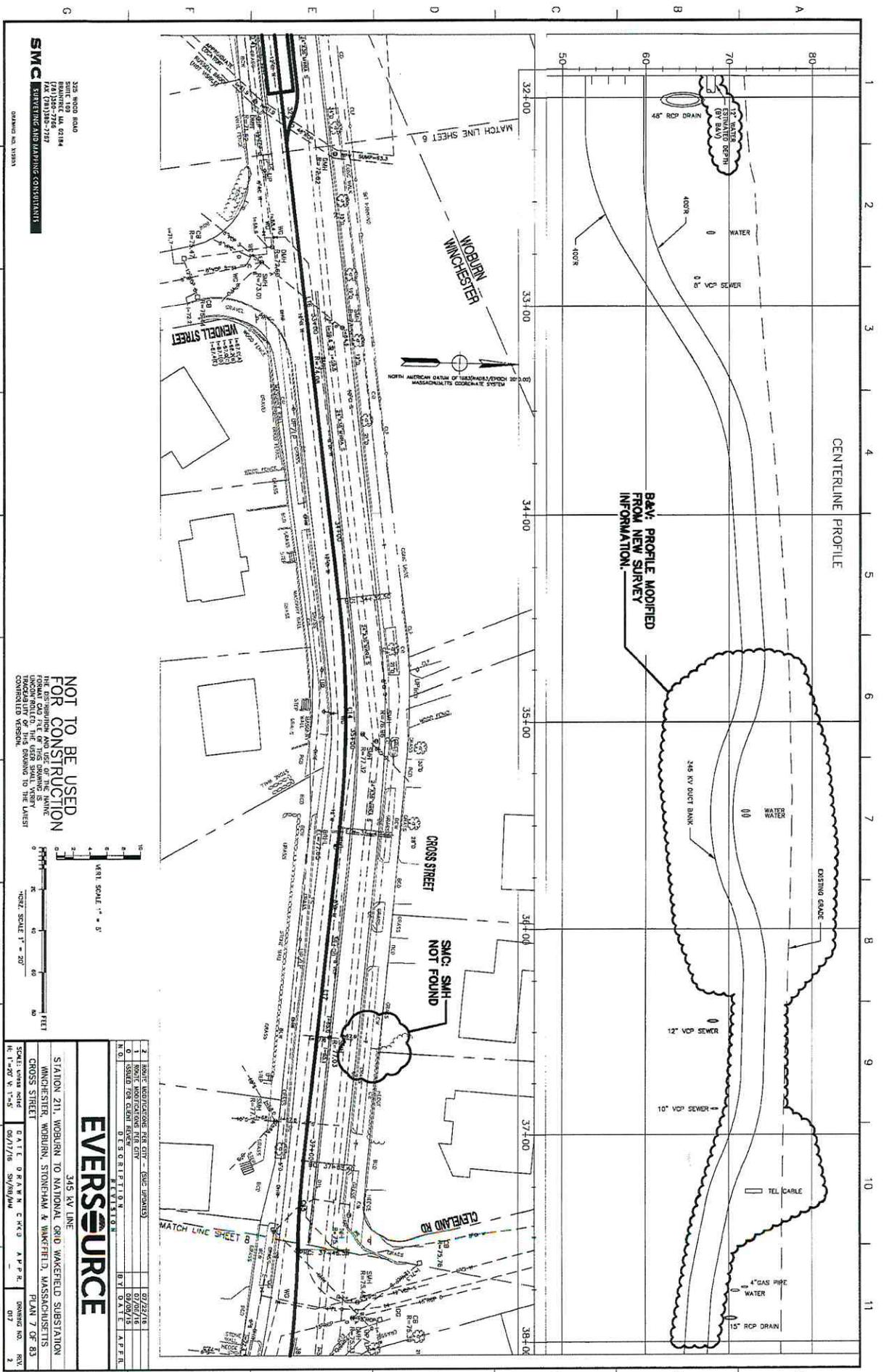


REFERENCES:  
 Dwg. 140 TYPICAL MANHOLE DETAILS  
 Dwg. 141 TYPICAL COMMUNICATION MANHOLE DETAILS

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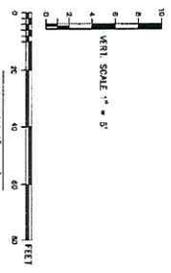
**EVERSOURCE**  
 345 AV LINE  
 STATION 211, MOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 WINCHESTER, MOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 CROSS STREET  
 DATE: 08/17/18  
 DRAWN BY: SWS/BAW  
 PROJECT NO.: 18-018  
 SHEET NO.: 3

NO.	DESCRIPTION	DATE
1	ROUTE WAKEFIELD SUBSTATION	07/27/18
2	ROUTE WAKEFIELD SUBSTATION	08/08/18
3	ROUTE WAKEFIELD SUBSTATION	08/08/18
4	ROUTE WAKEFIELD SUBSTATION	08/08/18
5	ROUTE WAKEFIELD SUBSTATION	08/08/18
6	ROUTE WAKEFIELD SUBSTATION	08/08/18
7	ROUTE WAKEFIELD SUBSTATION	08/08/18
8	ROUTE WAKEFIELD SUBSTATION	08/08/18
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10	ROUTE WAKEFIELD SUBSTATION	08/08/18
11	ROUTE WAKEFIELD SUBSTATION	08/08/18



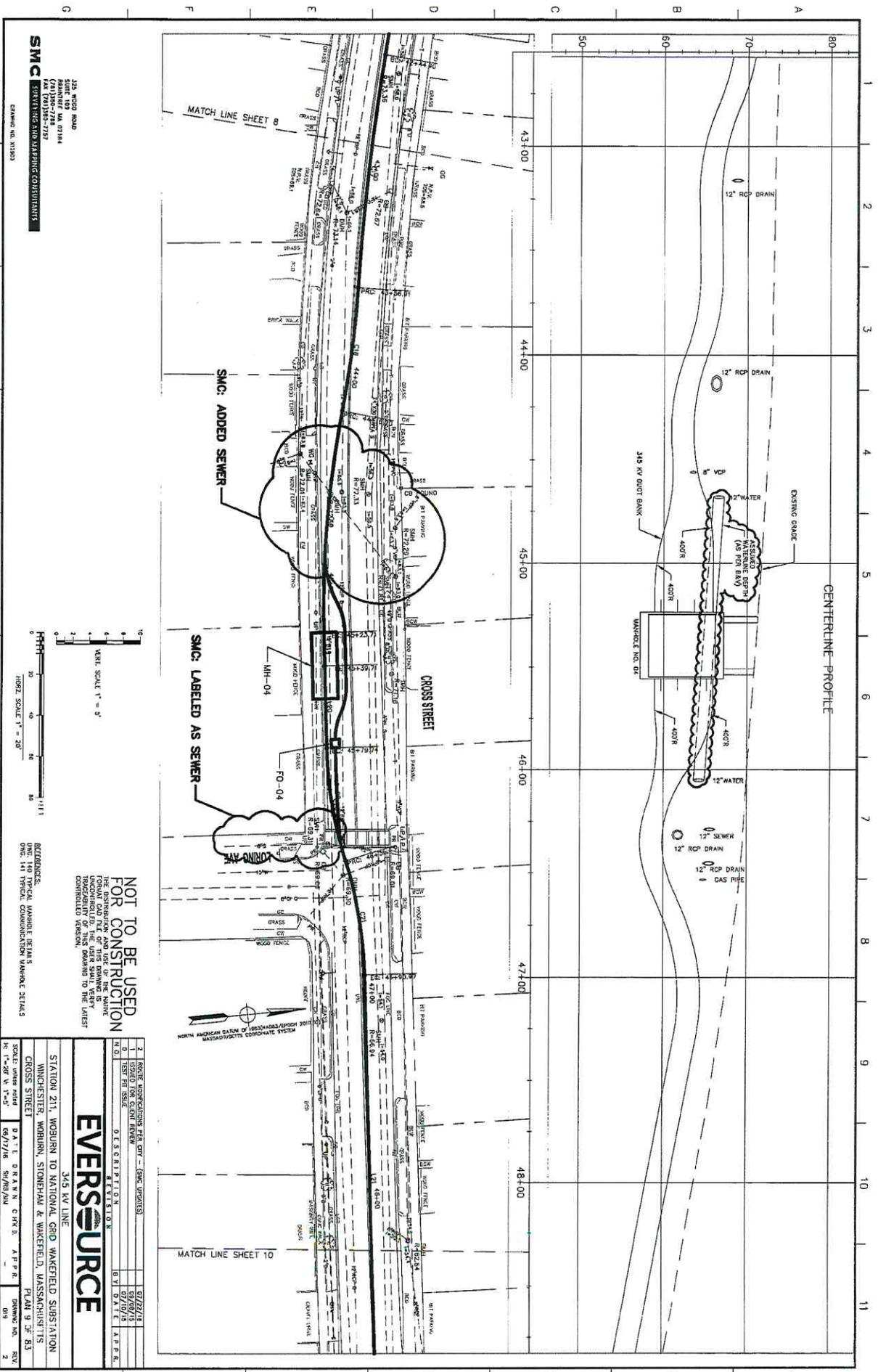
325 WOOD ROAD  
 SUITE 102  
 WILMINGTON, MA 01894  
 (781) 355-2746  
 FAX (781) 355-2727  
**SMC ENGINEERING AND DESIGN CONSULTANTS**  
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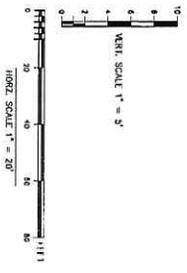


NO.	DESCRIPTION	DATE	BY	CHKD.
1	ISSUED FOR CONSTRUCTION	07/25/18	DAVID	A.P.R.
2	REVISIONS FOR CITY - (SIC UPDATES)	07/25/18	DAVID	A.P.R.

**EVERSOURCE**  
 ELEVATION  
 STATION 211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 WINDHURST, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 CROSS STREET  
 PLAN 7 OF 83  
 SCALE: UNLESS NOTED OTHERWISE  
 DATE: 06/17/18  
 DRAWING NO. 17004  
 SHEET NO. 2



**SMC** SURVEYING AND MAPPING CONSULTANTS  
 325 WOOD ROAD  
 SUITE 100 WA, 01744  
 (508) 255-7728  
 FAX (508) 255-7727  
 DRAWING NO. 101803



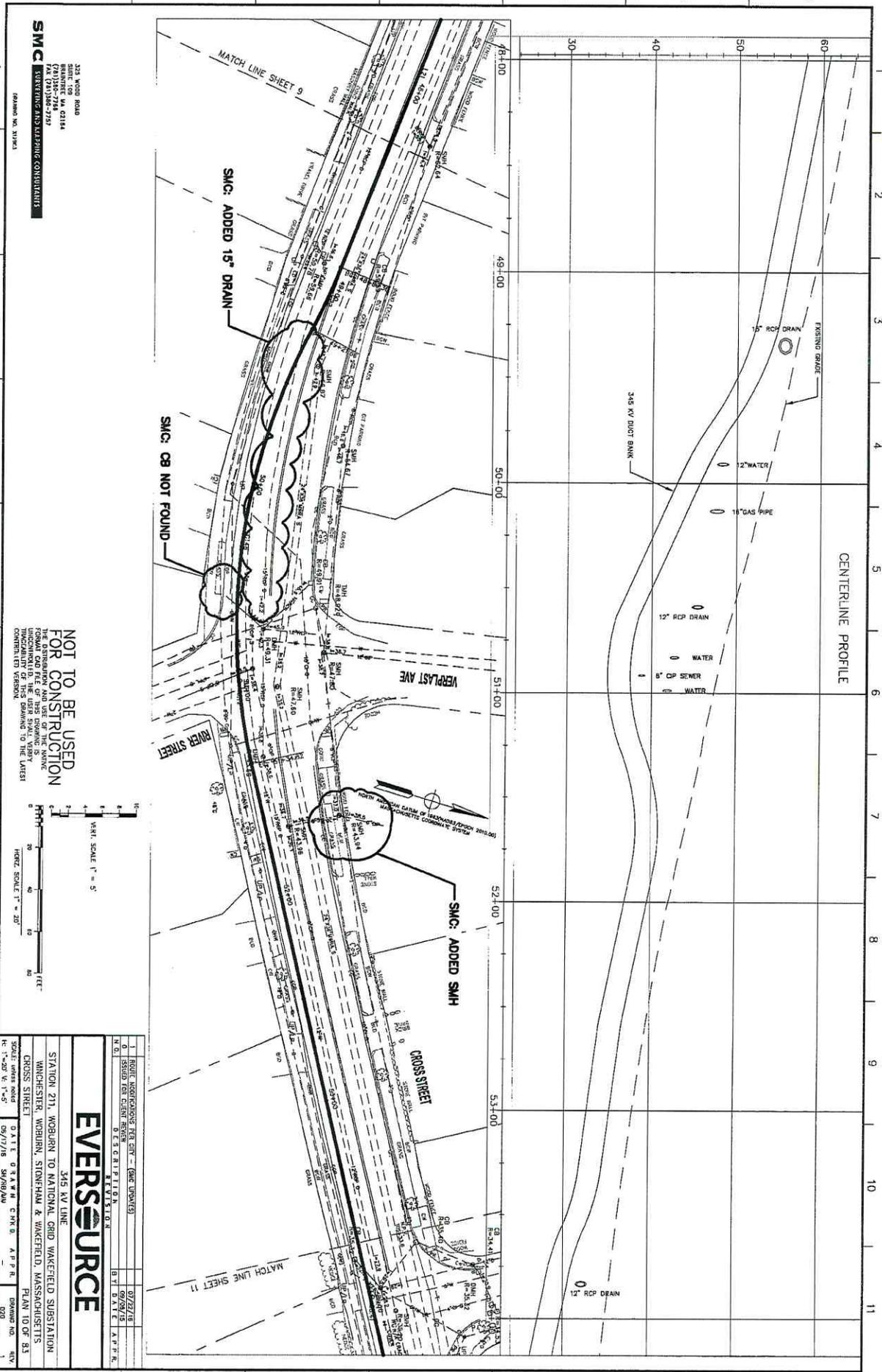
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REFERENCES:  
 DWS 140 TYPICAL MANHOLE DETAILS  
 DWS 141 TYPICAL COMMUNICATION MANHOLE DETAILS

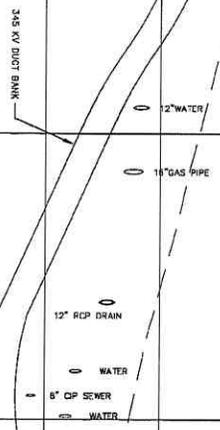
1	DATE UNDERSTANDING PERMIT - (DATE UNDERSTANDING)			
2	DATE FOR CONSTRUCTION			
3	DATE FOR AS-BUILT			
4	DATE FOR FINAL			
5	DATE FOR CLOSEOUT			
6	DATE FOR COMPLETION			
7	DATE FOR FINAL REVIEW			
8	DATE FOR FINAL APPROVAL			
9	DATE FOR FINAL SIGNATURE			
10	DATE FOR FINAL REVIEW			
11	DATE FOR FINAL APPROVAL			
12	DATE FOR FINAL SIGNATURE			

**EVERSOURCE**

34.5 KV LINE  
 STATION 211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 WINCHESTER, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 CROSS STREET  
 PLAN 9 OF 83  
 SCALE: 1"=20' HORIZ. 1"=2' VERT.  
 DATE: 06/17/16  
 DRAWING NO.: 101803

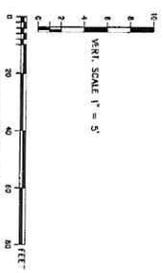


CENTERLINE PROFILE



**SMC**  
 SUSTAINING AND PLANNING CONSULTANTS  
 323 WOOD ROAD  
 SUITE 100 MA 02114  
 (781) 335-7788  
 (781) 335-7787  
 0446000000 No. 21104

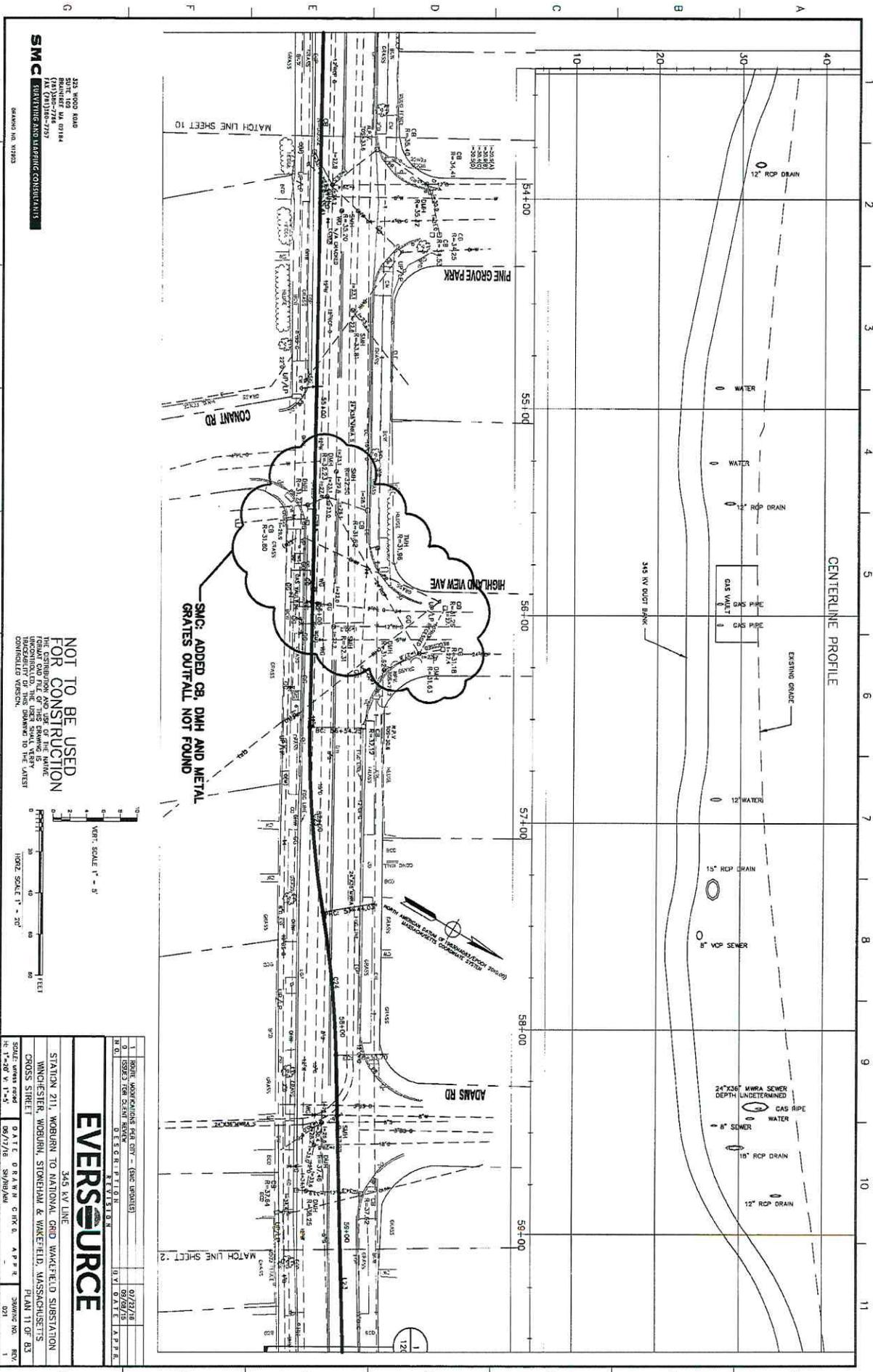
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 FOR CONSTRUCTION**  
 THE DESIGNER AND USER OF THE NAME  
 UNDERSIGNED, THE USER SHALL VERIFY  
 ACCURACY OF THIS DRAWING TO THE LATEST  
 CURRENT VERSION.



NO.	ROUTE/REVISIONS FOR SHEET - (DATE)	BY	DATE
1	ROUTE WORK/ISSUES FOR SHEET - (DATE)		
0	ISSUED FOR CLIENT REVIEW		

<b>EVERSOURCE</b>	
PROJECT NO.	345 IV LINE
STATION	211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION
CROSS STREET	WINDHURST, WOBURN, STONHAM & WAKEFIELD, MASSACHUSETTS
DATE	03/17/18
BY	SKM
CHKD.	APP
DATE	03/17/18
BY	SKM
CHKD.	APP
DATE	03/17/18
BY	SKM
CHKD.	APP
DATE	03/17/18



**SMC**  
 QUANTING AND LAPPING CONSULTANTS  
 323 WOOD ROAD  
 SUITE 102 WJ 0714  
 WILMINGTON, MA 01897  
 (781)266-9726  
 FAX (781)266-7797  
 WWW.SMC-MA.COM

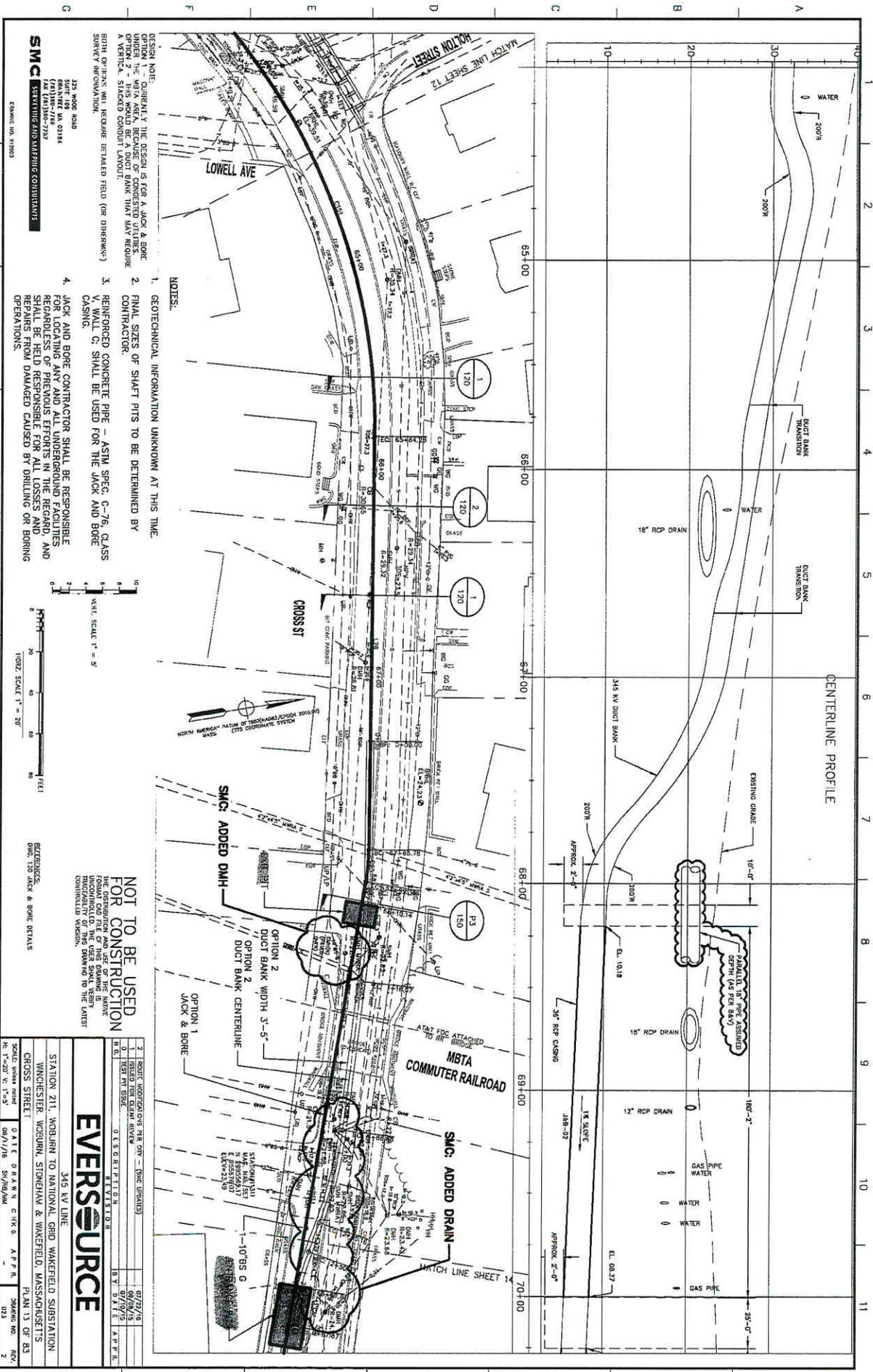
**NOT TO BE USED FOR CONSTRUCTION**  
 THE CENTERLINE AND USE OF THE LAND UNCONTROLLED. THE USER SHALL VERIFY COMPLETION VERSION.



1	ROUTE MODIFICATIONS FOR CITY - (SEE URBAN)	07/27/18
0	ISSUED FOR PERMITS	09/09/18
	DESIGN DATE	APR 18
	ISSUE DATE	APR 18

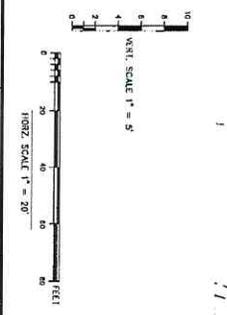
**EVERSOURCE**

345 EV LINE  
 STATION 211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 WINCHESTER, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 CROSS STREET  
 DATE: 07/27/18  
 CHK'D: APP: 4  
 SCALE: 1"=20' H, 1"=3' V  
 SHEET NO: 11 OF 13



**SMC** **SEWERING AND MAPPING CONSULTANTS**  
 325 WOOD ROAD  
 SUITE 108 WILMINGTON, MA 01897  
 (508) 653-7788  
 FAX (508) 653-7122  
 WWW.SMC-MA.COM

- NOTES:**
1. GEOTECHNICAL INFORMATION UNKNOWN AT THIS TIME
  2. FINAL SIZES OF SHAFT PITS TO BE DETERMINED BY CONTRACTOR.
  3. REINFORCED CONCRETE PIPE - ASTM SPEC. C-76, CLASS C, SHALL BE USED FOR THE JACK AND BORE CASING.
  4. JACK AND BORE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ANY AND ALL UNDERGROUND FACILITIES REGARDLESS OF PREVIOUS EFFORTS IN THE REGARD, AND REPAIRS FROM DAMAGE CAUSED BY DRILLING OR BORING OPERATIONS.



**NOT TO BE USED FOR CONSTRUCTION**

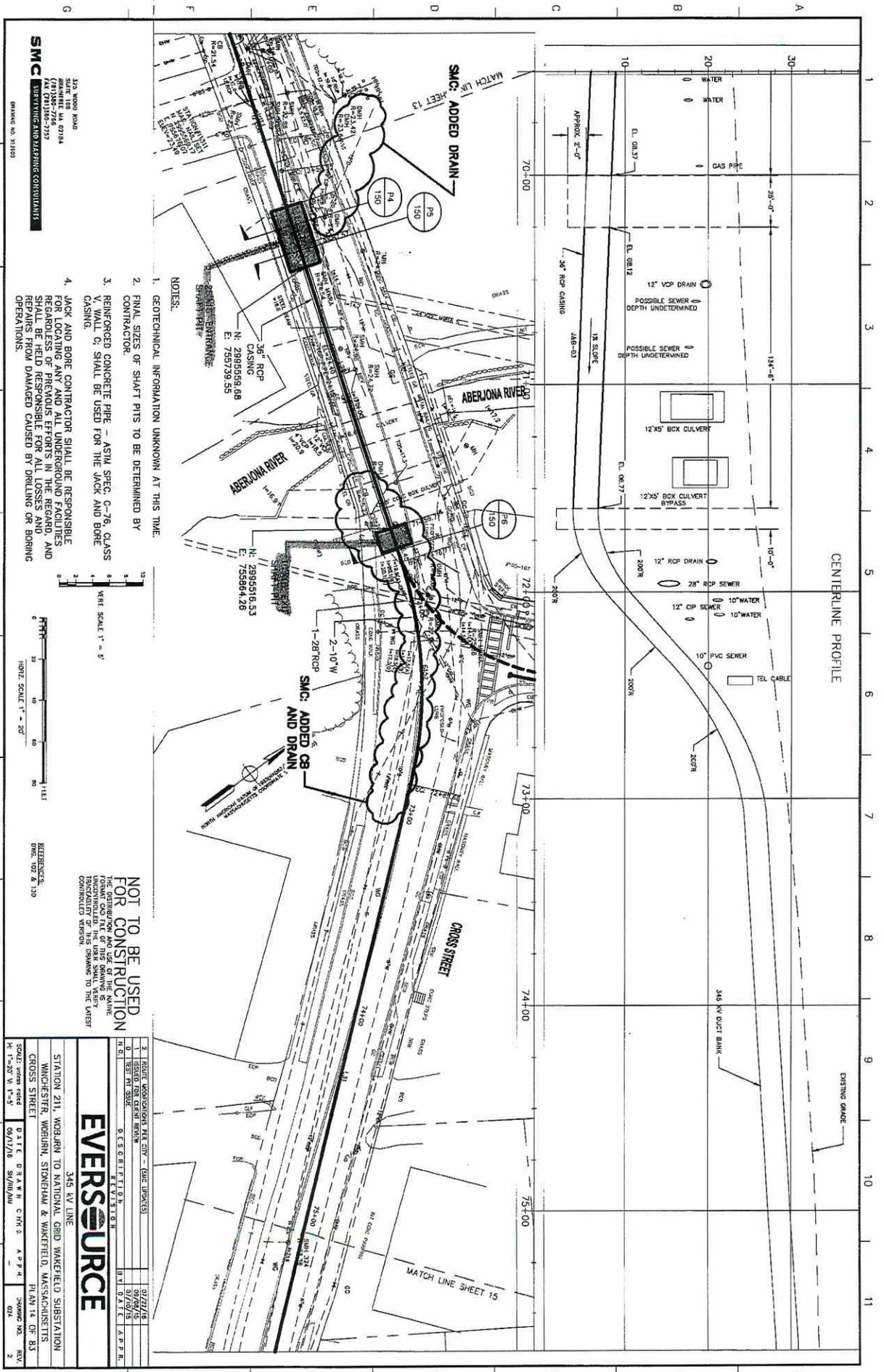
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REFERENCES:  
 PRC 128 JACK & BORE DETAILS

7	REVISED WORKSHEET FOR SHY - (SMC URBANS)	07/27/16
8	REVISED WORKSHEET FOR SHY - (SMC URBANS)	07/27/16
9	TEST PIT SHEET	07/27/16
10	DESIGN/REVISION	07/27/16
11	BY DATE	A.P.P.R.

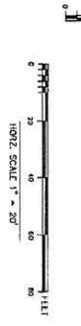
STATION 211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 CROSS STREET  
 WINCHESTER, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 SCALE: 1" = 20' HORIZ. 1" = 5' VERT.  
 09/11/16 09/28/16  
 113 2

**EVERSOURCE**



**SMC** SURVEYING AND PLANNING CONSULTANTS  
 342 WOOD ROAD  
 SUITE 102  
 WILMINGTON, MA 01894  
 (617) 262-7746  
 FAX (617) 262-7747  
 DRAWING NO. 23203

- NOTES:
1. GEOTECHNICAL INFORMATION UNKNOWN AT THIS TIME.
  2. FINAL SIZES OF SHAFT PITS TO BE DETERMINED BY CONTRACTOR.
  3. REINFORCED CONCRETE PIPE - ASTM SPEC. C-76, CLASS V, WALL C1, SHALL BE USED FOR THE JACK AND BORE CASING.
  4. JACK AND BORE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ANY AND ALL UNDERGROUND FACILITIES AND STRUCTURES. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRS FROM DAMAGED CAUSED BY DRILLING OR BORING OPERATIONS.



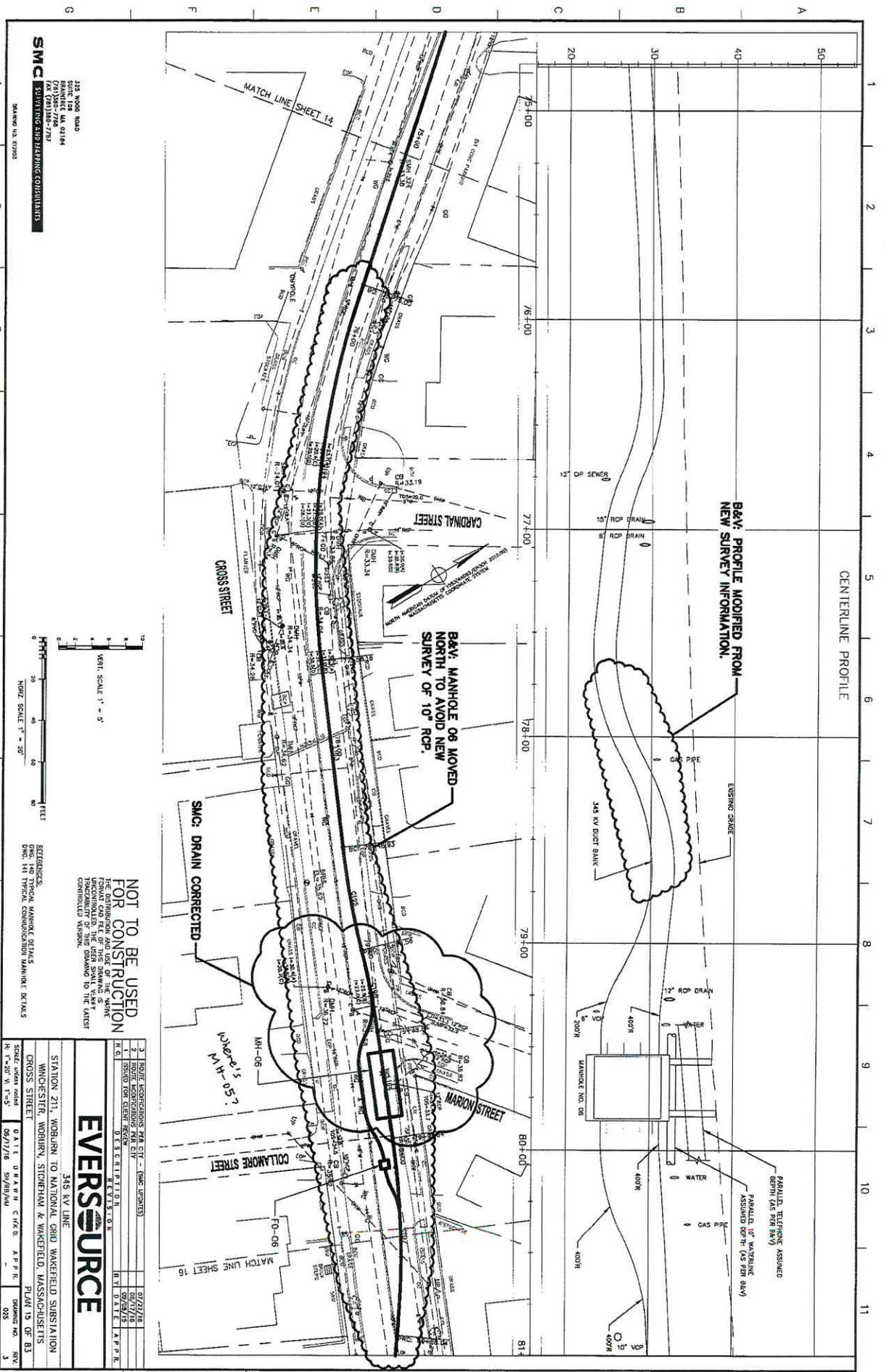
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1	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	07/22/18
2	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
3	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
4	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
5	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
6	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
7	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
8	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
9	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
10	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18
11	ROUTE WORKSHEET FOR CIVIL - (CIVIL WORKSHEET)	09/06/18

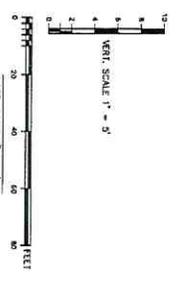
342 WOOD ROAD  
 WILMINGTON, MA 01894  
 (617) 262-7746  
 FAX (617) 262-7747  
 DRAWING NO. 23203

**EVERSOURCE**

STATION 211, WOBURN TO NATIONAL GRID WAKEFIELD SUBSTATION  
 WINCHESTER, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 CROSS STREET  
 DATE DRAWN: 05/17/18  
 SCALE: 1"=40' V, 1"=40' H  
 DRAWN BY: [Name]  
 CHECKED BY: [Name]  
 APPROVED BY: [Name]



**SMC** SURVEYING AND PLANNING CONSULTANTS  
 222 WOOD ROAD  
 SUITE 102 W. 07104  
 (781) 335-7744  
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REFERENCES:  
 DMC-143 TYPICAL MANHOLE DETAILS  
 DMC-141 TYPICAL CONDUIT/DUCT BANK DETAILS

3	ROUTE INSPECTIONS FOR CITY - (SMB/JR/SJS)	07/22/18
2	ROUTE MODIFICATIONS FOR CITY	06/17/18
1	ISSUED FOR CLIENT REVIEW	06/09/18
1	DESIGNATION	BY DATE
	REVISION	BY DATE
	APPROVAL	BY DATE

STATION 211, WOBURN TO NATIONAL GRID WAREFIELD SUBSTATION  
 WASHINGTON, WOBURN, STONEHAM & WAKEFIELD, MASSACHUSETTS  
 CROSS STREET  
 PLAN 15 OF 23  
 DATE DRAWN: 06/17/18  
 DATE CHECKED: 06/17/18  
 SCALE: HORIZ. 1"=20' VERT. 1"=5'

**EVERSOURCE**  
 345 kV LINE  
 DRAWING NO. 025  
 REV. 3

