DOCKET NO. 426

APPLICATION TO THE

CONNECTICUT SITING COUNCIL

FOR A

CERTIFICATE OF ENVIRONMENTAL

COMPATIBILITY AND PUBLIC NEED

FOR THE

115-kV Transmission
Connection and Expansion of
East Avenue Substation
6 Fitch Street
Norwalk, Connecticut

April 10, 2012

Submitted by:

Norwalk Third Taxing District
2 Second Street
East Norwalk, CT 06855

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A. SUMMARY DESCRIPTION AND PROJECT LOCATION

By way of background, the Third Taxing District ("TTD") of the City of Norwalk (the "City") is a political subdivision of the State of Connecticut encompassing the East Norwalk section of Norwalk. TTD operates an Electric Department, a citizen owned, public power utility that provides reliable, low-cost electricity to 3800 customers in East Norwalk. TTD is a part of the Connecticut Municipal Electric Energy Cooperative ("CMEEC"). Through CMEEC, TTD is able to purchase and generate electricity at favorable prices for its customers. TTD also owns and operates 6 megawatts ("MW") of diesel-fired generation for ISO-New England's forward locational reserve market.

Currently, TTD receives its power through a wholesale distribution agreement between CMEEC and The Connecticut Light and Power Company ("CL&P") whereby CL&P delivers power from its bulk transmission system to TTD's local distribution system. Under the terms of the agreement TTD pays CMEEC its share of the allocated costs of the CL&P system, stepping down the voltage from the bulk transmission system voltage of 115 kilovolts ("kV") to the distribution system voltage of 27.6-kV, and for operation and maintenance of the interconnection at a current rate of $2.03 per kilowatt ("kW")/month. The agreement can be cancelled by either party after November 30, 2013.

The facilities that comprise the interconnection are old, some as old as sixty years, and are limited in capacity and reliability. One of the two underground cables is often out-of-service for maintenance due to its age or because CL&P and other customers are performing service on connected facilities. The frequency of these

outages threaten the reliability of the interconnection and the TTD distribution system, especially in the event of a contingency on the second cable.

To improve reliability and capacity, TTD is proposing to construct a new 115-kV/27.6-kV substation adjacent to its existing substation on Fitch Street in Norwalk. Refer to Tab A (1), Figure A-1, site "Locus Map – USGS" and Tab A (2) Figure A-2, "Site Locus Map, Aerial." The substation will be served from CL&P's adjoining 115-kV "1416" line, which extends between CL&P's Compo and Darien substations. TTD plans to transfer its loads that are currently being served from two multi-use 27.6-kV circuits originating at CL&P's Norwalk 9S Substation.

A.1 Municipal Participation During the Consulting Process

As a political subdivision and public utility in the City, TTD is in regular communication with City staff and has met with several City representatives to discuss this project. Specifically, TTD has had the following meetings with the City:

7/21/11. On July 21, 2011 at 3:00 PM George Leary made a preliminary presentation to Norwalk City Officials on the proposed Fitch Street Substation plans in the Mayor's office. In attendance were Mayor, Richard Moccia, Department of Public Works ("DPW") Director, Hal Alvord and Planning and Zoning ("P&Z") Director, Mike Wrinn. The need for increased reliability and load growth were explained as the basis for this project.

8/25/11. Meeting at Norwalk P&Z with Planning Director Michael Greene and Michael Wrinn.

10/25/11. Meeting with Planning Director Michael Greene. He asked for a letter outlining the approvals we are seeking from P&Z. Potential subdivision of the property to accommodate CL&P was also discussed.

11/28/11 (+/-). Meeting at the East Norwalk railroad station with Hal Alvord, DPW Director and Catherine Herbert to discuss placing support structures in the station parking lot for the lines into and from the Fitch Street Substation.

2/22/12. TTD met with Mayor Richard Moccia; Corporation Counsel Robert Maslan; and Planning Director Michael Greene to present this draft application and all available technical information to commence the sixty day pre-application municipal review process. TTD will proceed in accordance with the City's directions with regard to meeting with other City departments or commissions. TTD looks forward to working with the City to identify any concerns and incorporate suggestions into this application prior to submitting it to the Connecticut Siting Council ("CSC" or the "Council").

3/8/12. TTD General Manager, Commissioners and environmental consultant attended a meeting of the Norwalk Planning & Zoning Plan Review Committee to present details on the Fitch St. Substation project and to answer questions of the Committee members.

3/21/12. The Norwalk Zoning Commission adopted a resolution listing four comments on the TTD Draft CSC Application. These comments were forwarded to the CSC in a letter dated March 23, 2012.

3/26/12. The Mayor of Norwalk sent a letter to the CSC waiving the remainder of the City's sixty day comment period.

B. PURPOSE OF THE APPLICATION

TTD is applying to the CSC for a Certificate of Environmental Compatibility and Public Need ("Certificate") for a new electric substation (the "Project") next to the TTD existing East Avenue Substation. The purpose of the Project is to increase capacity and improve reliability in TTD's electric distribution system. The current system configuration will not meet TTD's growing electric demand and future reliability needs.

C. STATUTORY AUTHORITY FOR APPLICATION

TTD is applying to the Council pursuant to Section 16-50q et seq. of the Connecticut General Statutes. This filing includes information concerning the Applicant, TTD, existing conditions at the Project site and the proposed conditions for the construction of the Project, including:

- Its location and design;
- The alternatives to the Project and the basis, for site selection;
- The need for the Project;
- The potential environmental effects; and
- The mitigation measures incorporated in the design.

This application provides the relevant information and generally follows the format required by the "Connecticut Siting Council Guidelines Checklist – Electric Substation Facility," dated April 2010.

D. LEGAL NAME AND ADDRESS OF APPLICANT

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E. APPLICANT CONTACTS

Correspondence and other communications with regard to the Fitch Street Substation should be addressed to, and notices, orders and other papers should be served upon, the following:

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F. DESCRIPTION OF FACILITY

Presently, two 27.6 to 4.16-kV TTD substations (East Avenue and Rowan Street) are supplied by two 27.6-kV underground circuits from CL&P's Norwalk 9S substation. The 9S circuits also supply other CL&P customers and are owned by CL&P up to the

intersection of East Avenue and Sunset Hill Avenue (about 1/2 mile from TTD's East Avenue substation. TTD also owns and operates a 27.6-kV cable which interconnects its two distribution substations so load can be fed from either incoming line during switching or planned maintenance. TTD is concerned about the long-term adequacy of their 27.6-kV supply system, which will be impacted by projected TTD and CL&P load growth, along with reliability concerns surrounding the 60 year old CL&P underground cables.

TTD proposes to construct a new 115/27.6-kV substation which would tap into the 115-kV 1416 line (Compo to Darien) located next to their existing East Avenue substation as shown in Figure F-1 – "Substation Location" at Tab B (1). The 1416 line will be looped through the 115-kV bus which includes a 115-kV bus tie breaker. The new TTD substation will consist of two 115/27.6-kV transformers (20/30/40 MVA) connected delta-grounded wye, which in turn will supply their two existing 27.6/4.16-kV substations. The proposed Commercial Operation Date of this project is the winter of 2013. Site plan drawings are attached at Tab B (2).

As the owner of the Compo – Darien 1416 Transmission Line, CL&P will construct, own and maintain the necessary take-off structures on the transmission line right-of-way and install the transmission line conductors from the take-off structures to the line terminals in the substation. The take-off structures will consist of two monopoles located in the Metro North Rail Road Station parking lot adjacent to the train platform.

F.1 Estimated Cost of the Project

TTD anticipates that the approximate total cost of the Project will be $8 million. TTD has already spent $1 million to acquire the Project site. CL&P and TTD will each own, construct and maintain its own project facilities. For example, the two transmission line support structures and transmission line to the substation terminals will be built and owned by CL&P. TTD anticipates that CL&P will bear the costs for that portion of the Project.

F.2 Facility Service Life

The substation equipment and supporting infrastructure would have a service life of approximately 40 years and would be capable of capacity increases during this period.

G. NEED FOR FACILITY

In order to provide for load growth, improved reliability and to prevent future cost increases, it is necessary for TTD to find an alternative for the existing two 27.6-kV lines from CL&P's Norwalk 9S Substation which serve our distribution system. The existing 9S45 and 9S46 lines are 60-plus year old underground, joint use lines which serve several other customers before reaching TTD. They do not have adequate capacity to provide for TTD's expected load growth. Further, due to the age of the lines and the maintenance needs of both CL&P and the customers connected to these lines, one of the two lines is often out of service leaving TTD facing a single contingency to full blackout. Finally, because TTD pay, through CMEEC, a monthly charge for the use of the shared facilities at Norwalk 9S, either load growth by TTD or a reduction in use by CL&P can sharply increase TTD's cost, even if TTD had no change in use.

G.1 System Alternatives

G.1.1 Absence of Expansion Options at Existing Substations

As shown on Tab C (1), Figure G-1 – "Existing Norwalk Area Substation System," TTD has only two substations, the Rowan Street Substation and the East Avenue Substation. Neither substation can be expanded within the existing property lines. The selected Fitch Street site is adjacent to the East Avenue substation and functionally will operate as an extension of that substation. TTD has no other power supply substations, only two distribution substations.

G.1.2 Other Alternatives

Given the limited capacity of the existing 9S45 and 9S46 lines and their age there are no viable options to building a bulk power substation.

G.1.2.1 Distributed Generation

The TTD is a densely developed area with little opportunity for distributed generation. TTD offers net metering and rebates for the installation of distributed generation but has had little uptake. Further, the cost of such generation and its application make it unsuited for this application.

G.1.2.2 Demand Response

TTD offers demand response programs, however, demand response cannot substitute for a basic power supply.

G.1.2.3 Conservation and Load Management Programs

TTD aggressively offers a broad selection of conservation and load management programs which have had a positive effect on TTD's load and system peak, but these programs are not a substitute for basic power supply.

G.1.2.4 Summary of Other Alternatives

TTD knows of no viable alternative for providing a safe, reliable and cost effective bulk power supply.

G.2 Conclusion

Given the existing geographic, economic and reliability constraints, TTD through its elected Commission feels that the construction of a bulk power supply substation, adjacent to the 115-kV right-of-way passing through its service area, adjacent to its East Avenue distribution substation and adjacent to the lines serving its Rowan Street distribution substation, is the best option for providing long-term power supply to its customer owners. G-2 at Tab C (2) depicts the Future Norwalk Area Substation System.

H. EXISTING CONDITIONS

Figures depicting current conditions on the Property, its access, abutting properties and key features discussed herein, are provided at Tab D (1), Figure H-1 "Existing Conditions," Tab D (2), Figure H-2 "Nearest Residences" and Tab D (3), Figure H-3 "Surrounding Features." The purpose of this section is to describe current conditions on the Property. A detailed discussion of the Substation's effects on the environment is provided in Section K of this document.

H.1 Existing Conditions

The Property encompasses approximately 0.58 acres. The parcel is identified by the City of Norwalk Tax Assessor's Office on Tax Map 23NW, Block 15, Tax Lot 16, and District 3. The property was purchased by TTD on September 28, 2010, specifically for this project. According to the City's Tax Assessor's field card, the Property is zoned "I1" which is defined by the City of Norwalk Zoning Regulations as "Industrial No. 1".

When purchased by the TTD in September 2010 the Property contained an unoccupied, single-family residence in disrepair (built in 1875), a concrete garage foundation, lawn and wooded areas. Subsequent to purchasing the Property, TTD demolished the house, removed the garage foundation, and cleared and grubbed the site. On-site topography can be characterized as generally sloping down from the south to the north with elevations ranging from 24 to 30 feet above mean sea level. The existing ground cover on-site is predominantly grass.

The surrounding land use consists of a train station, commercial, industrial and residential properties. The Site is located immediately north of a multi-use transportation and energy infrastructure corridor, consisting of existing overhead transmission lines, railroad tracks and commuter parking lots. The existing commuter railroad is located along the southern Property boundary at a grade approximately 9 feet above the Property.

The East Norwalk Metro North train station is located to the south, adjacent to the City owned commuter parking lot. A commercial building borders the property to the west and an auto body repair shop to the east at Tab D, Figure H-2 – "Nearest

Residences" depicts the locations and distances of the surrounding residences to the Substation.

Potential alternative site locations along the transmission line corridor were evaluated for development of the Substation (see Section 1, *Alternative Sites Evaluated*). No suitable alternative sites were identified. However, for the following reasons, the selected site is well suited for the Fitch Street Substation:

- The site is adjacent to the 115-kV 1416 and 1890 transmission lines just north of the south-bound track at the East Norwalk Metro North Railroad train station and next to the existing TTD East Avenue Substation;
- There are optimal interconnection opportunities to existing distribution feeders at the adjacent TTD East Avenue Substation;
- The Property has sufficient size and shape and access from a local road; and
- Construction can be completed and the Substation can be operated with minimal effects on the surrounding environment.

H.2 Site Access

The Site has frontage along Fitch Street.

H.3 Wetlands and Watercourses

There are no wetlands or watercourses located on or in the immediate vicinity of the Site. The closest mapped area of poorly or very poorly drained soils is located approximately 2,000 feet to the northeast. The Norwalk River is located approximately 1,700 feet to the west/northwest, and Mill Pond is located approximately 1,400 feet to the south of the Site. Please refer to Tab E (1), Figure H-4 – "Wetlands Map."

According to the information available from the Natural Resources Conservation Service (NRCS), soils mapped in the vicinity of the site consist of Urban Land. A soils report generated by NRCS is also attached at Tab E (2).

H.4 Vegetation and Wildlife

The site previously consisted of a residential property, but has been recently cleared and graded. The site is currently a gravel lot that is sparsely vegetated with three deciduous trees. The site provides minimal wildlife value.

H.5 Rare, Threatened, and Endangered Species

Based on a review of the State and Federal Listed Species and Significant Natural Communities Map for Norwalk, dated December 2011, the site is not located in an area with Listed Species or Natural Communities. Therefore, coordination with the Natural Diversity Database will not be required. Please refer to Tab E (3), Figure H-5 – "Natural Diversity Database Areas."

H.6 Water Supply Areas

Groundwater below and near the Property is classified by the CT Department of Energy and Environmental Protection ("CTDEEP") as a "GB" groundwater area. A GB classification indicates that the groundwater is within a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such groundwater may not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts. Properties along Fitch Street and in the vicinity are provided potable water by the First District Water Department of Norwalk, Connecticut. Please refer to Tab E (4), Figure H-6A – "Groundwater and Surface Water Classification Map."

Mill Pond, located approximately 0.2 miles south of the Property, is classified as "SC/SB". Norwalk River and Norwalk Harbor, located approximately 0.3 and 0.4 miles west and south of the Property, are also classified as "SC/SB". These coastal surface waters are designated for: habitat for fish and other aquatic life and wildlife; recreation; navigation; and industrial and agricultural water supply.

There are no public water supply wells within a two-mile radius of the Site. The Property is not located within an Aquifer Protection Area. Please refer to Tab E (5), Figure H-6B – "Aquifer Protection Areas."

H.7 Scenic Areas

According to the City of Norwalk's Conservation, Public Works and customer services, the site is not located within scenic areas.

H.8 Historic and Archaeological Resources

Results of a preliminary Cultural Resources Reconnaissance Survey revealed that there are no previous archaeological investigations completed in the vicinity of the Property and two archaeological sites had been recorded in this area of Norwalk. The two previous investigations were documented as prehistoric. Review of available historic maps and aerial images of the area dating back to 1848 suggests that the Property consisted of underdeveloped farmland from the colonial era to the mid-nineteenth century up until at least 1875, when a residential house and outhouse were built.

Heritage Consultants, LLC conducted a Subsurface Investigation to determine whether cultural resources are present at the Site. Fieldwork for this investigation consisted of pedestrian survey, limited auger testing, mapping, and photo-

documentation. During the examination of the Site, no evidence of cultural features and no cultural material were identified within any of the completed auger tests. As a result, no additional testing of the Project area was recommended.

On December 8, 2011, Heritage Consultants, LLC submitted documentation of the archaeological survey they prepared to the State Historic Preservation Office ("SHPO") for a determination as to whether the Project would have an effect on cultural resources. The SHPO has not responded as of April 5, 2012.

H.9 Natural Resources

Site bedrock and surficial geology was determined by reviewing the GIS Data for Connecticut by the CTDEEP. State Bedrock Map of 1985 was used to determine the bedrock geology underlying the Property. The map indicates the underlying bedrock geology is unmapped. Surficial soils at the Property are mapped as coarse on the 1995 State Surficial Geology Map. Coarse materials are composed mainly of gravel and sand, commonly in well-sorted layers. Please refer to Tab E (6), Figures H-9A, Tab E (7), H-9B and Tab E (8), H-9C which show "Bedrock Geology," "Surficial Materials" and "Soils Map," respectively.

H.10 Floodplain Areas

The Site is not located within a FEMA designated 100-year or 500-year floodplain, based on the North American Vertical Datum of 1988 as depicted on *FEMA Flood Insurance Rate Map (FIRM),* Fairfield County, Connecticut, Panel 532 of 626, Map Number 09001C0532F, effective date June 18, 2010. Please refer to Tab E (9), Figure H-10 – "Flood Insurance Rate Map."

H.11 Recreational Areas

There are no recreational areas directly abutting the Property. However, several recreational areas are located within a two mile radius of the Property. Recreational areas are listed on Tab E (10), Table H-1.

H.12 Seismic Areas

The USGS-National Earthquake Reduction Program has developed a series of maps that depict the estimated probability that certain levels of ground shaking from an earthquake will occur within a given period of time. USGS takes into account the seismic history of an area and the expected decrease in intensity with distance from the epicenter. Based on a review of USGS National Earthquake Reduction Program maps and maps obtained from the Weston (MA) Observatory (a geophysical research laboratory in Boston, MA), there are no seismic areas located at the Property or within its immediate area. Please refer to Tab E (11), "Earthquake Hazards Program."

H.13 Noise

The Property is currently undeveloped. The existing noise levels emanating from the Property are below those established for industrial areas by the CTDEEP's noise control regulations (RCSA Title 22a, 22a-69-1 to 22a-69-7.4) based on the survey conducted by HMB Acoustics. Contributing factors for noise generation in the area are traffic noises generated from the adjacent railroad and the surrounding local road system.

H.14 Lighting

Currently, there are no lighting facilities on-site.

H.15 Coastal Zone Management Areas

As defined in Conn. Gen. Stat. § 22a-94(a), the Connecticut Coastal Area includes the land and water within numerous towns, including the City of Norwalk. A subset of the Coastal Area, called the Coastal Boundary, represents an area within which activities regulated or conducted by coastal municipalities must be consistent with the Coastal Management Act. The Property is not located within the Coastal Boundary, however, areas to the south and west are within the coastal boundary, including the Metro-North railroad line south of Fitch Street.

H.16 Other Surrounding Features

Tab E, Table H-1 lists non-residential features within two miles of the Property. Tab D (3), Figure H-3 (*Surrounding Features*) depicts the nearest locations of non-residential development.

I. ALTERNATIVE SITES EVALUATED

TTD encompasses four square miles of densely developed urban area. It is bordered by Interstate Route 95 on the north, the Town of Westport on the east, Long Island Sound on the south and the Norwalk River on the west. This area is bisected by the Metro North Rail Road from east to west which is also the corridor for two major 115-kV transmission lines. To be a suitable substation site prospective property must be in reasonable proximity to both the transmission lines and TTD's existing distribution substations. TTD has been searching for a suitable site for several years but was reluctant to identify any site that would require the exercise of eminent domain over one or more parcels. When the proposed property came on the market its location was ideal being adjacent to both the transmission lines and TTD's East Avenue substation.

Its size was adequate for this purpose and it was zoned appropriately. Further, TTD was able to negotiate an affordable price. No other suitable site has been identified.

J. SAFETY AND RELIABILITY INFORMATION

The Substation would be constructed in full compliance with the standards of the National Electrical Safety Code, the Connecticut Department of Public Utility Control, and good utility practice. In the event that an energized line or substation equipment fails, protective relaying equipment would immediately remove the failed line or equipment from service, thereby protecting the public and the remaining equipment within the Substation.

The Substation would be equipped with measures to ensure continued service in the event of outages or faults on transmission or substation equipment. Continued reliability would be achieved by incorporating a "loop through" design configuration for the existing 115-kV overhead transmission line, transformer protection, and redundant automatic protective relaying equipment.

Protective relaying equipment would be provided to automatically detect abnormal system conditions (e.g., a faulted overhead transmission line) and would send a protective trip signal to circuit breakers to isolate the faulted section of the transmission system. The protective relaying schemes would include fully redundant primary and backup equipment so that a failure of one scheme would not require the portion of the system being monitored by the protective relaying equipment to be removed from service.

The protective relaying and associated equipment, along with a Supervisory Control and Data Acquisition ("SCADA") system for remote control and equipment

monitoring by the Connecticut Valley Electric Exchange ("CONVEX") System Operator, would be housed in a weatherproof, environmentally-controlled electrical equipment enclosure.

TDD will incorporate IEEE/ANSI and NFPA standards for fire protection in its substation design and operates these facilities to minimize the impact of fire, in the unlikely event it occurs. TTD will also train its employees and the local fire department on the safe methods to deal with a substation fire. The control enclosure would be locked and equipped with fire extinguishers, as well as smoke detectors that would be monitored from a remote location. Smoke detection would automatically activate an alarm at CONVEX and the system operators would them take appropriate action.

Additional devices would constantly monitor the Substation to alert TDD of any abnormal or emergency situations. The perimeter of the Substation would be enclosed by an eight-foot high chain link fence topped with an additional foot of three strands of barbed wire to discourage unauthorized entry and/or vandalism. The Substation entrance would be gated and locked. Lighting would be available within the Substation yard to facilitate work at night or during inclement weather.

TDD plans to install sumps to serve as oil-spill containment reservoirs around the proposed transformers. The sumps would be sized with sufficient capacity to contain a spill in the event of an inadvertent release of oil.

K. EFFECTS ON THE ENVIRONMENT

The development of the Fitch Street Substation would not have any long-term adverse effects on the existing environment and ecology, nor would it affect the scenic,

historic and recreational values of the vicinity. A *Proposed Conditions Map* is included as Figure K-1 at Tab F (1).

K.1 Public Health and Safety

The Fitch Street Substation would be designed to applicable TTD, industry, State, and local codes and standards and would not pose a safety concern or create undue hazard to the general public. The Substation would not consume any raw materials, would not produce any by-products and would be unmanned during normal operating conditions. Applicable signage would be installed alerting the general public of the dangers of high voltage associated with the Substation, as well as an eight foot high chain link fence. There are no plans to store fuels or hazardous materials at the Substation.

K.2 Local, State and Federal Land Use Permits

The project is consistent with Local, State, and Federal land use plans. Local land use application processes do not specifically apply to the Project. However, the Project has been designed to meet the intent of the local land use regulations. According to the City of Norwalk Zoning Regulations, the Property lies within an area zoned as Industrial (I1), and is not located within an Aquifer Protection Zone. Pursuant to Article 70, Use Regulations Controlling Industrial Zones, Section 118-700 Industrial Zone 1 of the Norwalk Zoning Regulations, public utility supply facilities are a permitted use by right requiring City Site Plan Approval. The general area of the Property is identified in the City of Norwalk, Plan of Conservation & Development as land primarily for industrial use.

K.3 Existing and Future Development

The Fitch Street Substation would benefit the community by improving the electrical service for existing development in the City and the surrounding areas, as well as supporting additional development through enhanced reliability and the capacity to serve additional load. The City currently has an older 27.6-4.16-kV distribution substation adjacent to the proposed Fitch Street Substation which does not have the ability to expand. The Substation would be situated immediately north of the existing overhead transmission line corridor, generally in the center portion of the Property. The Substation would be located within a rectangular shaped fenced compound that would encompass a 19,080 square foot area (measuring approximately 106 feet by 180 feet). Connecting the Substation to the existing transmission circuit requires the installation of two new steel monopoles on the existing transmission line path in the railroad parking area. The new poles would be similar in height to those currently occupying the transmission corridor, and two new line-terminal structures within the Substation.

K.4 Roads

Access to the Substation will be provided off of Fitch Street by an existing City standard curb-cut and concrete apron. A new 15-foot wide paved driveway would be installed to serve as entry/egress from Fitch Street to the Substation. This will serve as the only access to the Site once the Substation is in operation.

During construction, the new driveway will be stabilized with stone and anti-tracking mats would also be installed. Once the Project is completed, the new driveway would be paved and the adjacent disturbed areas will be landscaped. After construction

is completed, approximately three to four vehicle trips per month to the Property would be anticipated for maintenance and inspection activities.

K.5 Wetlands

No inland wetlands or watercourses are present on or near the Project site. Accordingly, the project will have no impacts to designated wetland areas.

K.6 Wildlife and Vegetation

The site is currently sparsely vegetated with three deciduous trees. Impacts to wildlife and vegetation will be minimal.

K.6.1 Rare, Threatened, and Endangered Species

There will be no impacts to rare, threatened or endangered species.

K.7 Water Supply Areas

There are no known public water supply wells located in the vicinity of the Property. The transformers at the Fitch Street Substation would contain mineral oil. However, this equipment would have secondary containment and accidental spill prevention provisions in place. Based on these design considerations, the Project would have no adverse environmental effect on the water resources.

K.8 Historic and Archaeological Resources

As of April 5, 2012, SHPO has not responded to the archaeological survey submitted by Heritage Consultants LLC on December 8, 2011.

K.9 Noise

After the Substation is placed in service, infrequent impulse noise would be generated from switching and circuit breaker opening and closing. The impulse noise levels and steady state transformer noise levels will not exceed the levels permitted at

the Property line by CTDEEP's noise control regulations according to HMB Acoustics. Please refer to Tab F (2) – Sound Analysis Report.

The construction and testing of the Substation facilities is expected to occur over a 12- to 18- month period. In general, construction hours would be from 7 a.m. to 5 p.m., Monday through Friday. Site preparation, including grading and installation of foundations, would take place during the initial six months of construction and involve the use of earth-moving equipment and construction vehicles.

The installation and testing of equipment would take approximately nine months and would involve the use of cranes to unload and install structural elements and large equipment.

The installation of the 115-kV line and Substation terminal structures, interconnection of the supply lines to the Substation, and connections to the distribution system would occur outside of normal work hours because these activities necessitate taking critical transmission and/or distribution equipment out of service. As a result, this work would be scheduled for off-peak electrical demand hours and coordinated with the City.

K.10 Floodplains

The Site is not located within the 100-year or 500-year floodplains.

K.11 Seismic Areas

As with other substations constructed by TTD, this Substation would meet or exceed the State Building Code, which includes seismic loading, wind loading, and snow and ice loadings, among others.

K.12 Lighting

Lighting would be available within the Substation yard to facilitate work at night under emergency conditions and during inclement weather. The Substation would have low-level lighting for safety and security purposes. However, these lights would be recessed or activated manually to minimize visual effects at night. Lighting would not extend beyond the limits of the fenced area.

K.13 Natural Resources

No adverse effects are anticipated on natural resources occurring at and/or nearby the Property. Earthwork would be required for construction of the Substation; however, no impacts to wetlands would occur as there are no designated wetlands in the vicinity of the Property.

Three existing trees require removal at the Property. The trees would be replaced with a variety of specimens, the majority of which are native to the region, as a rain garden at the northern section of the Property.

K.14 Coastal Zone Management Areas

The Site is not located within the Coastal Area Management Boundary, as defined by Conn. Gen. Stat. § 22a-94(a). No tidal wetlands, watercourses or coastal resources are located on the Site.

The coastal boundary is located approximately 50 feet from the Site immediately south of the Property.

The Project would not result in adverse impacts to coastal resources as defined in the Connecticut Coastal Management Act (CCMA). The CCMA identifies eight adverse impacts to coastal resources. This section provides a definition of each

adverse impact for each resource area and explains why the Project would not adversely affect each resource.

*1) Degrading **water quality** of coastal waters by introducing significant amounts of suspended solids, nutrients, toxics, heavy metals or pathogens, or through the significant alteration of temperature, pH, dissolved oxygen or salinity.*

The Project would not affect water quality within the adjacent coastal boundary. Erosion and sediment controls would be established as required by CTDEEP Bulletin 34 *Connecticut Guidelines for Soil and Erosion and Sediment Control, dated 2002.* Stormwater generated by the Project would be adequately treated, both in quantity and quality, in general accordance with the 2004 CT Stormwater Quality manual.

*2) Degrading **existing circulation patterns of coastal waters** by impacting tidal exchange or flushing rates, freshwater input, or existing basin characteristics and channel contours.*

The Property is outside of tidally influenced areas and would not impact current drainage or circulation patterns.

*3) Degrading **natural erosion patterns** by significantly altering littoral transport of sediments in terms of deposition or source reduction.*

The Project would not affect littoral transport of sediments.

*4) Degrading **natural or existing drainage patterns** by significantly altering groundwater flow and recharge and volume of runoff.*

Drainage patterns would not be significantly altered by the Project. It is anticipated that the proposed stormwater treatment practices would maintain or

increase groundwater recharge at the Site and not increase runoff for the 5-, 10- and 25-year design storms.

*5) Increasing the hazard of **coastal flooding** by significantly altering shoreline configurations or bathymetry, particularly within high velocity flood zones.*

The Site is not within the 100-year and 500-year floodplains and would not affect the shoreline configuration.

*6) Degrading **visual quality** by significantly altering the natural features of vistas and viewpoints.*

The Project is located over 1,000 feet from the nearest coastal resource and would not degrade the visual quality of the area. The Project consists of constructing the Substation in the southern portion of the Site. The Substation would be located at a ground elevation approximately 4 to 8 feet lower than what exists today. Planned landscaping would incorporate a rain garden along the northern portion of the Site, resulting in the lower portions of the Substation being largely out of view. The southern portion of the Site is adjacent to the Metro-North Railroad line.

*7) Degrading or destroying **essential wildlife, finfish or shellfish habitat** by significantly altering the composition, migration patterns, distribution, breeding or other population characteristics of the natural species or significantly altering the natural components of the habitat.*

No essential wildlife, finfish or shellfish habitat exist on the Property planned for construction activities.

*8) Degrading **tidal wetlands, beaches and dunes, rocky shorefronts, and bluffs and escarpments** by significantly altering their natural characteristics or function.*

The Project would not alter the natural characteristics of any coastal resource area as none exist on the Site.

K.15 Other Surrounding Features

No adverse effects are anticipated to the facilities listed in Table H-1 at Tab E, primarily because of the presence of the existing transportation and utility infrastructure corridor.

L. MITIGATION MEASURES

TTD has incorporated measures into all phases of Project development and implemented to promote protection of the environment in accordance with federal, State and local requirements.

L.1 Pre-Construction Considerations

Prior to any construction activities, TTD would prepare a Development and Management Plan ("D&M Plan"), which would be submitted for approval by CSC. The D&M Plan would include *Best Management Practices* ("BMPs"), which are designed to minimize or eliminate potential adverse environmental effects that may result from construction activities. The D&M Plan would include specific procedures and information on erosion and sedimentation control, and provisions for restoration and landscaping after construction of the Substation. The D&M Plan would also provide contact information should any questions or concerns arise during construction or operation of the facility.

Prior to commencement of construction, TTD intends to install erosion control measures at the limits of work in accordance with the approved D&M Plan and the CTDEEP Bulletin 34, "2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control". The erosion control would be inspected and maintained throughout the course of the Project until final site stabilization has been achieved.

L.2 Construction-Related Activities

All construction activities would be conducted in accordance with the required D&M Plan as approved by CSC. The siting and design of the Substation meets current zoning setback requirements and does not impact any regulated wetland areas or buffer areas. The Substation would be graded to maintain existing drainage patterns and contain and treat stormwater runoff on the Property via an infiltration trench. The remainder of the runoff would infiltrate through the Substation's gravel base or would be allowed to run off through the landscape and lawn areas.

Approximately 25,300 square feet of area will be disturbed on-site. These activities primarily include landscaping, grading, construction of the fenced Substation and the installation of the rain garden to treat the runoff.

BMPs would be utilized in accordance with the CTDEEP's Bulletin 34 "Connecticut Guidelines for Soil Erosion and Sediment Control" throughout the course of construction activities at the Site and maintained until disturbed areas have been stabilized. Geotextile fabric sediment barriers would be placed between the development footprint and the adjacent areas during construction and maintained until the Site is stabilized and restored.

L.3 Post-Construction Features

Upon completion of construction activities, all disturbed/exposed areas would be stabilized with topsoil and seeded with a low maintenance permanent cover of native grasses that would provide soil stability. Erosion controls would remain in place until final site stabilization is achieved.

The Project includes the installation of two 40-MVA transformers that would contain insulating (mineral) oil. The transformer equipment would each have secondary containment designed to hold 110 percent of a transformer's fluid capacity, and accidental spill prevention measures in place. TTD proposes to install Imbiber Bead Containment Systems for the sumps, to assist in preventing oil discharges from the containment sumps. In addition, a low level alarm that is integral to the system would be monitored remotely and would notify TTD in the event of abnormal conditions. Periodic inspections of the sumps would be performed by TTD personnel to promote proper functioning of the systems. Based on these design considerations, the Project would have no adverse environmental effect.

TTD would provide landscaping around the Substation perimeter, resulting in the fencing and the lower portions of internal equipment being largely out of view. Lighting would be available within the Substation yard to facilitate work at night under emergency conditions and during inclement weather. The Substation would have low-level lighting for safety and security purposes. However, these lights would be recessed or activated manually to minimize visual effects at night. Lighting would not extend beyond the limits of the fenced area.

L.4 Construction Sequencing

The general construction sequence for the Substation and line interconnection would include:

- Installation of erosion and sedimentation control measures;
- Construction of gravel access drive;
- Clear and grub the site within areas to be graded;
- Preparation of the Site (cut, fill, grading);
- Installation of Substation foundations, conduits and grounding grid;
- Spreading of trap rock;
- Installation of steel structures and Substation equipment;
- Installation of transmission line interconnections;
- Commissioning the Substation;
- Completion of Site restoration activities; and
- Removal of erosion and sediment control measures once all areas have been stabilized.

As requested by the City and consistent with BMPs for construction of substations:

- The erosion and sedimentation controls would be employed by the contractor during the earthwork and construction phases of the Project in accordance with the CTDEEP bulletin No. 34 *"2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control"*;

- Prior to starting any other work on the site, TTD's contractor would notify the appropriate agencies and install appropriate erosion control measures as depicted on the Site Plans;
- TTD's contractor would inspect and maintain erosion-control measures , remove sediment from the erosion control measures on a weekly basis and within twenty-four hours after each storm event and dispose of sediments in an upland area such that they do not encroach into other protected areas;
- TTD's contractor would be fully responsible for controlling construction activities such that sedimentation will not affect adjacent areas, whether such sedimentation is caused by water, wind or direct deposit;
- TTD's contractor would perform construction sequencing such that earth materials are exposed for a minimum of time before they are covered, seeded, or otherwise stabilized to prevent erosion; and
- Upon completion of construction and establishment of permanent ground cover, TTD's contractor would remove and dispose of erosion control measures, and remove sediment and debris from the areas where control measures were used.

M. HEALTH AND SAFETY

The Council has published a guide for applications for electric substations that addresses electric and magnetic fields ("EMF") that calls for information to be provided on existing and future EMF levels and the consistency of the proposed facility with the Council's EMF BMPs for transmission lines (CSC, 2007).

M.1 Electric and Magnetic Fields

The TTD of Norwalk sub-contracted Exponent to perform an electric and magnetic fields survey. Exponent measured the levels of 60-Hz EMF at the boundaries of the proposed substation site. The highest magnetic field observed in the vicinity of the proposed substation, approximately 75 mG, was measured above the existing 26.7-kV underground feeders west of the proposed substation site. On the eastern side of the site, the dominant EMF source is the existing 115-kV 1416 transmission line, and magnetic fields less than 23 mG were measured below this source. To characterize the fields associated with the proposed addition of the Fitch Street Substation in the future, Exponent modeled the proposed overhead 115-kV interconnection. Under average-load conditions, the maximum calculated magnetic field at the perimeter of the Fitch Street substation is less than 82 mG and occurs near the southeast corner of the substation. The magnetic fields in the area surrounding the substation decrease rapidly with distance to less than 20 mG within 23 feet of the substation fence. Under peak-load conditions, the highest calculated magnetic field is 186 mG near the southeast corner of the proposed site, decreasing rapidly with distance to less than 20 mG within 60 feet of the substation fence.

Neither the federal government nor Connecticut has enacted standards for magnetic fields or electric fields from power lines or other 60-Hz sources. The calculated values of EMF produced by existing sources in the site vicinity and the proposed substation in the future are well below the health-based reference levels published by the International Commission on Non-ionizing Radiation Protection and the International Committee for Electromagnetic Safety.

Questions about long term exposure to EMF have been addressed by panels of scientists on behalf of national and international health and scientific agencies. Major reviews on this topic, in order of the date of recent publication, include those published by the European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN, 2010), the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 2010), the Swedish Radiation Safety Authority (SSM, 2010), the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR, 2009), the World Health Organization (WHO, 2007), and the International Committee on Electromagnetic Safety ICES, 2002). The general scientific consensus of the health agencies reviewing this research is that at levels associated with the operation of the proposed substation, associated lines, or other common sources of EMF in our environment, the research does not support the conclusion that EMF causes any long-term, adverse health effects.

While neither the Council nor the above cited national and international health agencies have concluded that electric or magnetic fields pose a health hazard, the Council has embraced policies that would tend to minimize public exposure. The following features of the proposed Fitch Street Substation and site are consistent with the Council's recommendations for transmission lines included in Council's EMF BMPs for transmission lines:

- The substation and related construction is to be designed to meet or exceed the requirements of the National Electrical Safety Code ("NESC");

- The proposed site does not abut statutory facilities defined in Public Act No. 04-246 and no additional buffer beyond that called for by the NESC and standard utility design and practice is required;
- The substation is located adjacent to the existing East Avenue electric substation and the power source is the adjacent existing 115-kV 1416 transmission line. The interconnections of this line to the substation are very short;
- The source of the additional power for the community was determined to be 115-kV. At this voltage the magnetic field from the proposed interconnecting lines and the substation will be lower than had lower voltage source been chosen. To deliver the same power at lower voltages, greater current flow (the source of magnetic fields) is required than at higher voltages;
- While the substation will be an additional source of EMF, the field levels will be consistent with the range of EMF associated with the existing sources, particularly the existing 26.7-kV underground feeders and 1416 line, which are major contributors to EMF levels around the proposed site. At buildings adjacent to the site and under average-load conditions, the magnetic field levels will be similar to or lower than those produced by ordinary distribution lines (NIEHS, 2002). at distances greater than 23 feet from the southeast corner of the proposed site;
- New 23.6-kV feeders will exit the substation with the phase conductors in close proximity underground to minimize the magnetic field and totally shield the electric field as compared to an overhead line; and

- Consideration of current scientific research as summarized and evaluated by national and international health agencies reinforces the Council's BMP policies.
- Exponent's "EMF Assessment: Fitch Street Substation – Norwalk, Connecticut" is attached at Tab G.

M.2 Site Security

Critical Infrastructure Protection standards will be implemented as an added dimension to security measures. An eight foot high chain link fence topped with one foot of barbed wire (three strands) would enclose the Substation yard to prevent unauthorized access. The Substation yard would also be gated and locked. All gates would be padlocked at the end of the workday during construction activities and at all times once the Substation is in service. Appropriate signage would be posted at the Substation alerting the general public of high voltage facilities located within the Substation. Should the equipment experience a failure, protective relaying would immediately remove the equipment from service, thereby protecting the public and the equipment within the Substation. Other devices installed within the Substation would constantly monitor equipment to alert TTD of any abnormal or emergency situations.

M.2.1 Energy Facility Security

As a general rule, TTD in its planning for new facilities carefully designs its facilities to protect the security of the site and the on-going transmission of electricity. In response to the Council's concerns expressed in its White Paper on the security of siting energy facilities, in addition to the design features and the measures discussed above to monitor the operation at the Fitch Street Substation and to discourage

unauthorized entry onto the Site, TTD will meet with law enforcement and emergency response personnel in the City to discuss the Substation and coordination of efforts to protect its security.

Site construction was also discussed. TTD will work closely with the City of Norwalk Police Department to establish off-duty police protection at the site during the course of major construction activity.

M.3 Traffic Considerations

Access to the site is from a curb cut in Fitch Street and a short paved driveway. Post construction site conditions would not substantially affect existing traffic patterns. Once Substation construction is completed, the facility may be remotely operated with personnel on site only for periodic inspections, maintenance and emergency work.

N. PROJECT SCHEDULE

TDD anticipates completion of construction to occur in Winter 2013. A proposed schedule for project development is included in Tab H, "Project Schedule."

O. GOVERNMENT APPROVALS OBTAINED

As previously described, TTD is seeking the Siting Council's approval of a Certificate for the Project. Pursuant to Section 16-50x of the Connecticut General Statutes, the Council has exclusive jurisdiction over electric transmission facilities, such as substations. As part of the Council's procedural requirements, TTD will consult with the municipality and its agencies to obtain recommendations on measures to mitigate any concerns regarding the Project or its location and will make every effort to incorporate any such measures in the final design.

TTD has not identified any approvals that are required outside of the municipal consultation under the Siting Council Certificate process. As described previously, TTD has consulted with several state agencies regarding the Project, including the Connecticut Natural Diversity Database, the Connecticut Historical Commission, the State Historical Preservation Office.

P. BULK FILING OF MUNICIPAL DOCUMENTS

TTD is providing the following documents to the Council:

- a copy of the documents constituting the technical information submitted to the City as required for the municipal consultation;
- City of Norwalk Inland Wetlands and Watercourses Regulations;
- City of Norwalk Zoning Regulations; and
- City of Norwalk Plan of Conservation and Development.

Q. ADMINISTRATIVE NOTICE, PUBLIC AND ABUTTERS NOTICE, SERVICE AND OTHER FILING REQUIREMENTS

TDD is furnishing to the CSC one original and 20 copies of the Application, as well as an electronic version of the Application.

The Application is presented based on the CSC's June 2007 *Application Guide for Electric Substation Facility* to assist applicants in filing for a Certificate from the CSC for the construction of an electric substation as defined in Conn. Gen. Stat. § 16-50i(a)(4).

TDD also consulted Conn. Gen. Stat. §§ 16-50g through 16-50aa and Sections 16-50j-1 through 16-50z-4 of the Regulations of Connecticut State Agencies in preparing this Application.

Q.1 Administrative Notice

TTD respectfully requests that the Council take administrative notice of the complete record in Docket No. 398, including the application materials submitted by the Original Applicant, the Docket No. 398 Decision and associated Findings of Fact, materials submitted for the Development and Management Plan for the substation, generic hearings or statements prepared by the CSC as a result of generic hearings, subsequent communications with the Council regarding compliance with the terms and conditions of the Docket No. 398 Certificate, and other pertinent documents.

Q.2 Pre-Application Process (Conn. Gen. Stat. § 16-501 (e))

At least sixty (60) days prior to the filing of the application for a Certificate of Environmental Compatibility and Public Need (Certificate) with the CSC, TTD consulted with the municipality in which the facility will be located concerning the proposed and alternative sites of the facility. Specifically, on March 8, 2012, the TTD General Manager, George Leary, Commissioners Paul G. Kokias and David Brown and the consultant attended a meeting of the Norwalk Planning & Zoning Plan Review Committee to present details on the project and to answer questions of the Committee members. On March 21, 2012, TTD General Manager, George Leary, met with the Norwalk Zoning Commission. The consultation with the municipality also included a meeting with Mayor Richard Moccia, Corporation Counsel Robert Maslan and Planning Director Michael Greene on February 22, 2012, who were provided with technical reports concerning the public need, site selection process, and environmental effects of the proposed facility.

The municipality may conduct public hearings and meetings as it deems necessary for it to advise the applicant of its recommendations concerning the proposed facility. Within 60 days of the initial consultation, the municipality shall issue its recommendations to the applicant. (General Statutes § 16-50l (e))]

[Note: Municipal zoning and inland wetland agencies may regulate and restrict the location of an electric generating or substation facility. Such action must be taken within 30 days of application and any appeal from such action must be made to the Council within 30 days. (General Statutes § 16-50x (d))]

Q.3 Application Filing Fees (Conn. Gen. Stat. § 16-50v-1a)

The filing fee for this Application is determined by the following schedule:

Estimated Construction Cost	Fee
Up to $5,000,000	0.5% or $1,250.00, whichever is greater
Above $5,000,000	0.1% or $25,250.00, whichever is greater

Based on this schedule and the estimated construction cost for the Project presented in Section F.1, a check for the filing fee in the amount of $25,250.00 payable to the CSC accompanies this Application. TTD understands that additional assessments may be made for expenses in excess of the filing fee, and that fees in excess of the CSC's actual costs will be refunded to TTD.

Pursuant to Conn. Gen. Stat. § 16-50l(a)(1), TTD also encloses a separate check in the amount of $25,000 payable to the CSC for the municipal participation fee.

Q.4 Proof of Service (Conn. Gen. Stat. § 16-501 (b))

Pursuant to Conn. Gen. Stat. § 16-50l(b), the application is being served to each of the following:

1. each municipality in which any portion of such facility, including proposed and alternative sites, may be located, including the chief executive officer; the zoning commissions; the planning commissions; the planning and zoning commissions; the conservation commissions; and the inland wetland agencies;

2. the State Attorney General;

3. each member of the legislature in whose assembly or senate district the facility or any alternative location listed in the application may be located;

4. any agency, department, or instrumentality of the federal government that has jurisdiction, whether concurrent with the State or otherwise, over any matter that would be affected by such facility;

5. the Department of Agriculture;

6 the Department of Energy and Environmental Protection;

7. the Department of Public Health;

8. the Council on Environmental Quality;

9. the Public Utilities Regulatory Authority;

10. the Office of Policy and Management;

11. the Department of Economic and Community Development;

12. the Department of Transportation, pursuant to Conn. Gen. Stat. § 16-501(b); and

13. the Connecticut Light and Power Company.

The names of governmental officials and agencies on which a copy of the Application is being served (the "Proof of Service") will be provided.

Q.5 Public Notice (Conn. Gen. Stat. § 16-501 (b))

Notice of Application (the "Notice") was published in *The Hour*, a newspaper having general circulation in the site municipality, on April 6, 2012 and April 9, 2012 prior to the filing of this Application. The Notice included the name of the applicant, the date of filing and a summary of the Application. The Notice was published in not less than ten point type.

Copies of the Affidavit of Notice and the legal ad accompany this Application.

Q.6 Notice to Owners of Property Abutting Substation Site

A notice of the application was sent, at the same time as notice of the application is given to the general public, as discussed below, by certified or registered mail, return receipt requested, to each person appearing of record as an owner of property which abuts the proposed primary or alternative sites on which the facility would be located.

An Affidavit regarding the notice, a list of recipients, and a copy of the legal notice accompanies this Application.

R. OTHER RELEVANT INFORMATION

Affected Community Groups

East Norwalk Improvement Association
c/o Sarah Mann, President
51 Van Zant St.
East Norwalk, CT 06855

East Norwalk Neighborhood Association
20 Raymond Terrace
Norwalk CT06855

Norwalk Seaport Association
132 Water Street- 4th Floor
Norwalk, CT 06854

East Norwalk Business Association
25 Van Zant Street, Suite 14-8
East Norwalk, CT 06855
Phone: 203-854-5722 / Fax: 203-853-9572
Email: mail@eastnorwalkbusiness.org

Greater Norwalk Chamber of Commerce
101 East Ave. PO 668
Norwalk, CT 06852

South Norwalk Electric & Water
164 Water St.
Norwalk, Ct 06854

First District Water Dept.
12 New Canaan Ave.
Norwalk, CT 06851
203-847-7387

Norwalk River Watershed Association, Inc.
P.O. Box 197
Georgetown, CT 06829
877-NRWA-INFO

R.1 Exemption from CEAB Mandatory RFP Process

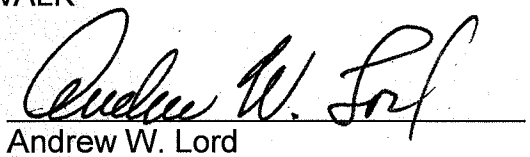
Pursuant to Conn. Gen. Stats. § 16-50*l*(a)(2), as an electric substation designed to change or regulate voltage of electricity greater than 69-kV, this project is exempt from the mandatory request for proposal process of the Connecticut Energy Advisory Board ("CEAB"). TTD has furnished a copy of the municipal filing to the CEAB and a copy of the legal notice and this Application.

S. CONCLUSION

Based on the foregoing and the attached supporting documents, TTD respectfully requests that the Council approve a Certificate of Environmental Compatibility and Public Need for the Project. It will greatly improve the reliability of TTD's distribution system, stabilize electric rates and will do so without substantial adverse environmental effects.

Respectfully submitted,

THIRD TAXING DISTRICT OF THE CITY OF NORWALK

By: 
Andrew W. Lord

Murtha Cullina :LLP
CityPlace I, 29th Floor
185 Asylum Street
Hartford, CT 06103
Telephone: 860-240-6180
Email: alord@murthalaw.com

TAB A-1

1:24,000

0 2,000

Feet

Based on USGS Topographic Map for Norwalk, CT Quadrangle. Revised 1986

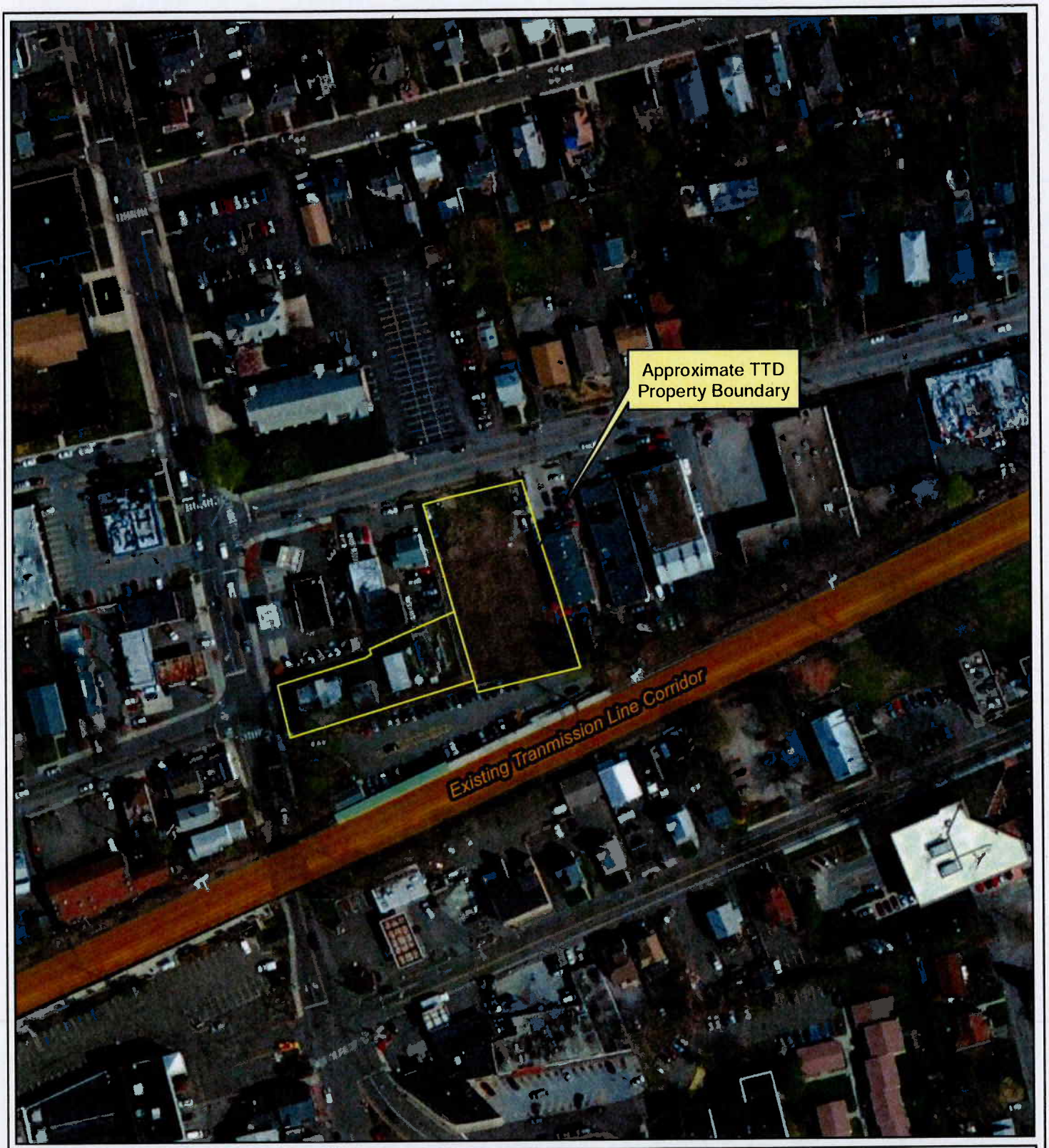
FIGURE A-1
SITE LOCUS MAP - USGS

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

December, 2011

TAB A-2



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Feet

Ortho: Bing, 2010

N
W E
S

FIGURE A-2
SITE LOCUS MAP, AERIAL

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

December, 2011

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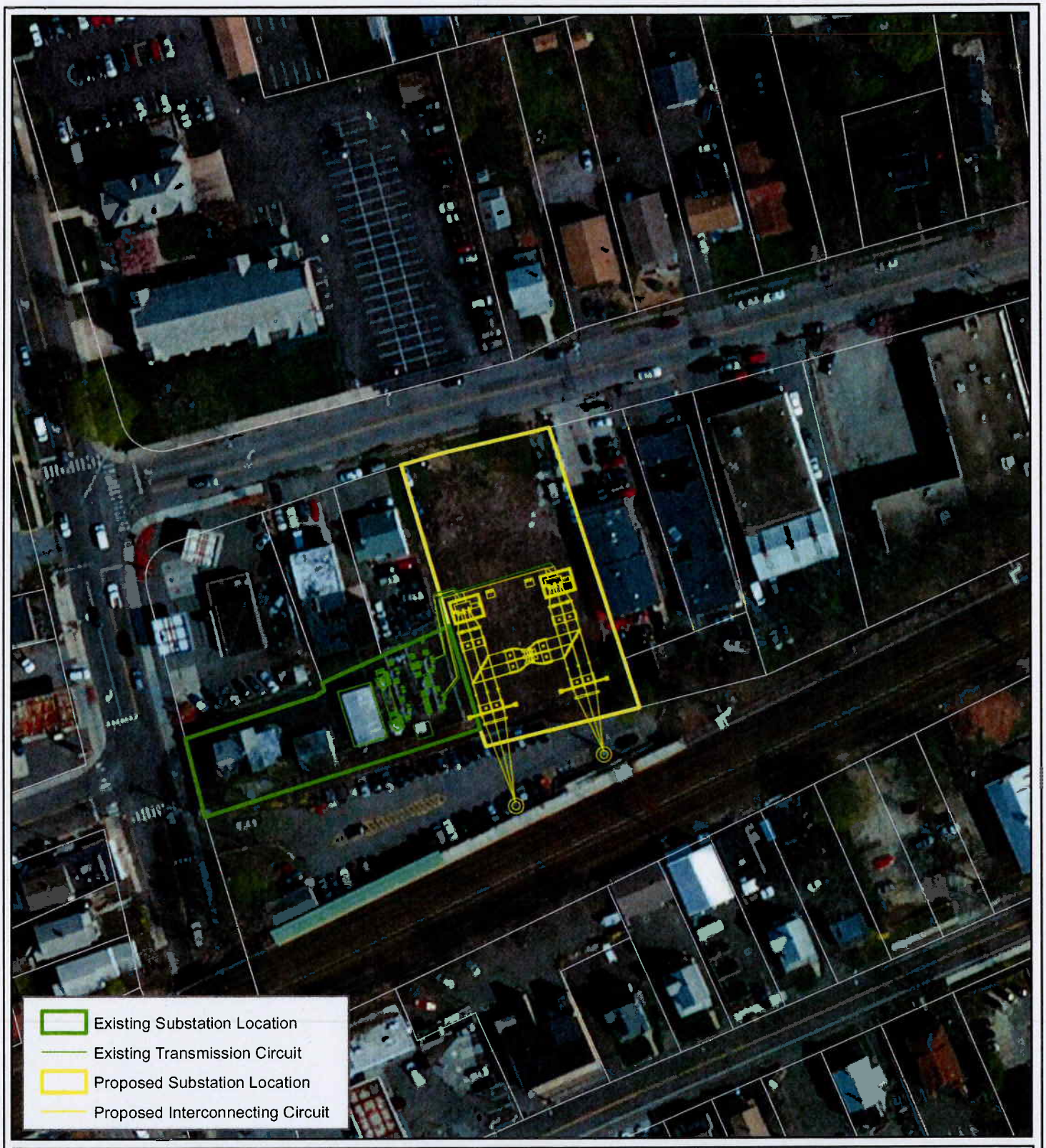
F-0203

TAB B-1



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Feet

Ortho: Bing, 2010

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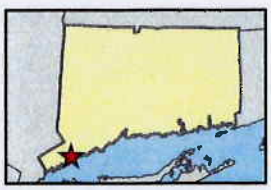

FIGURE F-1
SUBSTATION LOCATION

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

April, 2012

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N-0895

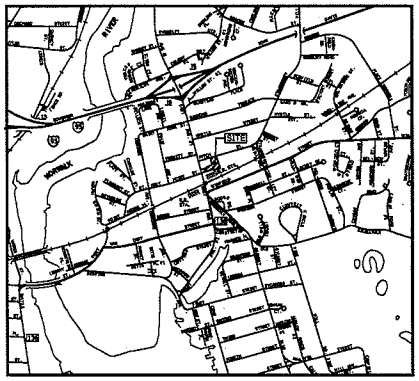
TAB B-2

THIRD TAXING DISTRICT
NORWALK, CONNECTICUT

FITCH STREET SUBSTATION

ISSUED FOR:
PRELIMINARY SITING COUNCIL REVIEW

LIST OF DRAWINGS	
SHEET NO.	TITLE
	COVER SHEET
C1.0	OVERALL SITE PLAN
C2.0	LAYOUT AND MATERIALS PLAN
C3.0	DRAINAGE AND UTILITY PLAN
C4.0	SEDIMENTATION AND EROSION CONTROL PLAN
C5.0	SEQUENCE, NARRATIVE AND DETAILS
C6.0	CITY OF NORWALK STANDARD ROADWAY DETAILS
C6.1	SITE DETAILS
S.01	BOUNDARY AND TOPOGRAPHIC SURVEY



LOCATION MAP
SCALE: 1"=1000'

PREPARED BY:
Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

CHUCK J. CROCE P.E.

OWNER:
THIRD TAXING DISTRICT
ELECTRIC COMPANY
2 SECOND STREET
EAST NORWALK, CT 06855
(203) 866-9271

APPLICANT:
THIRD TAXING DISTRICT
ELECTRIC COMPANY
2 SECOND STREET
EAST NORWALK, CT 06855
(203) 866-9271

Apr 03, 2013-10:56m Plotted By: APW
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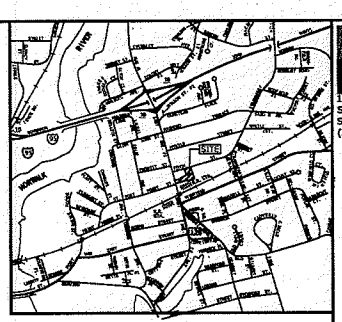

LOCATION MAP
SCALE: 1"=1000'

PLANS AND SPECIFICATIONS ARE SUBJECT TO REVISIONS PENDING FINAL SITING COUNCIL APPROVAL

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

PRELIMINARY SITING COUNCIL REVIEW SET

SCALE IN FEET
0 50' 100'
GRAPHIC SCALE

Third Taxing District

Proposed 115kv Substation

Fitch Street
Norwalk, CT

April, 2012

MARK	DATE	DESCRIPTION
PROJECT NO:		NOR05
FILE: SP-NOR05-01.dwg		
DRAWN BY:		MDS
CHECKED:		CJC
APPROVED:		JWB

OVERALL SITE LAYOUT PLAN

SCALE: 1" = 60'

C1.0

04/03/2012

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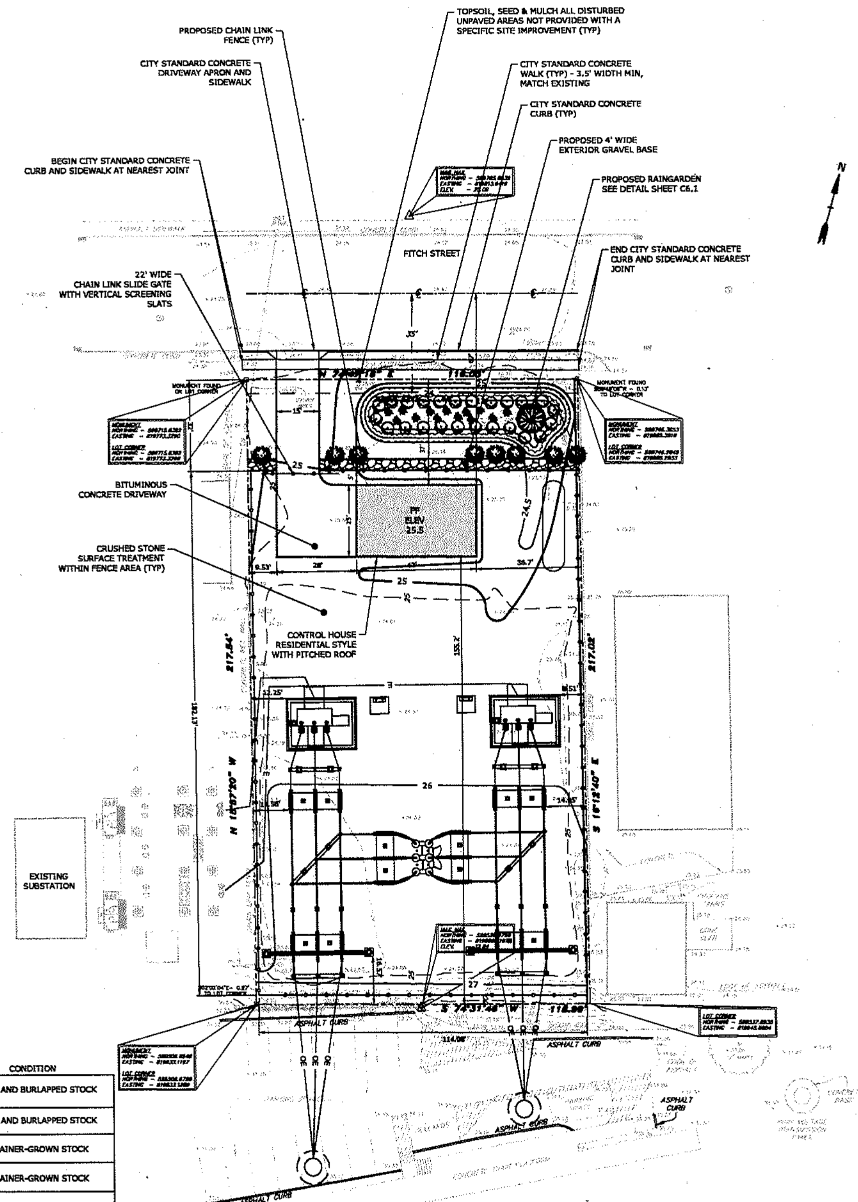
LAYOUT AND MATERIALS PLAN LEGEND:

- 25 - PROPOSED INDEX CONTOUR
- 25 - EXISTING INDEX CONTOUR
- 24 - PROPOSED INTERMEDIATE CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- EXISTING SPOT ELEVATION
- PROPOSED CONCRETE CURB
- PROPOSED FENCE
- PROPOSED SAWCUT LINE
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN
- EXISTING WATER VALVE
- EXISTING WATER METER
- EXISTING HYDRANT
- EXISTING OVERHEAD ELECTRIC SERVICE
- EXISTING UTILITY POLE



PROPOSED CHAIN LINK FENCE (TYP)
CITY STANDARD CONCRETE DRIVEWAY APRON AND SIDEWALK
TOPSOIL, SEED & MULCH ALL DISTURBED UNPAVED AREAS NOT PROVIDED WITH A SPECIFIC SITE IMPROVEMENT (TYP)
CITY STANDARD CONCRETE WALK (TYP) - 3.5' WIDTH MIN, MATCH EXISTING
CITY STANDARD CONCRETE CURB (TYP)
PROPOSED 4' WIDE EXTERIOR GRAVEL BASE
BEGIN CITY STANDARD CONCRETE CURB AND SIDEWALK AT NEAREST JOINT
PROPOSED RAINGARDEN SEE DETAIL SHEET C6.1
FITCH STREET
END CITY STANDARD CONCRETE CURB AND SIDEWALK AT NEAREST JOINT
22' WIDE CHAIN LINK SLIDE GATE WITH VERTICAL SCREENING SLATS
N
FF ELEV 25.5
BITUMINOUS CONCRETE DRIVEWAY
CRUSHED STONE SURFACE TREATMENT WITHIN FENCE AREA (TYP)
CONTROL HOUSE RESIDENTIAL STYLE WITH PITCHED ROOF
EXISTING SUBSTATION
ASPHALT CURB

PLANT LEGEND

SYMBOL	NO.	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION
	1	DECIDUOUS STREET TREE	PER CITY STANDARDS	3" - 3½"	BALLED AND BURLAPPED STOCK
	7	THUJA OCCIDENTALIS L.	ARBORVITAE	3" - 3½"	BALLED AND BURLAPPED STOCK
	12	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	30" - 36"	CONTAINER-GROWN STOCK
	12	CORNUS SERICEA	RED OSIER DOGWOOD	30" - 36"	CONTAINER-GROWN STOCK
	100	LOBELIA CARDINALIS	CARDINAL FLOWER	2" PLUG	CONTAINER-GROWN STOCK
	100	ASTER NOVAE ANGLIAE	NEW ENGLAND ASTER	2" PLUG	CONTAINER-GROWN STOCK

LAYOUT AND MATERIALS PLAN NOTES:

1. CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" (1-800-922-4455) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.
2. SITE ACCESS GATE SHALL REMAIN CLOSED EXCEPT WHEN NEEDED FOR SERVICE.

PLANS AND SPECIFICATIONS ARE SUBJECT TO REVISIONS PENDING FINAL SITING COUNCIL APPROVAL

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

PRELIMINARY SITING COUNCIL REVIEW SET

SCALE IN FEET 0 20' 40' GRAPHIC SCALE

Third Taxing District

Proposed 115kv Substation

Fitch Street
Norwalk, CT

April, 2012

MARK	DATE	DESCRIPTION

PROJECT NO:	N0895
FILE: LO-N0895-01.dwg	
DRAWN BY:	MDS
CHECKED:	CJC
APPROVED:	JWB

LAYOUT AND MATERIALS PLAN

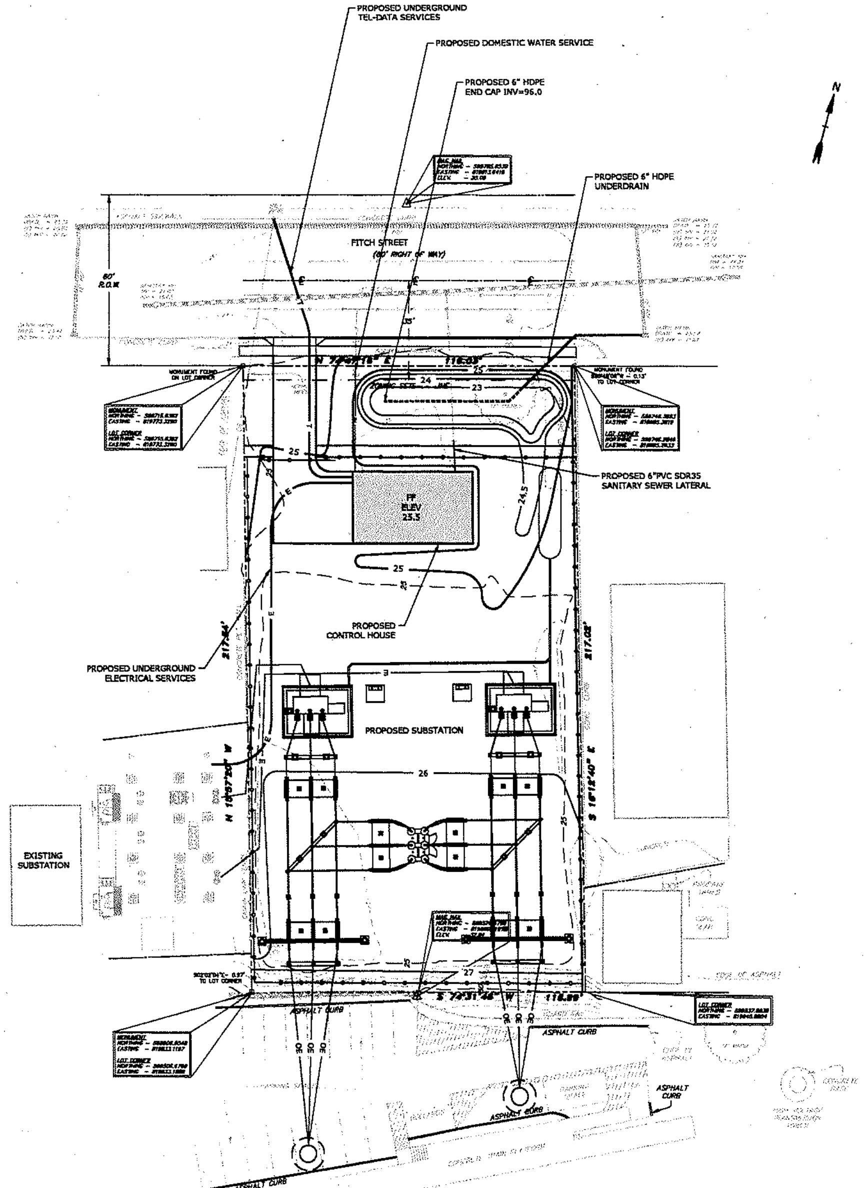
SCALE: 1" = 20'

C2.0

04/03/2012

DRAINAGE AND UTILITY PLAN LEGEND:

- —25— - PROPOSED INDEX CONTOUR
- - - 25 - - - EXISTING INDEX CONTOUR
- —24— - PROPOSED INTERMEDIATE CONTOUR
- - EXISTING INTERMEDIATE CONTOUR
- ×24.27 - EXISTING SPOT ELEVATION
- —SS— - PROPOSED SANITARY SEWER
- - EXISTING SANITARY SEWER
- - EXISTING SANITARY MANHOLE
- - PROPOSED STORM SEWER PIPE *
- - EXISTING STORM SEWER PIPE
- - EXISTING CATCH BASIN
- —PW— - PROPOSED WATER SERVICE
- - EXISTING WATER SERVICE
- - EXISTING WATER VALVE
- - EXISTING WATER METER
- - EXISTING HYDRANT
- —E— - PROPOSED ELECTRIC SERVICE
- —OE— - EXISTING OVERHEAD ELECTRIC SERVICE
- - EXISTING UTILITY POLE
- —T— - PROPOSED TELEPHONE SERVICE
- - EXISTING GAS SERVICE



DRAINAGE AND UTILITY PLAN NOTES:

1. CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" (1-800-922-4455) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.

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SCALE IN FEET 0 20' 40'
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CHECKED: CJC
APPROVED: JWB

DRAINAGE AND UTILITY PLAN

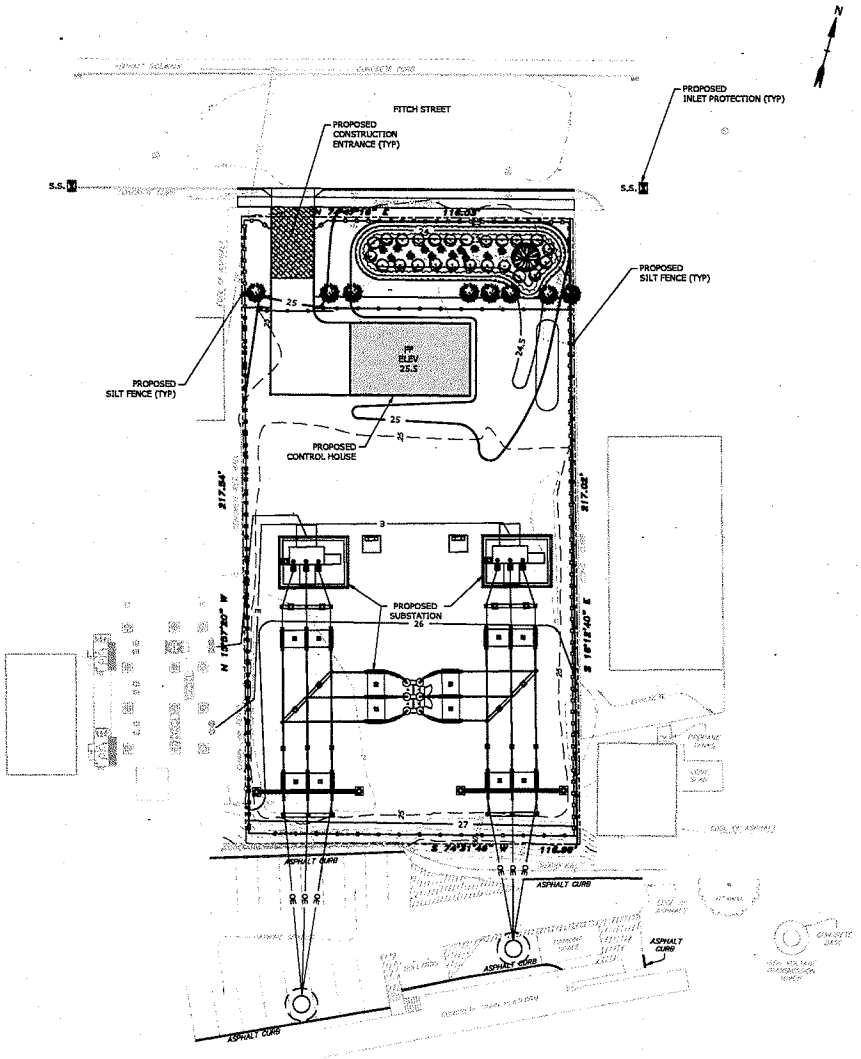
SCALE: 1" = 20'

C3.0

04/03/2012

SEDIMENTATION AND EROSION CONTROL PLAN LEGEND:

- PROPOSED SILT FENCE
- S.S. — PROPOSED SILT SACK
- PROPOSED HAYBALE RING
- PROPOSED CONSTRUCTION FENCE
- PROPOSED CONSTRUCTION FENCE GATE
- PROPOSED HAYBALE BARRIER
- PROPOSED CONSTRUCTION ENTRANCE



SEDIMENTATION AND EROSION CONTROL PLAN NOTES:

1. CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" (1-800-922-4455) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION OPERATION.
2. ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" DEP BULLETIN NO 34, AND ALL AMENDMENTS AND ADDENDA THERETO AS PUBLISHED BY THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION.
3. LAND DISTURBANCE SHALL BE KEPT TO THE MINIMUM NECESSARY FOR CONSTRUCTION.
4. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND ELSEWHERE AS ORDERED BY THE OWNER'S REPRESENTATIVE, THE CITY OR THE OWNER.
5. ALL CATCH BASINS SHALL BE PROTECTED WITH SILT SACKS, HAYBALE RING, SILT FENCE OR BLOCK AND STONE INLET PROTECTION THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL ALL DISTURBED AREAS ARE THOROUGHLY STABILIZED.
6. WHEREVER POSSIBLE, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO CONSTRUCTION.
7. ADDITIONAL CONTROL MEASURES SHALL BE INSTALLED DURING CONSTRUCTION PERIOD AS ORDERED BY THE OWNER'S REPRESENTATIVE, THE CITY OF NORWALK, OR THE OWNER.
8. ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE MAINTAINED IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
9. SEDIMENT REMOVED SHALL BE DISPOSED OF LEGALLY OFFSITE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES THROUGHOUT THE CONSTRUCTION PERIOD.
11. THE CONTRACTOR SHALL MAINTAIN A SUPPLY OF SILT FENCE/HAYBALES AND ANTI-TRACKING CRUSHED STONE ON-SITE FOR EMERGENCY REPAIRS.
12. THE CONTRACTOR SHALL UTILIZE APPROVED METHODS/MATERIALS FOR PREVENTING THE BLOWING AND MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES ONTO ADJACENT PROPERTIES AND SITE AREAS.
13. ALL DRAINAGE STRUCTURES SHALL BE INSPECTED WEEKLY BY THE CONTRACTOR AND CLEANED TO PREVENT THE BUILD-UP OF SILT.
14. THE CONTRACTOR SHALL CAREFULLY COORDINATE THE PLACEMENT OF EROSION CONTROL MEASURES WITH THE PHASING OF CONSTRUCTION.
15. KEEP ALL PAVED ROADWAYS CLEAN. SWEEP BEFORE FORECASTED STORMS OR WEEKLY AS NECESSARY.
16. TREAT ALL UNPAVED SURFACES WITH 4" MINIMUM OF TOPSOIL AND SEEDING PRIOR TO FINAL STABILIZATION.
17. HAYBALE BARRIERS AND SILT FENCING SHALL BE INSTALLED ALONG THE TOE OF CRITICAL CUT AND FILL SLOPES AS SHOWN ON THE PLANS AND AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
18. ALL TRUCKS LEAVING THE SITE MUST BE COVERED.
19. DISTURBED SLOPES SHALL BE TREATED WITH AN EROSION CONTROL SLURRY CONSISTING OF A MIXTURE OF WOOD FIBER MULCH, PLANT SEED AND 3 GALLONS/ACRE OF SILT STOP 640 LIQUID FLOCCULENT. THE FLOCCULENT IS PROVIDED BY HYDROGRASS TECHNOLOGIES, OXFORD MASSACHUSETTS.
21. ALL SEDIMENTATION AND EROSION CONTROLS SHALL BE CHECKED WEEKLY AND AFTER EACH RAINFALL EVENT. NECESSARY REPAIRS SHALL BE MADE WITHOUT DELAY.
22. PRIOR TO ANY FORECASTED RAINFALL, EROSION AND SEDIMENT CONTROLS SHALL BE INSPECTED AND REPAIRED AS NECESSARY.
23. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, EROSION CONTROLS MAY BE REMOVED ONCE AUTHORIZATION TO DO SO HAS BEEN SECURED FROM THE CITY OF NORWALK. DISTURBED AREAS SHALL BE SEEDED AND MULCHED.
24. REFER TO SHEET C5.0 FOR EROSION & SEDIMENTATION CONTROL NOTES, NARRATIVE AND DETAILS.

PLANS AND SPECIFICATIONS ARE SUBJECT TO REVISIONS PENDING FINAL SITING COUNCIL APPROVAL

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

PRELIMINARY SITING COUNCIL REVIEW SET

SCALE IN FEET 0 20' 40'
GRAPHIC SCALE

Third Taxing District

Proposed 115kv Substation

Fitch Street
Norwalk, CT

April, 2012

MARK	DATE	DESCRIPTION
PROJECT NO:		NORWG
FILE:		SE-NORWG-01.dwg
DRAWN BY:		MDS
CHECKED:		CJC
APPROVED:		JWB

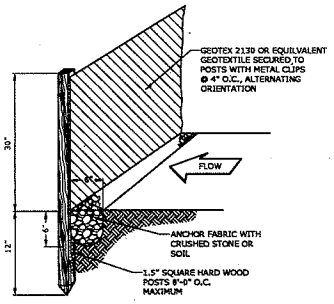
SEDIMENTATION AND EROSION CONTROL PLAN

SCALE: 1" = 20'

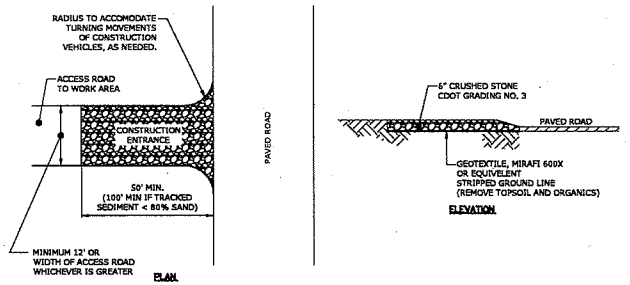
C4.0

04/03/2012

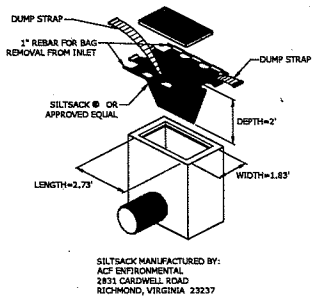
Apr 03, 2012 10:08am Plotted By: ARM
Tighe & Bond, Inc. J:\NORWG\SE-NORWG-01 TDD Siting Council Appl\DRAWINGS\D_Current\Sheets\SE-NORWG-01.dwg



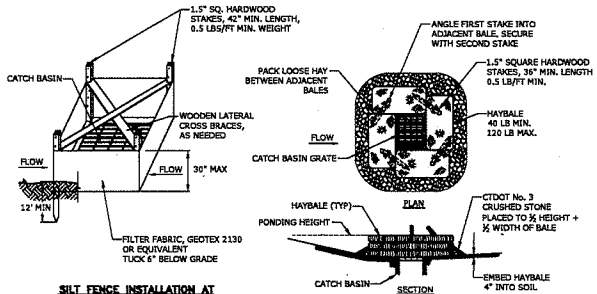
SILT FENCE
NO SCALE



CONSTRUCTION ENTRANCE
NO SCALE



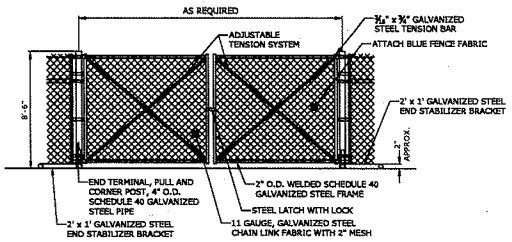
SILTSACK®
NO SCALE



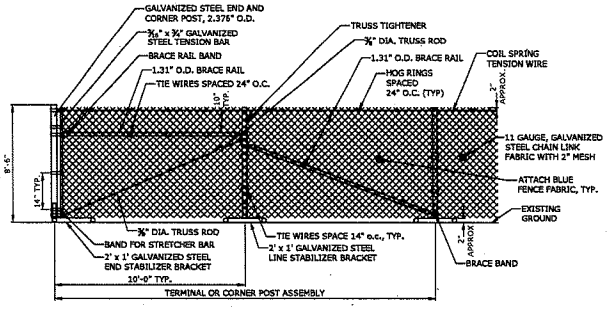
SILT FENCE INSTALLATION AT CATCH BASIN AT LOW POINTS

HAYBALE FILTER INSTALLATION AT CATCH BASIN AT LOW POINTS

CATCH BASIN EROSION CONTROL
NO SCALE



8' TEMPORARY CHAIN LINK CONSTRUCTION GATE
NO SCALE



8' TEMPORARY CHAIN LINK CONSTRUCTION FENCE
NO SCALE

SEDIMENTATION AND EROSION NARRATIVE:

1. THE THIRD TAXING DISTRICT IS PROPOSING TO CONSTRUCTION A 115/27.5KV SUBSTATION ON A 0.58 ACRE PARCEL ON 6 FITCH STREET IN NORWALK, CONNECTICUT. THE PROPOSED CONSTRUCTION INCLUDES A NEW SUBSTATIONS, UTILITY POLE, OVERHEAD WIRES, A CONTROL HOUSE, CHAIN LINK SECURITY FENCING, DIREWAY, LANDSCAPING AND GRAVEL SURFACE TREATMENT. IN ADDITION, THE PROPOSED PROJECT INCLUDES THE INSTALLATION OF THE PROPOSED CONTROL BUILDING UTILITIES INCLUDING ELECTRICAL AND TEL-DATA SERVICES, SANITARY SEWER LATERAL, AND DOMESTIC WATER SERVICE.

DISTURBANCE AND PHASING:

1. THE PROJECT IS ANTICIPATED TO BE CONSTRUCTED IN A SINGLE PHASE. THE TOTAL DISTURBED AREA IS 0.58 ACRES.

SEDIMENTATION AND EROSION CONTROL NARRATIVE:

1. FLAG THE LIMITS OF CONSTRUCTION NECESSARY TO FACILITATE THE PRECONSTRUCTION MEETING.
2. HOLD PRECONSTRUCTION MEETING. (REMEMBER TO CALL BEFORE YOU DIG 1-900-922-4455).
3. FLAG REMAINDER OF THE LIMITS OF CONSTRUCTION AND TREE PROTECTION ZONES. SECURE AREAS FROM VEHICULAR TRAFFIC AND PEDESTRIAN ACCESS.
4. INSTALL THE CONSTRUCTION ENTRANCE.
5. INSTALL PERIMETER EROSION AND SEDIMENT CONTROLS AND TREE PROTECTION DEVICES IN ACCORDANCE WITH THE EROSION AND SEDIMENTATION PLAN.
6. CUT TREES WITHIN THE DEFINED CLEARING LIMITS AND REMOVE CUT WOOD. CHIP BRUSH AND SLASH, STOCKPILE CHIPS FOR FUTURE USE OR REMOVE OFF SITE.
7. CONSTRUCT TEMPORARY SETTLING BASINS AND/OR SUMP PITS, AS REQUIRED.
8. STRIP AND STOCKPILE ALL TOPSOIL THAT IS WITHIN THE FOOTPRINT OF THE CONSTRUCTION SITE AND REFERENCE STOCKPILE MANAGEMENT FOR EROSION AND SEDIMENT CONTROLS. (SEE 2002 CT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL CHAPTER 4, PART II ON STOCKPILE MANAGEMENT). REMOVE TREE STUMPS TO AN APPROVED DISPOSAL SITE.
9. MAKE ALL CUTS AND FILLS REQUIRED. ESTABLISH THE SUBGRADE FOR THE TOPSOIL AREAS, DRIVEWAY AND GRAVEL COMPOUND AS REQUIRED AND BENCH THE CONTROL BUILDING TO A SUBGRADE. ALLOW A REASONABLE AMOUNT OF AREA AROUND THE FOOTPRINT OF THE BUILDING FOR THE CONSTRUCTION ACTIVITIES.
10. BEGIN CONSTRUCTION OF THE CONTROL HOUSE AND SUBSTATION.
11. PRIOR TO INSTALLING SURFACE WATER CONTROLS SUCH AS TEMPORARY DIVERSIONS AND STONE DIKES, INSPECT EXISTING CONDITIONS TO ENSURE DISCHARGE LOCATIONS ARE STABLE. IF NOT STABLE, REVIEW DISCHARGE CONDITIONS WITH THE DESIGN ENGINEER AND IMPLEMENT ADDITIONAL STABILIZATION MEASURES PRIOR TO INSTALLING WATER SURFACE CONTROLS.
12. INSTALL ALL SANITARY SEWER LATERAL, DRAINAGE SYSTEMS, DOMESTIC WATER SERVICE, AND UTILITIES TO WITHIN 5 FEET OF THE CONTROL HOUSE OR AS OTHERWISE MODIFIED BY THE DESIGN ENGINEER TO ADJUST FOR UNFORESEEN SITE CONDITIONS.
13. PREPARE SUB-BASE, SLOPES, DRIVEWAY, SUBSTATION COMPOUND, AND ANY OTHER AREA OF DISTURBANCE FOR FINAL GRADING.
14. INSTALL PROCESS AGGREGATE IN DRIVEWAY AREA AND GRAVEL SURFACE TREATMENT IN SUBSTATION COMPOUND.
15. PLACE TOPSOIL WHERE REQUIRED. COMPLETE THE PERIMETER LANDSCAPE PLANTINGS.
16. FINE GRADE, RAKE, SEED AND MULCH.
17. UPON SUBSTANTIAL COMPLETION OF THE CONTROL HOUSE COMPLETE THE BALANCE OF SITE WORK AND STABILIZATION OF ALL OTHER DISTURBED AREAS. INSTALL PAVING.
18. WHEN ALL OTHER WORK HAS BEEN COMPLETED, REPAIR AND SWEEP ALL PAVED AREAS. INSPECT THE DRAINAGE SYSTEM AND CLEAN AS NEEDED.
19. AFTER SITE IS STABILIZED REMOVE TEMPORARY EROSION AND SEDIMENT CONTROLS (E.G. GEOTEXTILE SILT FENCES).

PLANS AND SPECIFICATIONS ARE SUBJECT TO REVISIONS PENDING FINAL SITING COUNCIL APPROVAL

Tighe&Bond
1000 Bridgeport Avenue
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Shelton, CT 06484
(203) 712-1100

PRELIMINARY SITING COUNCIL REVIEW SET

Third Taxing District

Proposed 115kv Substation

Fitch Street
Norwalk, CT

April, 2012

MARK	DATE	DESCRIPTION
PROJECT NO:		NORWS
FILE:		SE-NORWS-C0.dwg
DRAWN BY:		MDS
CHECKED:		CJC
APPROVED:		JWB

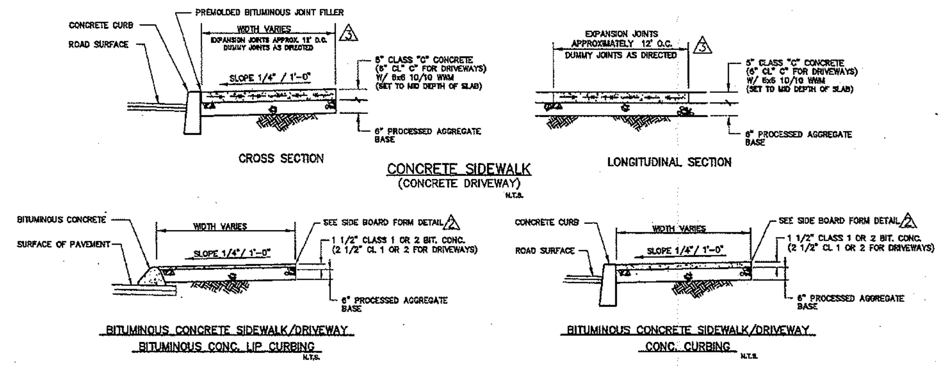
S & E SEQUENCE, NARRATIVE AND DETAILS

SCALE: AS NOTED

C5.0

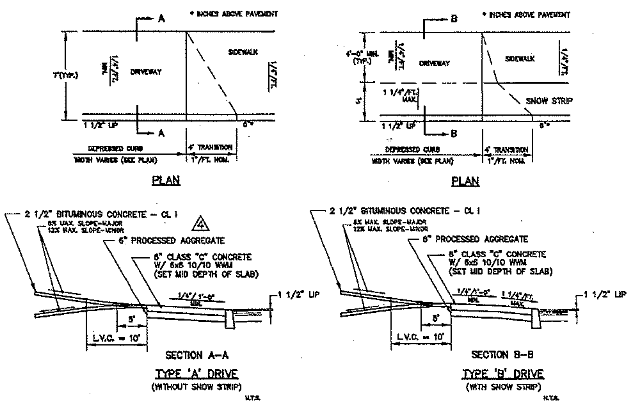
04/02/2012

Apr 03, 2012 - 10:37am Plotted By: APW
Tighe & Bond, Inc. J:\NORWS Norwalk TDD Siting Council App\DRAWINGS\C_Cover\Sheets\SE-NORWS-C0.dwg



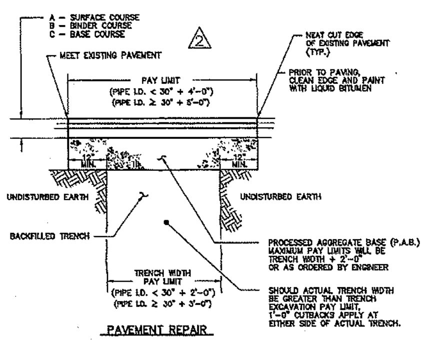
CONCRETE CURB
ROAD SURFACE
PREMOLDED BITUMINOUS JOINT FILLER
WIDTH VARIES
EXPANSION JOINTS APPROX. 12' O.C. DUMMY JOINTS AS DIRECTED
SLOPE 1/4" / 1'-0"
5" CLASS "C" CONCRETE (6" CL" C" FOR DRIVEWAYS) W/ 6x6 10/10 WWM (SET TO MID DEPTH OF SLAB)
6" PROCESSED AGGREGATE BASE
CROSS SECTION
CONCRETE SIDEWALK
(CONCRETE DRIVEWAY)
N.T.S.
EXPANSION JOINTS APPROXIMATELY 12' O.C.
DUMMY JOINTS AS DIRECTED
LONGITUDINAL SECTION
BITUMINOUS CONCRETE
SURFACE OF PAVEMENT
SEE SIDE BOARD FORM DETAIL
1 1/2" CLASS 1 OR 2 BIT. CONC. (2 1/2" CL 1 OR 2 FOR DRIVEWAYS)
BITUMINOUS CONCRETE SIDEWALK/DRIVEWAY
BITUMINOUS CONC. LIP CURBING
N.T.S.
CONC. CURBING

CITY STANDARD BITUMINOUS CONCRETE SIDEWALK/DRIVEWAY DETAILS
NO SCALE



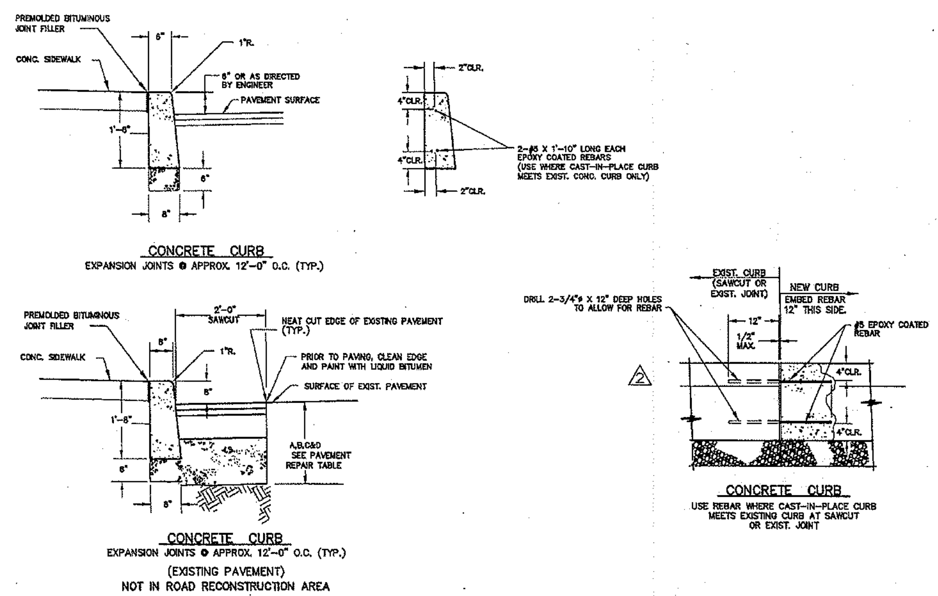
* INCHES ABOVE PAVEMENT
DRIVEWAY
SIDEWALK
1/4"/FT.
7'(TYP.)
1 1/2" LIP
DEPRESSED CURB
WIDTH VARIES (SEE PLAN)
4' TRANSITION
1"/FT. NOM.
PLAN
SNOW STRIP
2 1/2" BITUMINOUS CONCRETE – CL I
8% MAX. SLOPE–MAJOR
12% MAX. SLOPE–MINOR
6" PROCESSED AGGREGATE
6" CLASS "C" CONCRETE W/ 6x6 10/10 WWM (SET MID DEPTH OF SLAB)
1 1/2" LIP
L.V.C. = 10'
SECTION A–A
TYPE 'A' DRIVE
(WITHOUT SNOW STRIP)
SECTION B–B
TYPE 'B' DRIVE
(WITH SNOW STRIP)
N.T.S.

CITY STANDARD CONCRETE APRON WITH CONCRETE CURBING
NO SCALE



A – SURFACE COURSE
B – BINDER COURSE
C – BASE COURSE
MEET EXISTING PAVEMENT
NEAT CUT EDGE OF EXISTING PAVEMENT (TYP.)
PRIOR TO PAVING, CLEAN EDGE AND PAINT WITH LIQUID BITUMEN
PAY LIMIT
(PIPE I.D. < 30" + 4'–0")
(PIPE I.D. ≥ 30" + 5'–0")
12" MIN.
UNDISTURBED EARTH
BACKFILLED TRENCH
PROCESSED AGGREGATE BASE (P.A.B.) MAXIMUM PAY LIMITS WILL BE TRENCH WIDTH + 2'–0" OR AS ORDERED BY ENGINEER
TRENCH WIDTH PAY LIMIT
(PIPE I.D. < 30" + 2'–0")
(PIPE I.D. ≥ 30" + 3'–0")
SHOULD ACTUAL TRENCH WIDTH BE GREATER THAN TRENCH EXCAVATION PAY LIMIT, 1'–0" CUTBACKS APPLY AT EITHER SIDE OF ACTUAL TRENCH.
PAVEMENT REPAIR

CITY STANDARD PAVEMENT REPAIR DETAIL
NO SCALE



PREMOLDED BITUMINOUS JOINT FILLER
CONC. SIDEWALK
1"R.
6" OR AS DIRECTED BY ENGINEER
PAVEMENT SURFACE
2"CLR.
4"CLR.
2–#5 X 1'–10" LONG EACH EPOXY COATED REBARS (USE WHERE CAST–IN–PLACE CURB MEETS EXIST. CONC. CURB ONLY)
CONCRETE CURB
EXPANSION JOINTS @ APPROX. 12'–0" O.C. (TYP.)
2'–0" SAWCUT
NEAT CUT EDGE OF EXISTING PAVEMENT (TYP.)
PRIOR TO PAVING, CLEAN EDGE AND PAINT WITH LIQUID BITUMEN
SURFACE OF EXIST. PAVEMENT
A,B,C&D SEE PAVEMENT REPAIR TABLE
CONCRETE CURB
EXPANSION JOINTS @ APPROX. 12'–0" O.C. (TYP.)
(EXISTING PAVEMENT)
NOT IN ROAD RECONSTRUCTION AREA
DRILL 2–3/4"ø X 12" DEEP HOLES TO ALLOW FOR REBAR
EXIST. CURB (SAWCUT OR EXIST. JOINT)
NEW CURB
EMBED REBAR 12" THIS SIDE.
#5 EPOXY COATED REBAR
1/2" MAX.
CONCRETE CURB
USE REBAR WHERE CAST–IN–PLACE CURB MEETS EXISTING CURB AT SAWCUT OR EXIST. JOINT

CITY STANDARD CONCRETE CURB DETAILS
NO SCALE

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Third Taxing District

Proposed 115kv Substation

Fitch Street
Norwalk, CT

April, 2012

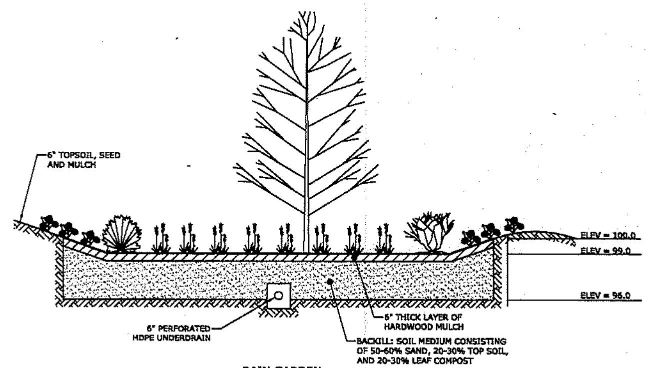
MARK	DATE	DESCRIPTION
PROJECT NO:		N0895
FILE:	DS-N0895-02.dwg	
DRAWN BY:		NDE
CHECKED:		CJC
APPROVED:		JWB

CITY OF NORWALK
STANDARD ROADWAY
DETAILS

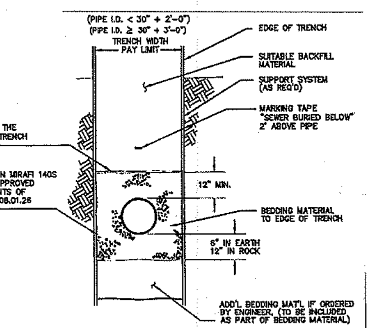
SCALE: AS NOTED

C6.0

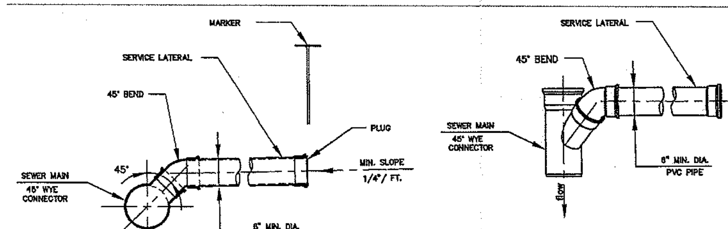
04/03/2012



RAIN GARDEN
NO SCALE


(PIPE I.D. < 30" + 2'-0")
(PIPE I.D. ≥ 30" + 3'-0")
TRENCH WIDTH
PAY LIMIT
EDGE OF TRENCH
SUITABLE BACKFILL MATERIAL
SUPPORT SYSTEM (AS REQ'D)
MARKING TAPE "SEWER BURIED BELOW" 2' ABOVE PIPE
OVERLAP ON TOP, THE ENTIRE WIDTH OF TRENCH (PAY LIMIT)
ENCASE SEWER MAIN/LATERAL TRENCH IN MIRAFI 140S OR SUPAC 5NP FILTER FABRIC OR AN APPROVED EQUAL CONFORMING TO THE REQUIREMENTS OF CONN DOT FORM 816, 2004, ARTICLE M.08.01.26 AS AMENDED.
12" MIN.
BEDDING MATERIAL TO EDGE OF TRENCH
6" IN EARTH
12" IN ROCK
ADD'L BEDDING MAT'L IF ORDERED BY ENGINEER, (TO BE INCLUDED AS PART OF BEDDING MATERIAL)

CITY STANDARD SANITARY SEWER
TYPICAL TRENCH SECTION
NO SCALE



SECTION

PLAN
1" = 1'-0"

CITY STANDARD SANITARY SEWER
STANDARD SERVICE LATERAL CONNECTION
NO SCALE

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(203) 712-1100

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Third Taxing District

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Fitch Street
Norwalk, CT

April, 2012

MARK	DATE	DESCRIPTION

PROJECT NO:	N0885
FILE: DS-N0885-02.dwg	
DRAWN BY:	HDB
CHECKED:	CJC
APPROVED:	JWB

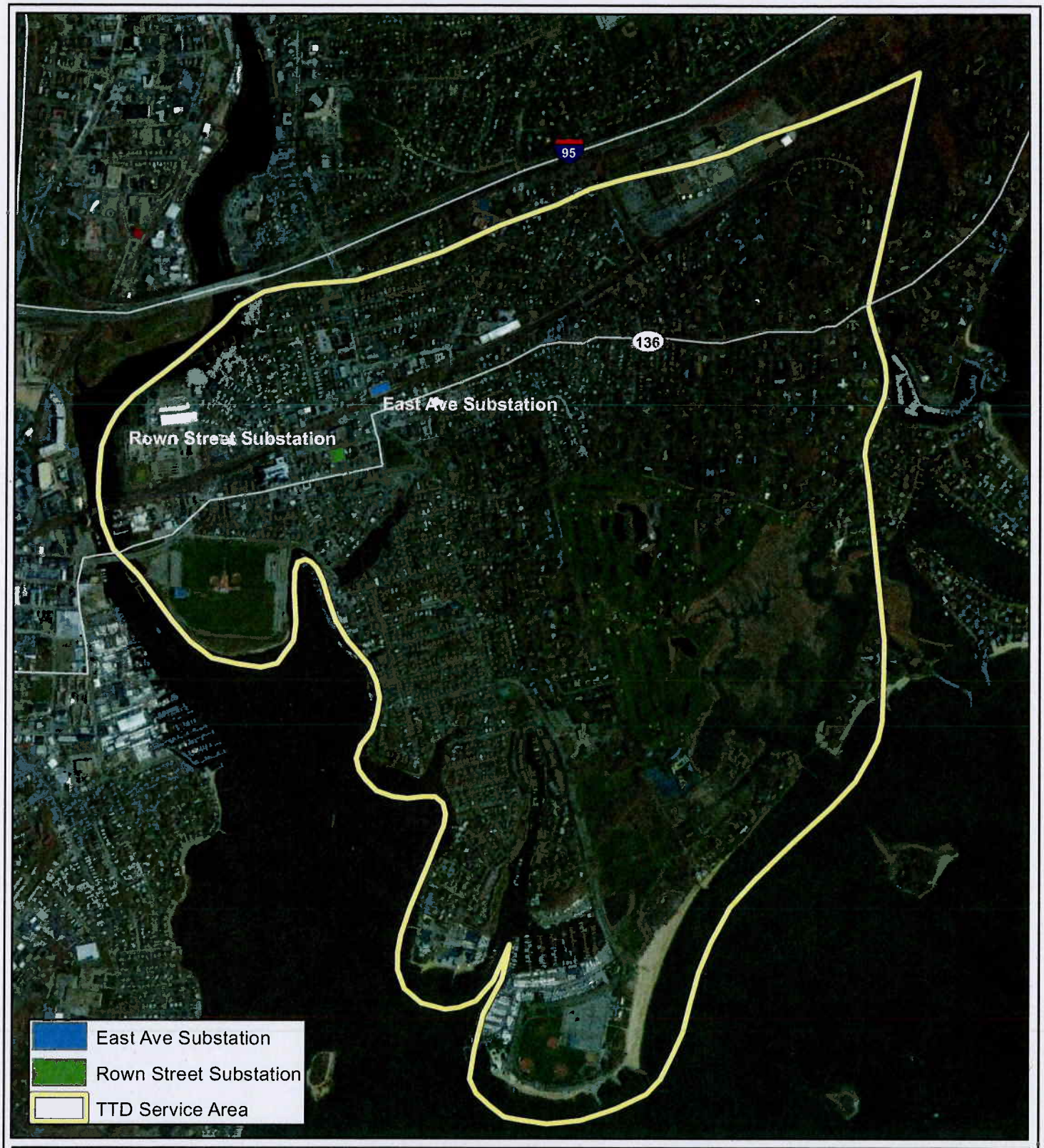
CITY OF NORWALK
STANDARD UTILITY
DETAILS

SCALE: AS NOTED

C6.1

04/03/2012

TAB C-1



1:18,000

0 1,500

Feet

Based on USGS Topographic Map for Norwalk, CT Quadrangle. Revised 1986

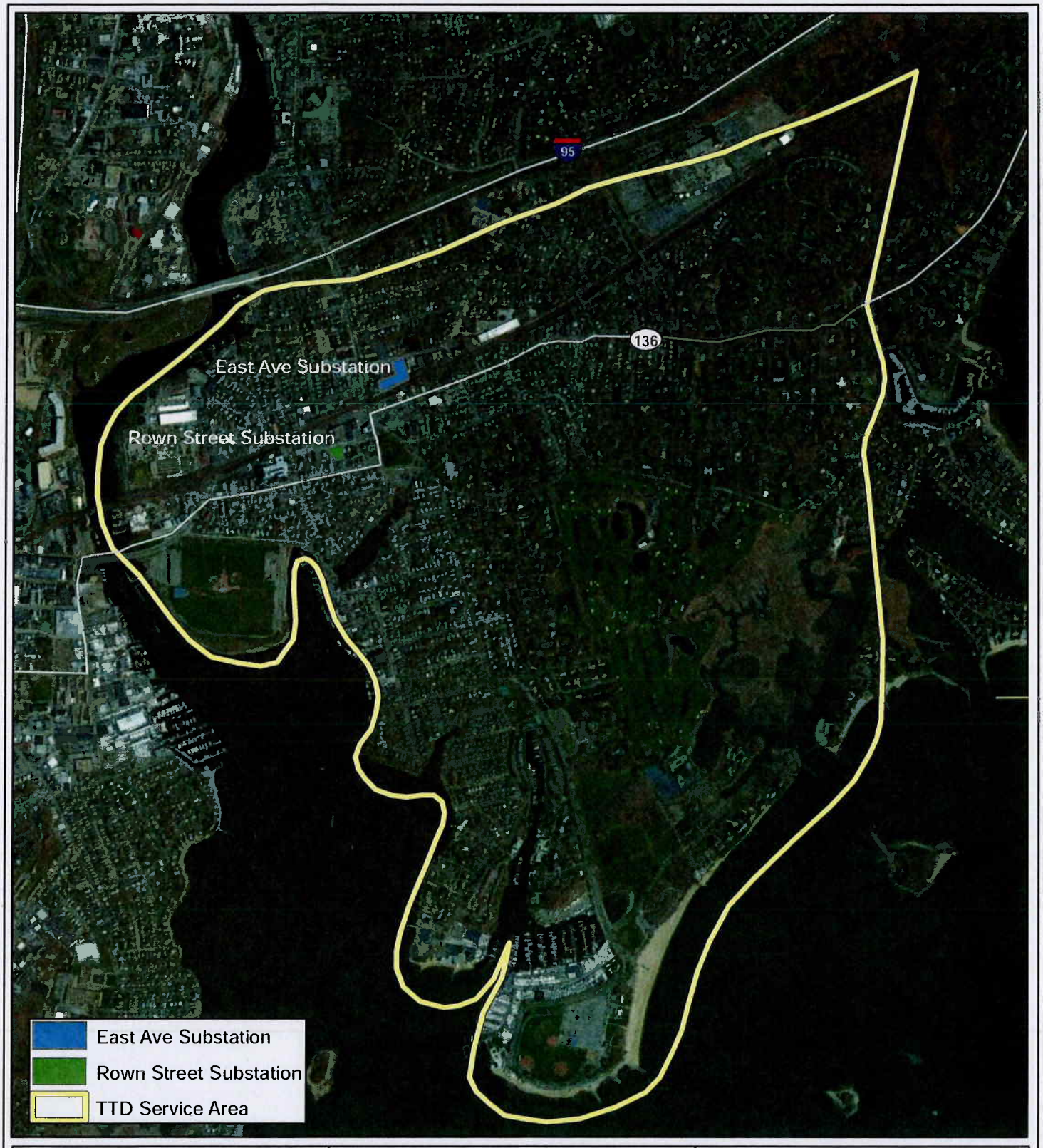
N
W E
S

FIGURE G-1
EXISTING NORWALK AREA SUBSTATION SYSTEM
New 115 kV Substation
Fitch Street
Norwalk, Connecticut
Tighe&Bond
April, 2012

G:\GIS\CT\SiteLocus\NorwalkC I \FigureG-1.mxd Date Saved: 4/3/2012 User: ncd

F-0203

TAB C-2



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Feet

Based on USGS Topographic Map for Norwalk, CT Quadrangle. Revised 1986

FIGURE G-2
FUTURE NORWALK AREA SUBSTATION SYSTEM

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

December, 2011

G:\GIS\CT\SiteLocus\NorwalkCT\FigureG-2.mxd Date Saved: 12/8/2011 User: scs

F-0203

TAB D-1

1:1,200

0 100

Feet

Ortho: Bing, 2010

N

W E

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FIGURE H-1
EXISTING CONDITIONS

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

April, 2012

G:\GIS\CT\SiteLocus\NorwalkCT\FigureH-1.mxd Date Saved: 4/3/2012 User: ncd

N-0895

TAB D-2

1:1,200

0 100

Feet

Ortho: Bing, 2010

N

W E

S

FIGURE H-2
NEAREST RESIDENCES

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

Date: 4/3/2012

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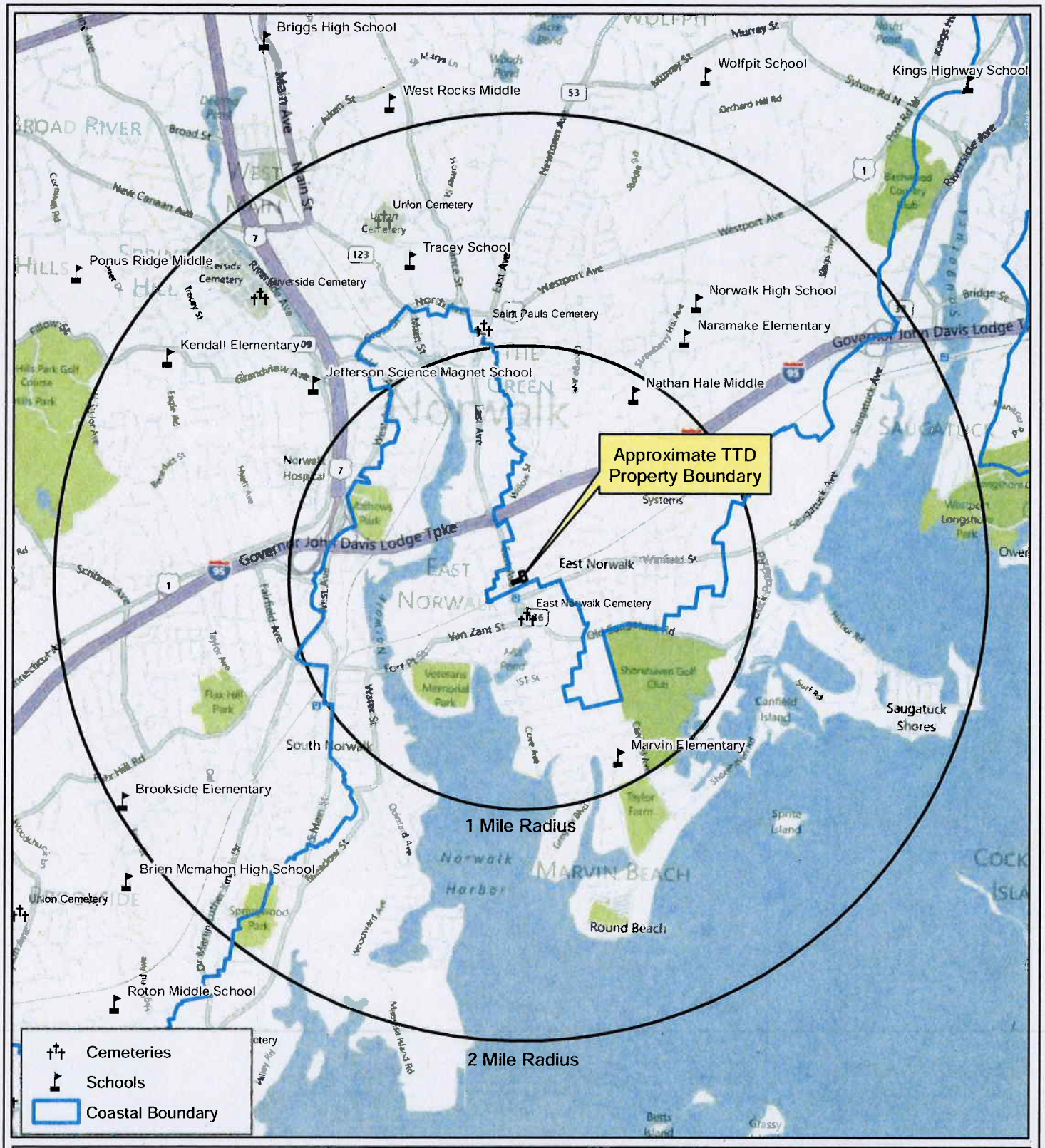
N-0895

TAB D-3



1:36,000

0 3,000

Feet

Bing Maps

FIGURE H-3
SURROUNDING FEATURES

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

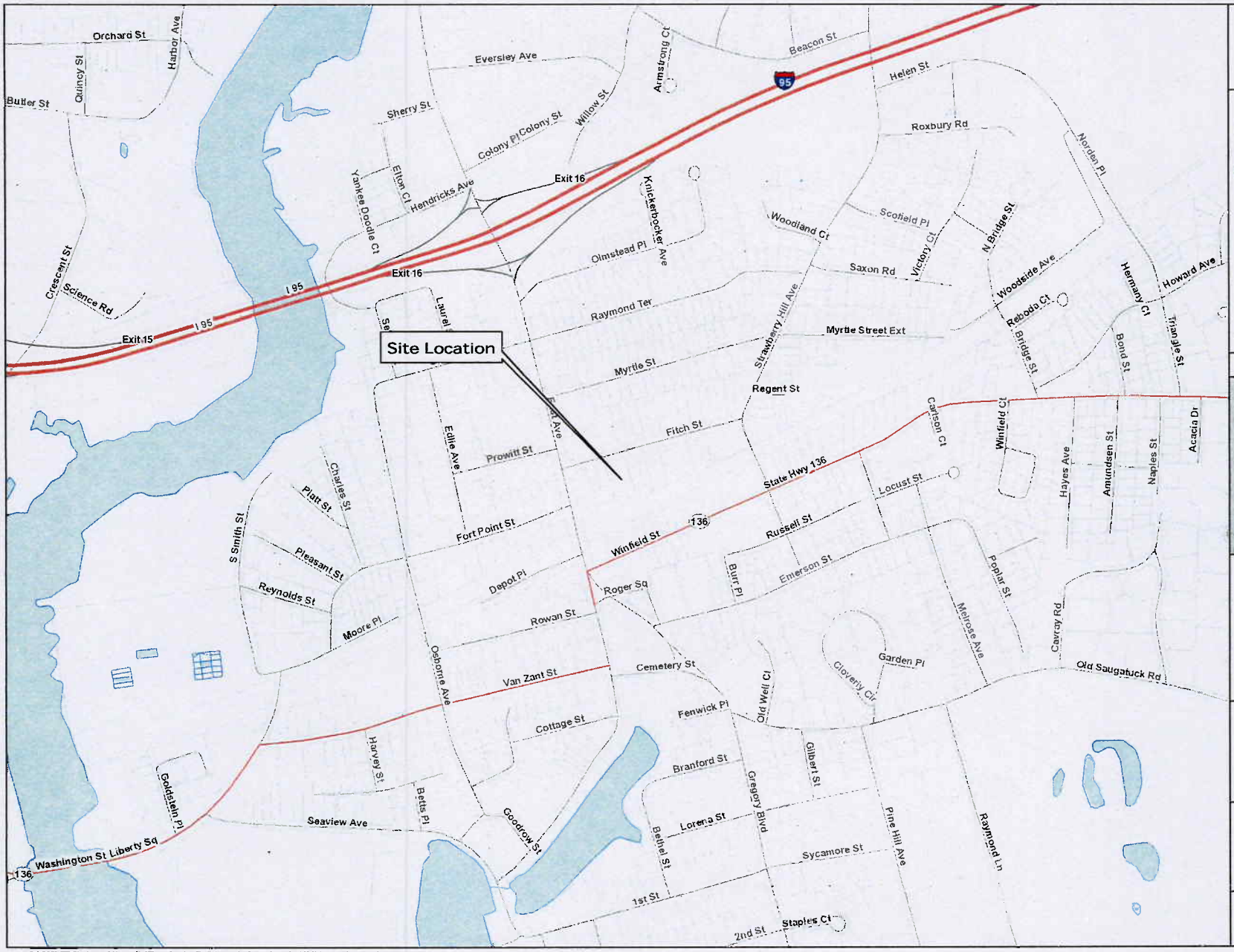
Tighe&Bond

December, 2011

G:\GIS\CT\SiteLocus\NorwalkCT\FigureH-3.mxd Date Saved: 12/8/2011 User: scs

F-0203

TAB E-1



G:\GIS\CT\SiteLocus\NorwalkCT\wetlands_FitchSt.mxd Data Saved: 4/3/2012 User: ncd

WETLANDS MAP

LEGEND

Wetlands

- Alluvial and floodplain soils
- Poorly drained and/or very poorly drained soils

LOCUS MAP

0 500 1,000 Feet

1 " = 500 '

NOTES

Data source: CT DEP

Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

New 115 kV Substation
Fitch Street
Norwalk, Connecticut
April, 2012

Tighe&Bond

FIGURE
H-4

TAB E-2

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for State of Connecticut

6 Fitch Street

December 8, 2011

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

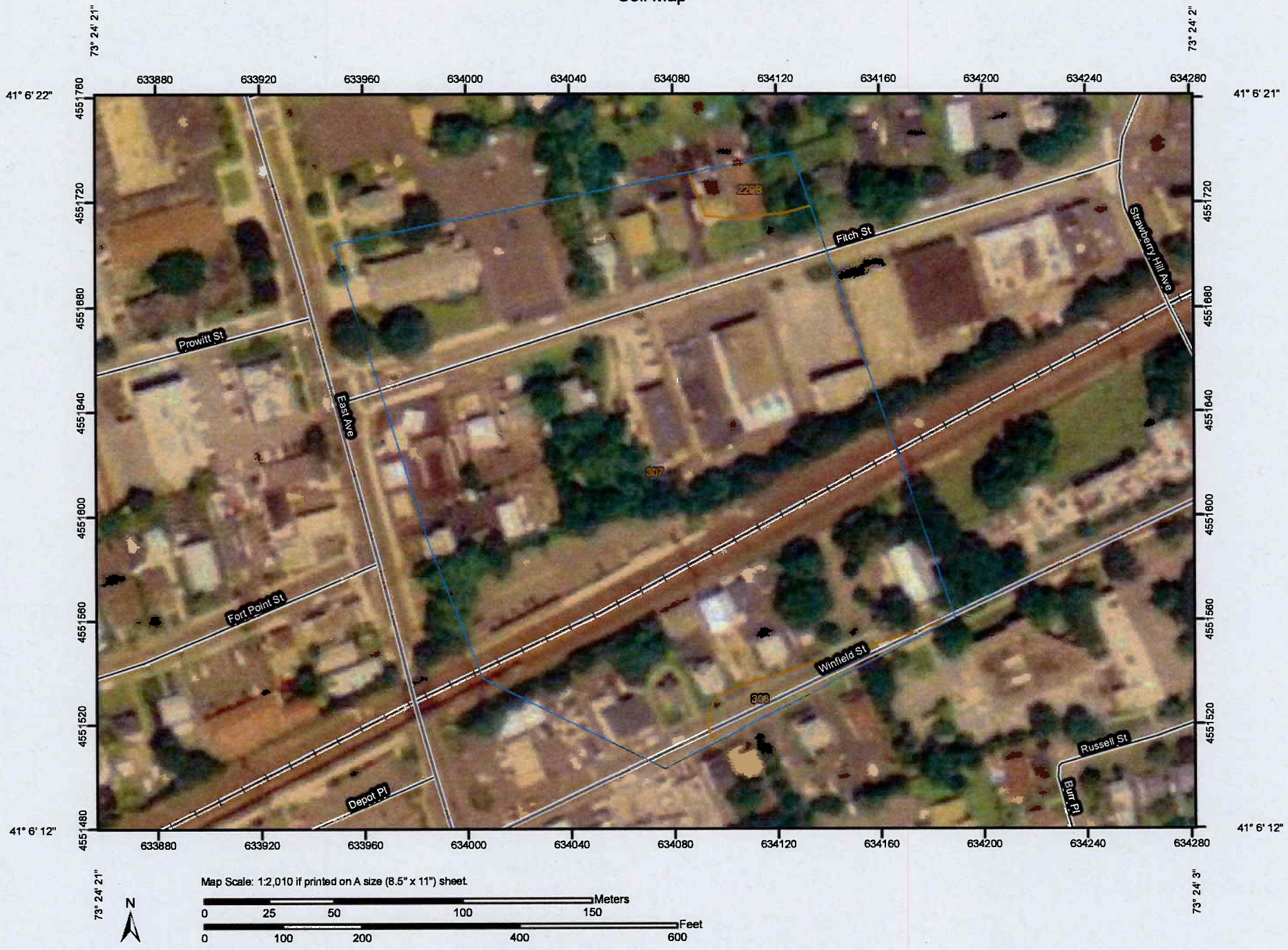
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:2,020 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 10, Mar 31, 2011

Date(s) aerial images were photographed: 7/16/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
229B	Agawam-Urban land complex, 0 to 8 percent slopes	0.2	2.3%
306	Udorthents-Urban land complex	0.2	2.3%
307	Urban land	8.7	95.4%
Totals for Area of Interest		**9.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

229B—Agawam-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days

Map Unit Composition

Agawam and similar soils: 40 percent
Urban land: 35 percent
Minor components: 25 percent

Description of Agawam

Setting

Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.8 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 8 inches: Fine sandy loam
8 to 14 inches: Fine sandy loam
14 to 24 inches: Fine sandy loam
24 to 60 inches: Stratified very gravelly coarse sand to fine sand

Description of Urban Land

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 6 inches: Material

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, kames, outwash plains, terraces
Down-slope shape: Convex

Across-slope shape: Convex

Merrimac
Percent of map unit: 5 percent
Landform: Kames, outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear

Walpole
Percent of map unit: 5 percent
Landform: Depressions on terraces, drainageways on terraces
Down-slope shape: Concave
Across-slope shape: Concave

Udorthents
Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear

Scarboro
Percent of map unit: 3 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

Unnamed, red parent material
Percent of map unit: 2 percent

306—Udorthents-Urban land complex

Map Unit Setting
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days

Map Unit Composition
Udorthents and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent

Description of Udorthents

Setting
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Properties and qualities
Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.8 inches)

Interpretive groups
Land capability (nonirrigated): 3e

Typical profile
0 to 5 inches: Loam
5 to 21 inches: Gravelly loam
21 to 80 inches: Very gravelly sandy loam

Description of Urban Land

Interpretive groups
Land capability (nonirrigated): 8

Typical profile
0 to 6 inches: Material

Minor Components

Unnamed, undisturbed soils
Percent of map unit: 8 percent

Udorthents, wet substratum
Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear

Rock outcrop
Percent of map unit: 2 percent

307—Urban land

Map Unit Setting
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days

Map Unit Composition
Urban land: 80 percent
Minor components: 20 percent

Description of Urban Land

Interpretive groups

Land capability (nonirrigated): 8

Typical profile

0 to 6 inches: Material

Minor Components

Udorthents, wet substratum

Percent of map unit: 10 percent
Down-slope shape: Convex
Across-slope shape: Linear

Unnamed, undisturbed soils

Percent of map unit: 10 percent

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://soils.usda.gov/

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://soils.usda.gov/

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://soils.usda.gov/

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://soils.usda.gov/

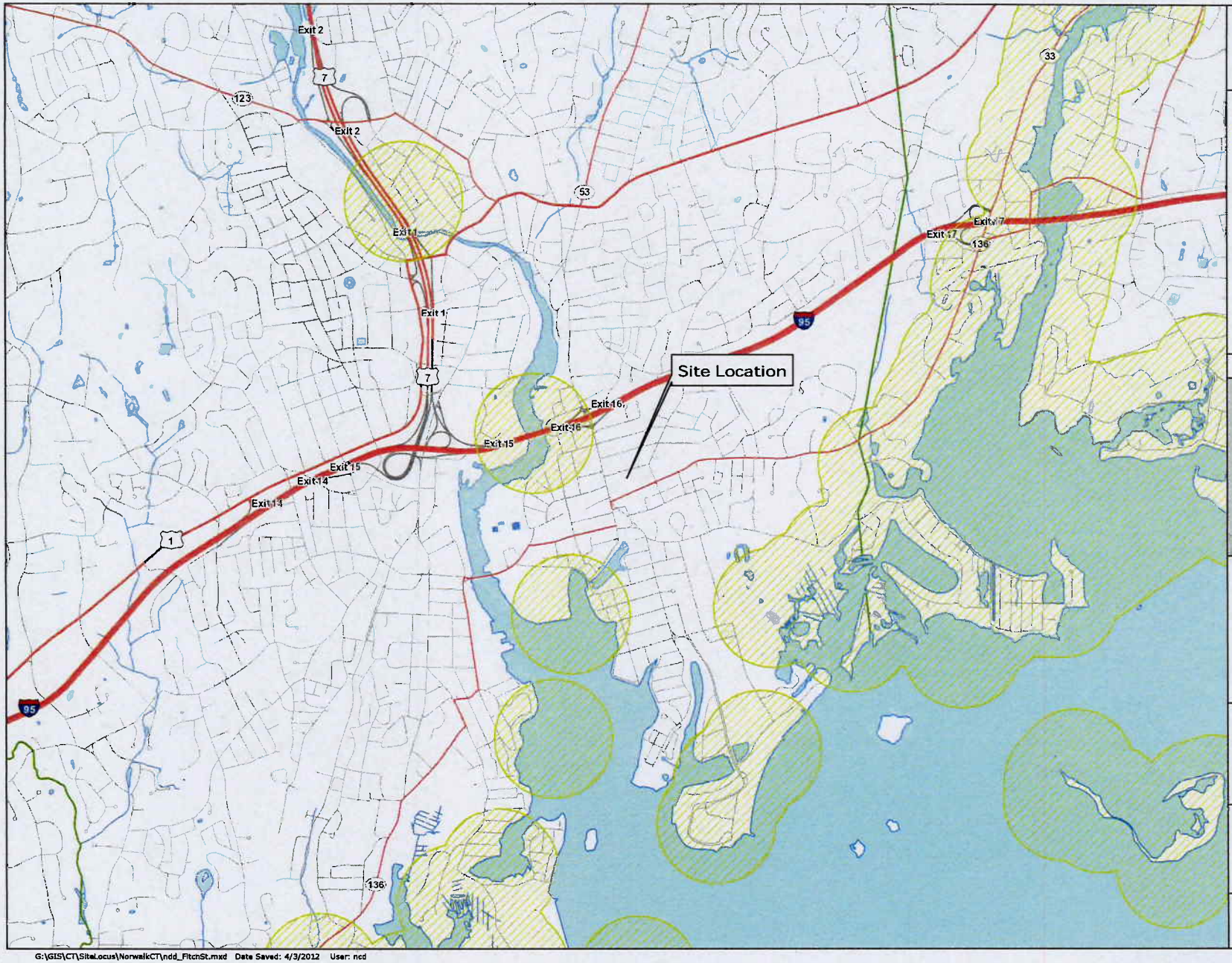
United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.glti.nrcs.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://soils.usda.gov/

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://soils.usda.gov/

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210.

TAB E-3



NATIONAL DIVERSITY DATABASE AREAS

LEGEND

Natural Diversity Area (December 2011)

LOCUS MAP

N

0 2,000 4,000 Feet

1 " = 2,000 '

NOTES

Data source: CT DEP

Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

New 115 kV Substation
Fitch Street
Norwalk, Connecticut
April, 2012

Tighe&Bond

FIGURE
H-5

G:\GIS\CT\SiteLocus\NorwalkCT\ndd_FitchSt.mxd Date Saved: 4/3/2012 User: ncd

TAB E-4

GROUNDWATER & SURFACE WATER CLASSIFICATION MAP

LEGEND

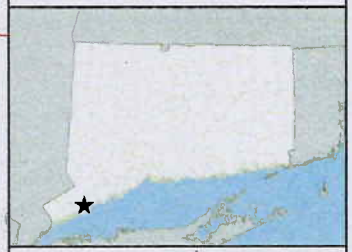
Coastal and Marine Surface Waters
- SA
- SB; SB/SA
- SC/SA; SC/SB
- SD/SA; SD/SB

Surface Water Quality Classification
- A
- AA
- B
- B,C,D to A
- C,D to B

Surface Water Quality Classification
- A
- AA
- B
- B, C, D to A
- C, D to B

Ground Water Quality Classification
- GA
- GAA, GAAs
- GB
- GC
- GA, GAA May be Impaired

LOCUS MAP



0 500 1,000 Feet

1 " = 500 '

NOTES

Data source: CT DEP

Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Feet US

New 115 kV Substation
Fitch Street
Norwalk, Connecticut
April, 2012

Tighe&Bond

FIGURE
H-6A

G:\GIS\CT\SiteLocus\NorwalkCT\groundwater_FitchSt.mxd Date Saved: 4/3/2012 User: ncd

TAB E-5

AQUIFER PROTECTION AREAS

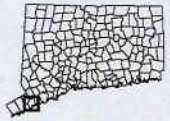
NORWALK, CT

August 29, 2011

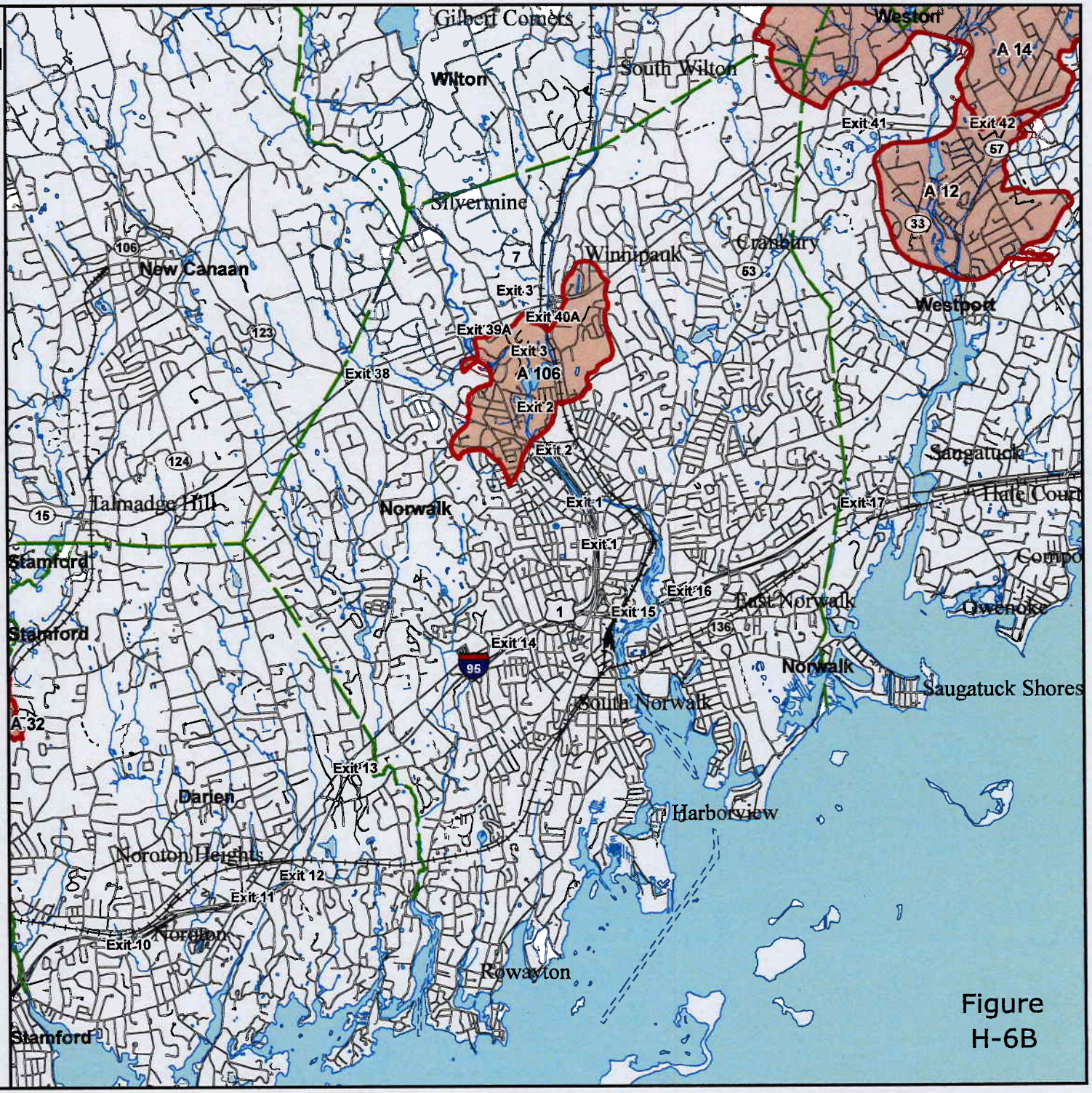
- A # Level A APA (Final Adopted)
- A # Level A APA (Final)
- B # Level B APA (Preliminary)
- # APA ID Number
- Town Boundary

NOTE: This map shows Connecticut's Aquifer Protection Areas, as delineated through the Level A and Level B Mapping Processes. Aquifer Protection Areas are delineated for active public water supply wells in stratified drift that serve more than 1000 people, in accordance with Sections 22a-354c and 22a-354z of the Connecticut General Statutes. Level B Mapping delineates a preliminary aquifer protection area, providing an estimate of the land area from which the well draws its water. Level A Mapping delineates the final Aquifer Protection Area, which becomes the regulatory boundary for land use controls designed to protect the well from contamination. As Level A Mapping is completed for each well field and approved by DEEP, it will replace the Level B Mapping. Towns that have adopted the Aquifer Protection Areas at the local level and for which landuse regulations are now in place are designated by the solid pink/red shading.

QUESTIONS: DEEP, Bureau of Water Protection and Land Reuse, Planning and Standards Division
Phone (860) 424-3020
www.ct.gov/deep/aquiferprotection



Connecticut Department of Energy & Environmental Protection



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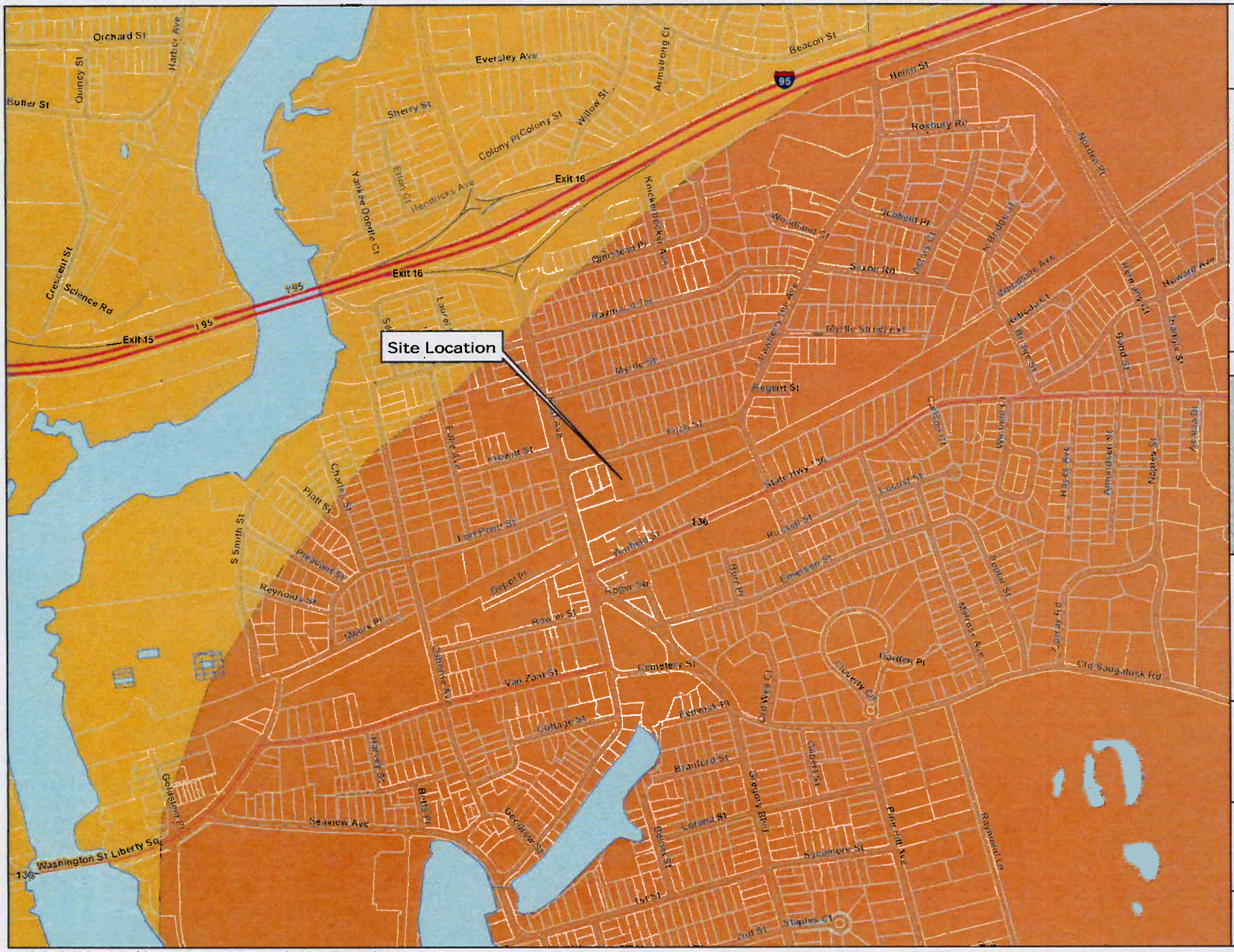


BEDROCK GEOLOGY

LEGEND

- Trap Falls Formation and Ordovician? granitic gneiss undivided
- Unmapped

LOCUS MAP

0 500 1,000 Feet

1 " = 500 '

NOTES

Data source: CT DEP

Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

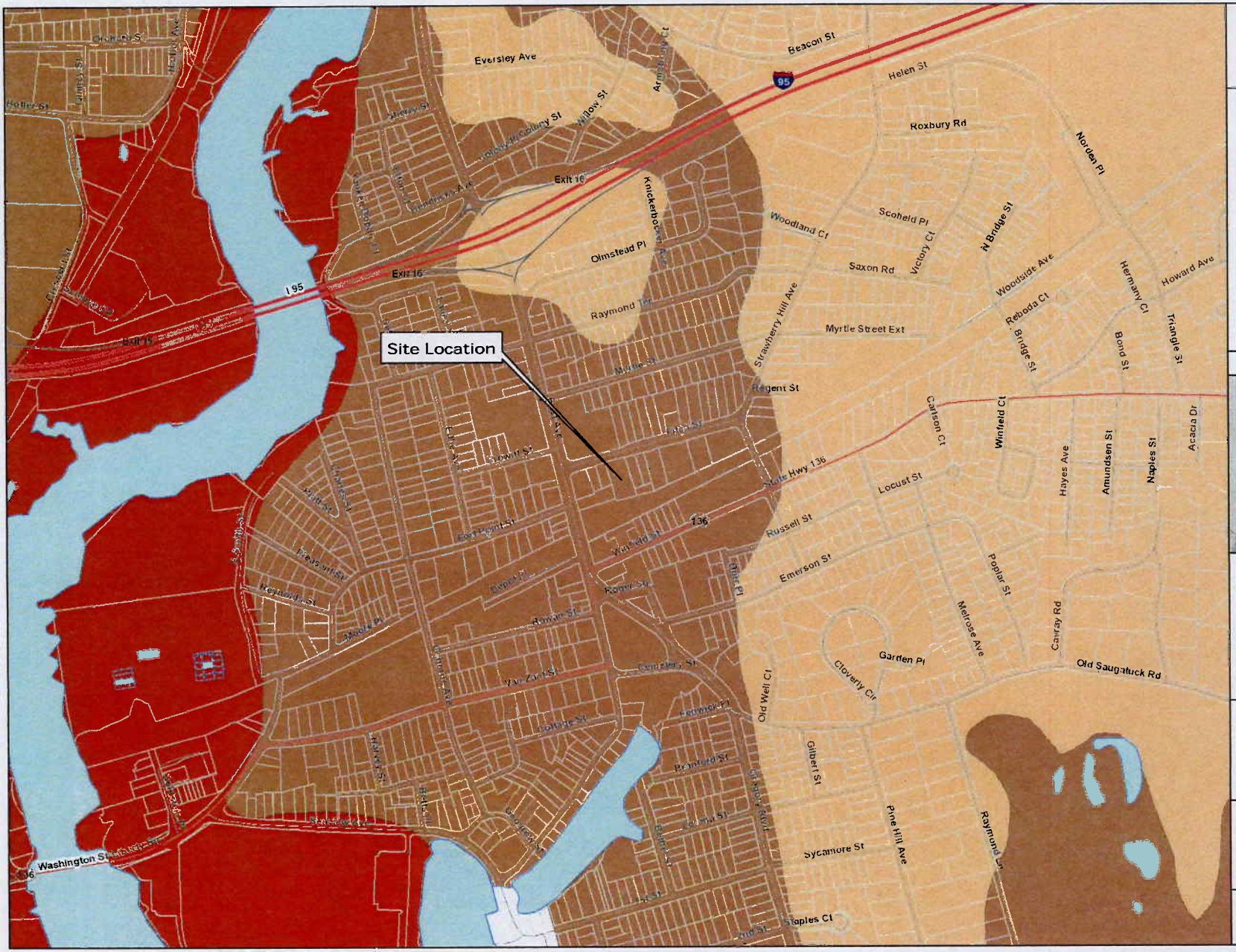
New 115 kV Substation
Fitch Street
Norwalk, Connecticut
April, 2012

Tighe&Bond

FIGURE
H-9A

G:\GIS\CT\SiteLocus\NorwalkCT\bedrock_FitchSt.mxd Date Saved: 4/3/2012 User: ncd

TAB E-7

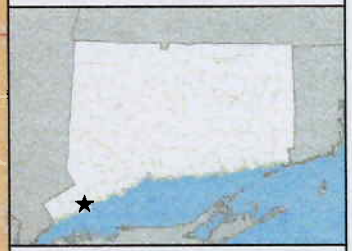


SURFICIAL MATERIALS

LEGEND

- Artificial Fill
- Coarse
- Till

LOCUS MAP



0 500 1,000 Feet

1 " = 500 '

NOTES

Data source: CT DEP

Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

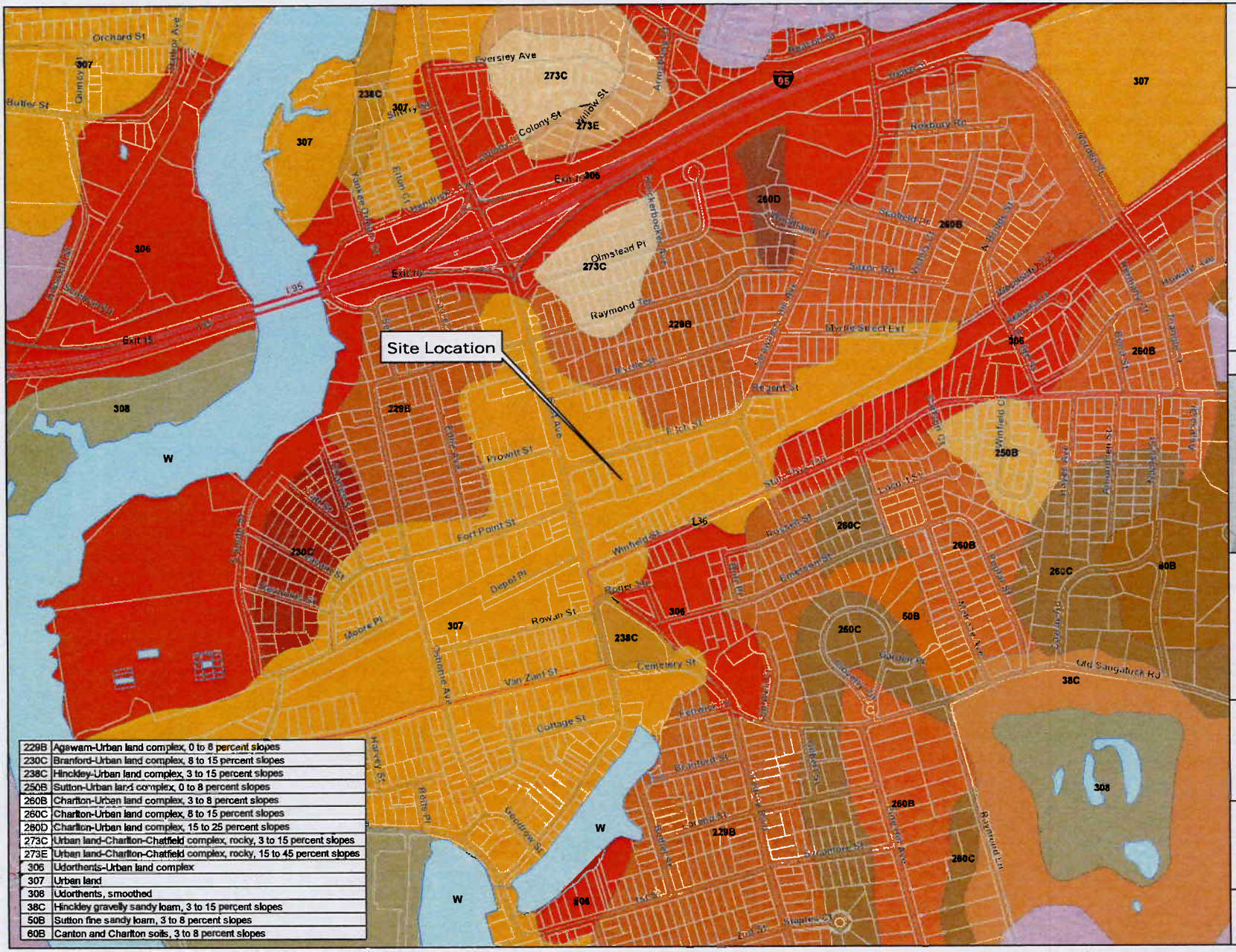
New 115 kV Substation
Fitch Street
Norwalk, Connecticut
April, 2012

Tighe&Bond

FIGURE
H-9B

G:\GIS\CT\SiteLocus\Norwalk CT\surficial_FitchSt.mxd Date Saved: 4/3/2012 User: ncd

TAB E-8



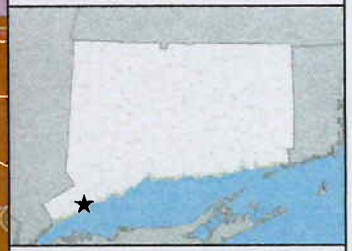
229B	Agawam-Urban land complex, 0 to 8 percent slopes
230C	Branford-Urban land complex, 8 to 15 percent slopes
238C	Hinckley-Urban land complex, 3 to 15 percent slopes
250B	Sutton-Urban land complex, 0 to 8 percent slopes
260B	Charlton-Urban land complex, 3 to 8 percent slopes
260C	Charlton-Urban land complex, 8 to 15 percent slopes
260D	Charlton-Urban land complex, 15 to 25 percent slopes
273C	Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes
273E	Urban land-Charlton-Chatfield complex, rocky, 15 to 45 percent slopes
306	Udorthents-Urban land complex
307	Urban land
308	Udorthents, smoothed
38C	Hinckley gravelly sandy loam, 3 to 15 percent slopes
50B	Sutton fine sandy loam, 3 to 8 percent slopes
60B	Canton and Charlton soils, 3 to 8 percent slopes

G:\GIS\CT\SiteLocus\NorwalkCT\soils_FitchSt.mxd Date Saved: 4/3/2012 User: ncd

SOILS MAP

LEGEND

LOCUS MAP



0 500 1,000 Feet

1 " = 500 '

NOTES

Data source: CT DEP

Coordinate System: NAD 1983 StatePlane Connecticut FIPS 0600 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Units: Foot US

New 115 kV Substation
Fitch Street
Norwalk, Connecticut
April, 2012

Tighe&Bond

FIGURE
H-9C

TAB E-9

MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0532F

FIRM

FLOOD INSURANCE RATE MAP

FAIRFIELD COUNTY, CONNECTICUT
(ALL JURISDICTIONS)

PANEL 532 OF 626

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NORWALK, CITY OF	090012	0532	F
WESTPORT, TOWN OF	090019	0532	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community

MAP NUMBER
09001C0532F

EFFECTIVE DATE
JUNE 18, 2010

Federal Emergency Management Agency

Figure H-10

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

TAB E-10

Table H-1
Non-Residential Features within Two Miles of the Property in Norwalk

Name	Address	Location from Property
Schools		
Clas Academy	25 Van Zant Street	0.5 miles southwest
Gibbs College	10 Norden Place	0.7 miles northeast
Nathan Hale Middle School	176 Strawberry Hill Avenue	1.2 miles northeast
Marvin Elementary School	15 Calf Pasture Beach Road	1.2 miles south
Norwalk High School	55 County Street	1.5 miles northeast
Columbus Magnet School	46 Concord Street	1.6 miles southwest
Tracey School	20 Camp Street	1.6 miles north
Jefferson Science Magnet School	75 Van Buren Avenue	1.7 miles northwest
Kendall Elementary School	57 Fillow St	1.8 miles northwest
Naramake Elementary School	16 King Street	2 miles northeast
Brookside Elementary School	382 Highland Ave	2 miles southwest
Child Daycare Facilities		
Bright Beginning Academy	244 East Avenue	0.3 miles south
Apple Tree Pre-school	131 Strawberry Hill Avenue	0.7 miles northeast
Playgrounds		
Apple Tree Pre-school	131 Strawberry Hill Avenue	0.7 miles northeast
Nathan Hale Middle School	176 Strawberry Hill Avenue	1.2 miles northeast
Hospitals		
Norwalk Hospital	121 Water St	1.3 miles southwest
Norwalk Hospital	34 Maple St, Norwalk, CT	1.7 miles northwest
Parks and Beaches		
Mill Pond Park	Mill Pond Park	0.5 miles south
Norwalk Harbor Walk	Norwalk Harbor Walk	0.6 miles northwest
Edgewater Park	Edgewater Park	0.7 miles south
Shorehaven Golf Club	Shorehaven Golf Club	0.7 miles southeast
Eric Malmquist Field	Eric Malmquist Field	0.8 miles north
Consistution Park	Consistution Park	0.8 miles southwest
Liberty Square	Liberty Square	0.8 miles southwest
Veterans Memorial Park	Veterans Memorial Park	0.8 miles southwest
Ludlow Park	Ludlow Park	0.9 miles south
Matthews Park	104 Shorefront Park	0.9 miles northwest
Jennie Jenks Park	Jennie Jenks Park	0.9 miles northeast
East Norwalk Historical Cemetery	2 East Wall Street	1 mile north
Charles Creek Park	Charles Creek Park	1.1 miles south
John H. Ryan Park	John H. Ryan Park	1.4 miles southwest
Taylor Farm Park	Taylor Farm Park	1.4 miles south
Flax Hill Park	213 Flax Hill Road	1.6 miles southwest
Shady Beach	Shady Beach Park	1.7 miles south
Springwood Park	2 Meadow Street	1.9 miles southwest
Calf Pasture Beach Park (Round Beach)	69 Calf Pasture Beach Rd	2 miles south
Oak Hills Park Golf Course	104 Shorefront Park	2 miles northwest
Group Homes		
Former Fitch School	73 Strawberry Hill Ave	0.4 miles northeast
The Marvin Senior Center	60 Gragory Blvd	0.7 miles south
Licensed Youth Camps		
none identified within two miles		
Hunting and Wildlife Management Areas		
none identified within two miles		

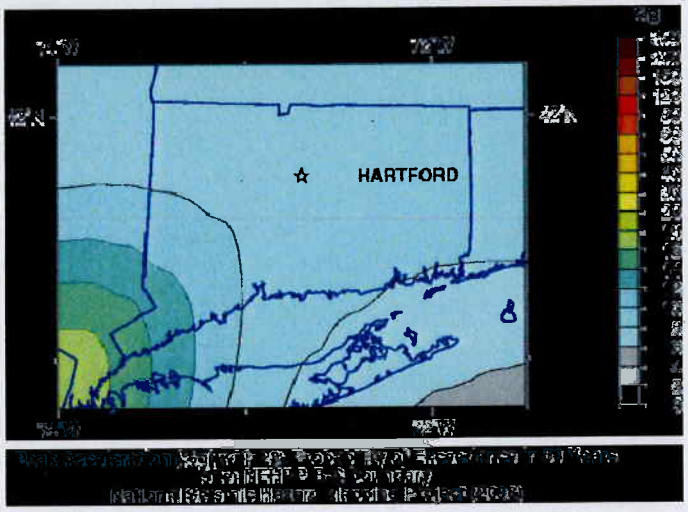
TAB E-11

USGS
science for a changing world

Earthquake Hazards Program

Connecticut

Seismic Hazard Map



USGS National Seismic Hazard Maps

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Contact Weston Observatory
Earth and Environmental Science

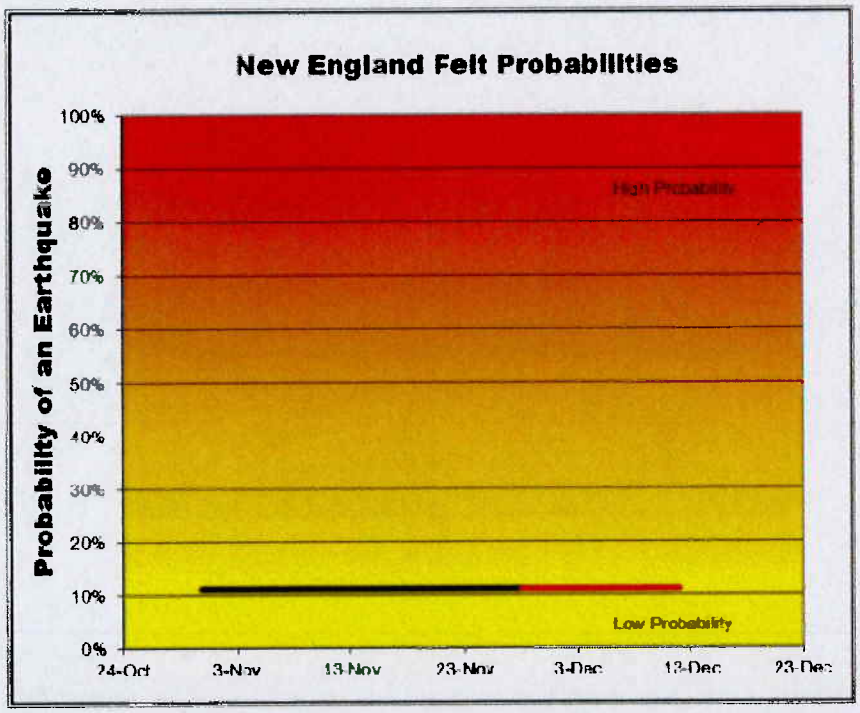
bc home > research > weston observatory > northeast earthquakes > earthquake probabilities

New England Earthquake Probabilities

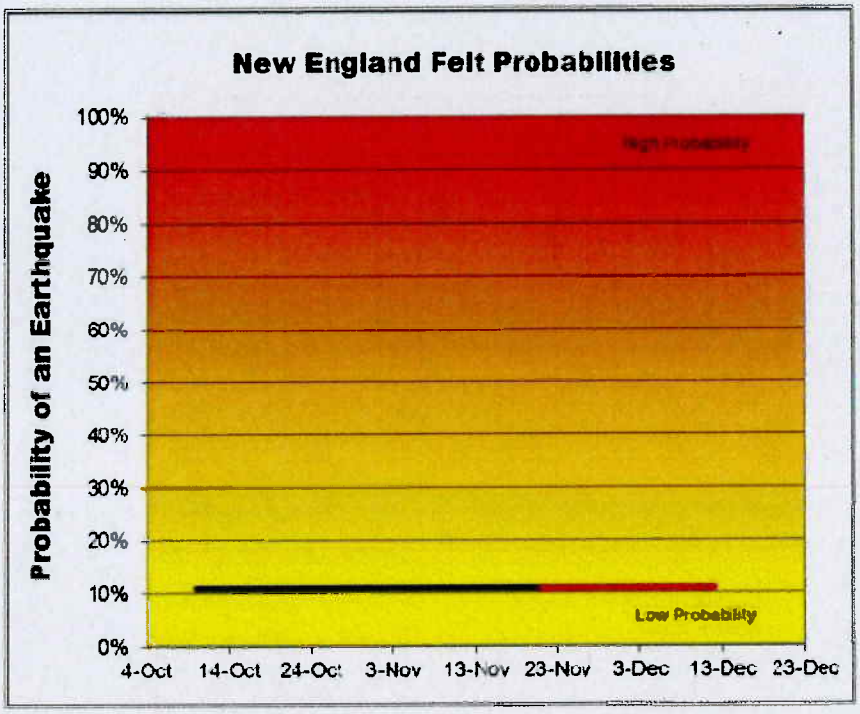
This page was last updated on Monday, December 5th, 2011.

These earthquake probabilities are computed based on an analysis of the earthquake activity in New England from 1975-1999 and are presented here on an experimental basis for informational purposes only. Earthquakes smaller than magnitude 2.7 were not included in the analysis and so do not affect the probability values. Please address any questions or comments to weston.observatory@bc.edu.

The last earthquake in the New England region with magnitude 2.7 or greater occurred on September 26th, 2010. The magnitude 3.1 Mn earthquake was located 9.0km NNE of Contoocook, NH. For 7 days after September 26th, there was a 22 percent chance of another felt earthquake (magnitude 2.7 or greater) centered somewhere in New England. No such earthquake occurred during this seven day period, therefore the probability dropped back to 11 percent.



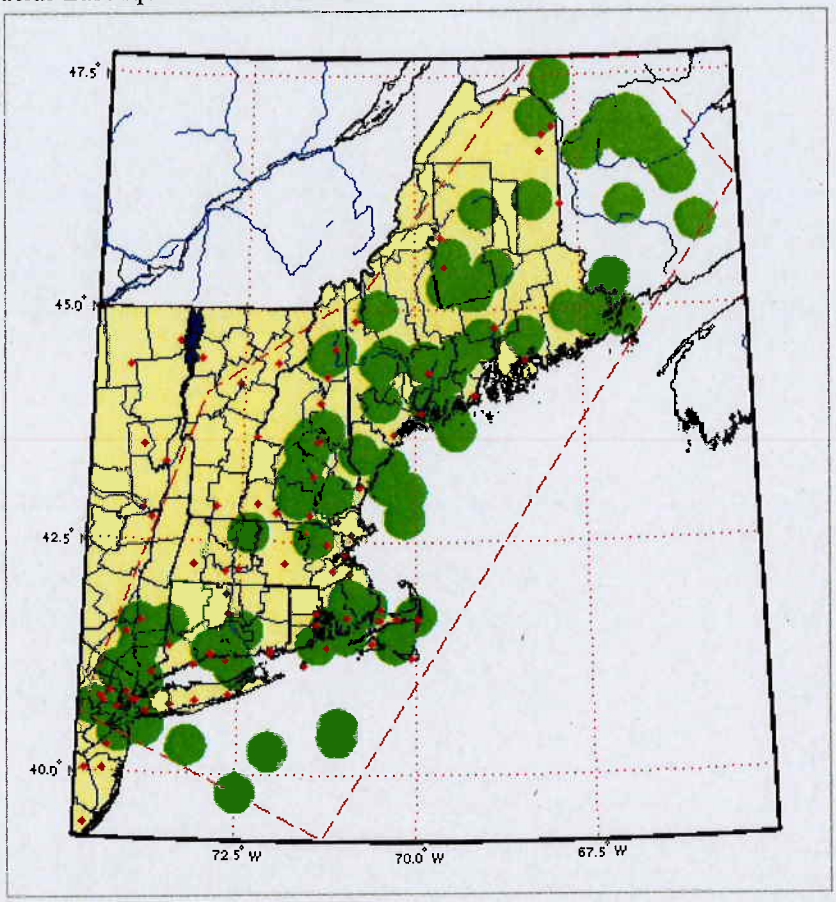
This is a chart of the calculated earthquake probabilities for the last 3 weeks (black line) with the magnitude 2.7 or greater and the earthquake probability for the next 7 days (red line) for New England.



This is a chart of the magnitude 2.7 or greater earthquake probabilities for New England from the last 3 months (black line) and the probability of such an earthquake for the next 7 days (red line).

Note: These probabilities are for felt earthquakes above magnitude 2.7 only. Normally, earthquakes between magnitude 2.0 and 3.0 can be felt near the epicenter but cause no damage. Earthquakes between magnitude 3.0 and 4.0 are more widely felt (between 10 and 100 miles from the epicenter) but almost never cause damage. Earthquakes above magnitude 4.5-5.0 can cause minor damage (cracks in plaster and brick walls) near the epicenter. Earthquakes above magnitude 6.0 or so can cause more severe damage to buildings. The probability of a potentially damaging earthquake (above magnitude 5.0) during the next 7 days centered somewhere in New England is estimated to be 0.064 percent.

Spatial Earthquake Probabilities



This is a map of the New England region showing states, counties, and many cities and towns (red symbols) throughout the region. The green-shaded areas are based on an analysis of the earthquake activity of magnitude 2.7 or greater from 1975 to 1988. According to our analysis of the statistics of earthquakes that occurred between 1989 and 1998, there is a 66 percent chance that the next earthquake of magnitude 2.7 or greater in New England will occur in one of the green areas.

Updated: December 5, 2011
Maintained by: BC Educational Seismology Project

Contact | Feedback | Top of page
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TAB F-1

1:1,200

0 100

Feet

Ortho: Bing, 2010

N

W E

S

FIGURE K-1
PROPOSED CONDITIONS

New 115 kV Substation
Fitch Street
Norwalk, Connecticut

Tighe&Bond

April, 2012

G:\GIS\CT\SiteLocus\NorwalkCT\FigureK-1.mxd Date Saved: 4/3/2012 User: ncd

N-0895

TAB F-2

HMB

HMB ACOUSTICS LLC 3 CHERRY TREE LANE, AVON, CT. 06001 860-677-5955

Noise Analysis Report

Norwalk Third Taxing District
East Ave. Sub-Station / Fitch St. Sub-Station
Norwalk, Ct.

November 10, 2011

Prepared for:
Norwalk Third Taxing District
2 Secoond Sreet.
East Norwalk, Ct. 06855

Prepared by:
Allan Smardin
HMB Acoustics, LLC
3 Cherry Tree Lane
Avon, Ct. 06001

Introduction

A new sub-station is being proposed for property on Fitch Street, in Norwalk, Ct. This sub-station will be located adjacent to an existing sub-station. The surrounding area is mixed industrial, commercial, and residential in nature. On Tuesday, October 18, 2011, acoustical measurements were taken at the existing sub-station, and in the surrounding community, in order to establish base-line noise data.

In rendering this report, I have reviewed site plans, and equipment lists for the existing sub-station, and the new sub-station. The specific focus of this noise evaluation is to determine whether the combined existing and new sub-stations produce noise levels which will have an adverse impact on the surrounding community.

Noise Evaluation

On October 18, 2011, background noise measurements were taken at the existing site; and at the new site, as well as in the surrounding area. It is standard practice to take background noise data as a baseline. When the facility is operating, the noise data includes the background noise levels. The combined noise levels are then corrected for the background noise condition.

Taking the single line equipment that is being listed for the new sub-station site; and combining it with the existing single line equipment; the resultant calculated noise levels were then projected to the surrounding areas. These noise levels are shown on TABLE 1.

Noise Regulations

The City of Norwalk and the State of Ct. have enacted regulations which limit the amount of noise which may be transferred from one property to another. These regulations utilize a dBA scale. The dBA scale is used because it closely approximates the response characteristic of the human ear to loudness, and is the scale most commonly used in the measurement of community noise. A copy

of the relevant portions of each regulation are attached to the report. In pertinent part, the Regulations provide as follows:

Norwalk Noise Code

Daytime:

- "The hours between 8:00 a.m. and 8:00 p.m., Monday through Saturday, and the hours 9:00 a.m. through 8:00 p.m. on Sundays and federal and state holidays." (Sec. 68-3 Definitions).

Nighttime:

- "The hours between 8:00 p.m. and 8:00 a.m., Sunday evening through Saturday morining, except Saturday night shall mean the hours between 8:00 p.m.Saturday and 9.00 a.m. Sunday."
(Sec. 68-3 Definitions).

Noise Levels:

- No person in an industrial noise zone shall emit noise exceeding 66 dBA (day or night) when measured at a commercial property line. In addition, no person in an industrial noise zone shall emit noise in excess of 61 dBA (daytime) and 51 dBA (nighttime) when measured at a residential property line.
(Sec.68-5 C (3)).

State of Ct. Noise Regulations

Exemptions:

- "Noise generated by transmission facilities, distribution facilities, and sub-stations of public utilities providing electrical power, telephone, cable television, or other similar services and located on property which is not owned by the public utility and which may or may not be whithin utility easements."
(Sec.22a-69-1.8 (m)).

Conclusions

Based on the noise levels that have been projected to nearby properties; the levels listed in TABLE 1, demonstrate that the two sub-stations, operating simultaneously, will not exceed the allowable noise levels set forth in the noise regulations.

TABLE 1

The combined noise levels of the two sub-stations have been corrected for background noise conditions and extrapolated to the nearest residences and commercial sites on Fitch Street.

- Nearest residence (Northeast of the site) = 40 dBA.
- The next nearest residence (Northeast of the site) = 34 dBA
- The farthest residence (Northeast of the site) = 31 dBA
- The church across the street from the site (Northwest of the site) = 34 dBA
- Nearest commercial business (East of the site) = 45 dBA
- Nearest commercial business (West of the site) = 40 dBA

that may jeopardize their health or safety or welfare or degrade the quality of life. This ordinance is enacted to protect, preserve and promote the health, safety, welfare and quality of life for the citizens of Norwalk through the reduction, control and prevention of noise.

§ 68-3. Definitions.

The following definitions shall apply in the interpretation and enforcement of this ordinance:

AMBIENT NOISE or BACKGROUND NOISE — Noise of a measurable intensity which exists at a point as a result of a combination of many distant sources individually indistinguishable.

COMMERCIAL ZONE — All commercial districts, business districts, as defined in the Zoning Regulations of the City of Norwalk, and all uses associated therewith either permitted as a right or as a special use.

COMMON COUNCIL — The Common Council of the City of Norwalk.

CONSTRUCTION — Any site preparation, assembly, erection, substantial repair, alteration or similar action, but excluding demolition, for or of public or private rights-of-way, structures, utilities or similar property.

CONSTRUCTION EQUIPMENT — Any equipment or device operated by fuel or electric power used in construction or demolition work.

* DAYTIME HOURS — The hours between 8:00 a.m. and 8:00 p.m., Monday through Saturday, and the hours 9:00 a.m. through 8:00 p.m. on Sundays and federal and state holidays.

DECIBEL — A logarithmic unit of measure used in measuring magnitudes of sound. The symbol is dB. SPL (sound pressure level) is defined as:

MUFFLER — A device for abating sounds such as those produced by escaping gases.

✱ NIGHTTIME HOURS — The hours between 8:00 p.m. and 8:00 a.m., Sunday evening through Saturday morning, except Saturday night shall mean the hours between 8:00 p.m. Saturday and 9:00 a.m. Sunday.

NOISE — Any sound, the intensity of which exceeds the standards set forth in § 68-5C or D of this ordinance.

NOISE DISTURBANCE — Any sound which annoys, disturbs, injures or endangers the comfort, repose, health, peace or safety of a person, or which causes injury or damage to property or business.

NOISE LEVEL — The sound pressure level in decibels as measured with a sound level meter using the A-weighting network. The level so read is designed "dB(A)" or "dBA."

NOISE SENSITIVE ZONE — Any area designated by the Norwalk Board of Health as a "noise-sensitive zone" where noise problems are likely to occur or known to exist. As a minimum requirement, said zone must include within its boundaries a school, hospital, house of worship, day-care center, nursing home, public library, senior citizen center, residence or court.

PERSON — Any individual, firm, partnership, association, syndicate, company, trust, corporation, municipality, agency or political or administrative subdivision of the state or other legal entity of any kind.

PREMISES — Any buildings, structure, land, or portion thereof, including all appurtenances, and shall include yards, lots, courts, inner yards and real properties without buildings or improvements owned or controlled by a person. The emitter's premises includes contiguous publicly dedicated street and highway rights-of-way, all road rights-of-way and waters of the state.

PROPERTY LINE — That real or imaginary line along the ground surface and its vertical extension which separates real property owned or controlled by any person

NORWALK

B. It shall also be unlawful for any person to make, continue or cause or permit to be made, verbally or mechanically, any unnecessary noise or noise disturbance.

C. Noise level standards.

(1) No person in a residential zone shall emit noise beyond the boundaries of his/her premises exceeding the levels stated herein and applicable to adjacent residential, commercial or industrial zones:

	Receptor's Zone			
Emitter's Zone	Industrial	Commercial	Residential (day)	Residential (night)
Residential	62 dBA's	55 dBA's	55 dBA's	45 dBA's

(2) No person in a commercial zone shall emit noise beyond the boundary of his/her premises exceeding the levels stated herein and applicable to adjacent residential, commercial or industrial zones:

	Receptor's Zone			
Emitter's Zone	Industrial	Commercial	Residential (day)	Residential (night)
Commercial	62 dBA's	62 dBA's	55 dBA's	45 dBA's

(3) No person in an industrial zone shall emit noise beyond the boundary of his/her premises exceeding the levels stated herein and applicable to adjacent residential, commercial or industrial zones:

	Receptor's Zone			
Emitter's Zone	Industrial	Commercial	Residential (day)	Residential (night)
* Industrial	70 dBA's	66 dBA's	61 dBA's	51 dBA's

D. High background noise levels and impulse noise.

(1) In those individual cases where the background noise levels caused by sources not subject to these regulations exceed the standards contained herein, a source shall be considered to cause excessive noise if the noise

STATE OF CT

Sec. 22a-69-1.8. Exemptions

Exempted from these Regulations are:

(a) Conditions caused by natural phenomena, strike, riot, catastrophe, or other condition over which the apparent violator has no control.

(b) Noise generated by engine-powered or motor-driven lawn care or maintenance equipment shall be exempted between the hours of 7:00 a.m. and 9:00 p.m. provided that noise discharged from exhausts is adequately muffled to prevent loud and/or explosive noises therefrom.

(c) Noises created by snow removal equipment at any time shall be exempted provided that such equipment shall be maintained in good repair so as to minimize noise, and noise discharged from exhausts shall be adequately muffled to prevent loud and/or explosive noises therefrom.

(d) Noise that originates at airports that is directly caused by aircraft flight operations specifically preempted by the Federal Aviation Administration.

(e) Noise created by the use of property for purposes of conducting speed or endurance events involving motor vehicles shall be exempted but such exemption is effective only during the specific period(s) of time within which such use is authorized by the political subdivision or governmental entity having lawful jurisdiction to sanction such use.

(f) Noise created as a result of, or relating to, an emergency.

(g) Construction noise.

(h) Noise created by blasting other than that conducted in connection with construction activities shall be exempted provided that the blasting is conducted between 8:00 a.m. and 5:00 p.m. local time at specified hours previously announced to the local public, or provided that a permit for such blasting has been obtained from local authorities.

(i) Noise created by on-site recreational or sporting activity which is sanctioned by the state or local government provided that noise discharged from exhausts is adequately muffled to prevent loud and/or explosive noises therefrom.

(j) Patriotic or public celebrations not extending longer than one calendar day.

(k) Noise created by aircraft, or aircraft propulsion components designed for or utilized in the development of aircraft, under test conditions.

(*l*) Noise created by products undergoing test, where one of the primary purposes of the test is evaluation of product noise characteristics and where practical noise control measures have been taken.

* (m) Noise generated by transmission facilities, distribution facilities and substations of public utilities providing electrical powers, telephone, cable television or other similar services and located on property which is not owned by the public utility and which may or may not be within utility easements.

(Effective June 15, 1978)

Sec. 22a-69-1.9. Burden of persuasion regarding exclusions and exemptions

In any proceeding pursuant to these Regulations, the burden of persuasion shall rest with the party attempting to enforce the Regulations. Notwithstanding the foregoing, if an exclusion or exemption stated in these Regulations would limit an obligation, limit a liability, or eliminate either an obligation or a liability, the person who would benefit from the application of the exclusion or exemption shall have the burden of persuasion that the exclusion or exemption applies and that the terms of the exclusion or exemption have been met. The Department shall cooperate with

TAB G

Exponent®

EMF Assessment: Fitch Street Substation– Norwalk Connecticut

EMF Assessment: Fitch Street Substation– Norwalk Connecticut

Prepared for

Third Taxing District Electric Department
2 Second St.
Norwalk, Connecticut 06855

Prepared by

Exponent
420 Lexington Avenue, Suite 1740
New York, New York 10170

February 20, 2012

© Exponent, Inc.

Contents

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Limitations

At the request of the Third Taxing District Electric Department, Exponent measured electric and magnetic fields associated with the existing East Avenue Substation and surrounding transmission and distribution lines. In addition, Exponent modeled the magnetic field levels associated with the proposed Fitch Street Substation and proposed 115-kV interconnection. This report summarizes work performed to date and presents the findings resulting from that work. In preparing this report, we have relied on geometry, material data, usage conditions, specifications, and various other types of information provided by the client. We cannot verify the correctness of this input data, and rely on the client for the data's accuracy. Although Exponent has exercised usual and customary care in the conduct of this analysis, the responsibility for the design and operation of the project remains fully with the client.

The findings presented herein are made to a reasonable degree of engineering and scientific certainty. Exponent reserves the right to supplement this report and to expand or modify opinions based on review of additional material as it becomes available, through any additional work, or review of additional work performed by others.

The scope of services performed during this investigation may not adequately address the needs of other users of this report, and any re-use of this report or its findings, conclusions, or recommendations presented herein are at the sole risk of the user. The opinions and comments formulated during this assessment are based on observations and information available at the time of the investigation. No guarantee or warranty as to future life or performance of any reviewed condition is expressed or implied.

Executive Summary

The Third Taxing District Electric Department (TTD) has proposed the construction of a new transmission substation at Fitch Street in Norwalk, Connecticut, adjacent to the site of the TTD's main distribution substation on East Avenue.[1] TTD is presently served by two underground 27.6-kV cables from the Connecticut Light & Power (CL&P) Norwalk Substation. In the proposed configuration, TTD will be served by a new 115-kilovolt (kV) interconnection and associated equipment located on the Fitch Street site, including:

(1) a 115-kV loop feed with a single tie breaker and associated buswork;

(2) two 20/30/40 megavolt-ampere (MVA) 115-27.6-kV transformers; and

(3) connection of the 27.6-kV side of each transformer, via the adjacent East Avenue Substation, to the former 9S-45 and 9S-46 breaker positions. The 9S-45 and 9S-46 circuits will be separated from CL&P's cables.

Exponent measured the existing levels of 60-Hertz (Hz) electric and magnetic fields in the vicinity of the East Avenue Substation, including existing transmission and distribution sources near the proposed site. The highest magnetic field level located in the vicinity of the proposed substation, approximately 75 milligauss (mG), was measured above the underground 26.7-kV cables (102E-50, 9S-45 and 9S-46) on the western side of the proposed site. On the eastern side of the proposed site, the dominant magnetic field source is the existing 115-kV 1416 transmission line; magnetic field levels less than 23 mG were measured below this source in the adjacent Metro North commuter rail parking lot. The electric field measured at locations around the East Avenue Substation and associated circuits were very low; even under the highest voltage source, the 115-kV 1416 transmission line, the highest measured value was 0.127 kilovolt per meter (kV/m). Shielding by trees and other conductive objects, as well as conductor height, are contributors to the low measured electric field values.

To characterize the magnetic field levels that will be associated with the Fitch Street Substation in the future, Exponent modeled the proposed 115-kV interconnection based on elevation and plan drawings provided by Tighe & Bond. Under average-load conditions, the maximum calculated magnetic field at the perimeter of the Fitch Street Substation would be less than 82 mG, occurring near the southeast corner of the substation. The magnetic fields in the area surrounding the substation decrease rapidly with distance to less than 20 mG within 23 feet of the substation fence. Under peak-load conditions, the highest calculated magnetic field level is 186 mG near the southeast corner of the proposed site, decreasing rapidly with distance to less than 20 mG within 60 feet of the substation fence. This loading would be expected to occur for only limited durations during the year. At some locations within buildings adjacent to the proposed site, the calculated magnetic-field levels both before and after construction of the substation under peak-load conditions are expected to be higher than background magnetic-field levels measured in many residences (4 mG or less).

[1] The Fitch Street Substation appears in the Connecticut Siting Council's 2011 Forecast of Loads and Resources.

Multiple features of the proposed Fitch Street Substation and site are consistent with the Connecticut Siting Council's recommendations for transmission lines in its "EMF Best Management Practices," and a consideration of reviews and assessments of research by panels of scientists for national and international agencies does not support a change in these practices.

Introduction

The electrical power system in the United States produces alternating current electric and magnetic fields (EMF) that changes direction and intensity 60 times per second—i.e., a frequency of 60 Hertz (Hz).[2] This frequency is in the extremely low frequency (ELF) range of the electromagnetic spectrum. Electricity produced by generating stations flows as 60-Hz current through transmission and distribution lines to a local substation, where it is distributed over low voltage distribution lines to supply power to the many appliances and electrical devices that we use in our homes, schools, and workplaces.

Electric fields occur as a result of the electric potential (i.e., voltage) on these objects, and magnetic fields occur as a result of current flow through these objects.[3] Just like a temperature field, both electric fields and magnetic fields can be measured, and their levels depend on the properties of the source of the field (e.g., voltage, current, and configuration) and the distance from the source of the field, among other things.

Both electric fields and magnetic fields decrease rapidly with distance from the source (NIEHS, 2002). This is similar to the way that the heat generated by a space heater or a campfire lessens as a person moves farther away from it. Although ordinary objects do not block magnetic fields, objects such as trees and buildings easily block electric fields.

Magnetic fields are found throughout our environment because electricity is needed for so many things in our daily lives, from lighting, heating, and cooling our homes to powering our refrigerators and computers.

This report evaluates the effect of the Third Taxing District Electric Department's (TTD) proposal for a new substation at 6 Fitch Street in Norwalk, Connecticut on EMF levels and consistency with relevant regulatory guidance.

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[2] Europe's electrical system produces 50-Hz EMF.

[3] The electric field is expressed in measurement units of volts per meter (V/m) or kilovolts per meter (kV/m); 1 kilovolt per meter is equal to 1,000 V/m. The strength of magnetic fields is expressed as magnetic flux density in units called gauss (G), or in milligauss (mG), where 1 G is equal to 1,000 mG.

Existing and New Sources of EMF in the Project Vicinity

Figure 1 depicts the site of the proposed Fitch Street Transmission Substation, showing the location and orientation of measured and modeled profiles. The existing East Avenue Substation, also depicted in Figure 1, serves as TTD's main distribution substation, and is set back approximately 150 feet east of East Avenue. A second TTD distribution substation, the Rowan Street Substation, is located approximately 0.2 miles southwest of the East Avenue Substation, south of the tracks of the Metro North commuter rail (Figure 2).

The TTD is presently served by CL&P's Norwalk Substation (9S) by two underground 27.6-kV cables, which run south on East Avenue. The 9S-46 cable feeds the TTD East Avenue Substation, and the 9S-45 cable feeds the TTD Rowan Street Substation. In addition, TTD owns and operates a second 27.6-kV cable (the 102E-50 circuit) connecting the two distribution substations, so load can be fed from either incoming line. The 102E-50 breakers are normally closed to the two incoming lines, with switching provided in contingencies (e.g., line failures) and during planned maintenance. The 102E-50 cable, as well as the terminal section of the 9S-45 cable, originate in the manhole adjacent to the switchgear house in the East Avenue Substation, and proceed west along Fort Point Street. Presently, the 27.6-kV feeder voltage is transformed to 4.16 kV at both substations for distribution to TTD customers, except the City Waste Water Treatment Plant, which receives service at 27.6-kV from TTD's East Avenue Substation.[4]

The cables coming down East Avenue are segmented copper, lead-jacketed, with a PVC outer jacket. Each three-phase cable occupies one duct and the two ducts are approximately 7.5 inches on center. The 9S-45 and the 102E-50 circuits between the East Avenue Substation and the Rowan Street Substation are individual single-phase cables that are installed within separate ducts along Fort Point Street and the remaining route to Rowan Street.

The Fitch Street Transmission Substation, to be owned and operated by TTD, will be tied in the proposed configuration to the 115-kV 1416 line between the Compo and Darien Substations (Figure 2). As part of the new 115-kV interconnection, two new vertical monopoles will be installed south of the proposed site. A 115-kV loop feed, single-tie breaker, and associated buswork are located within the Fitch Street Transmission Substation, along with two 20/30/40 MVA 115-27.6-kV transformers (Figures 3 and 4). The 27.6-kV secondaries of each transformer will be connected, via the adjacent East Avenue Substation, to the former 9S-45 and 9S-46 feeder positions, and the 9S-45 and 9S-46 circuits will be separated from CL&P.

[4] The feeder to the Waste Water Treatment Plant is presently out of service, but it is scheduled to be re-energized within the next two years.

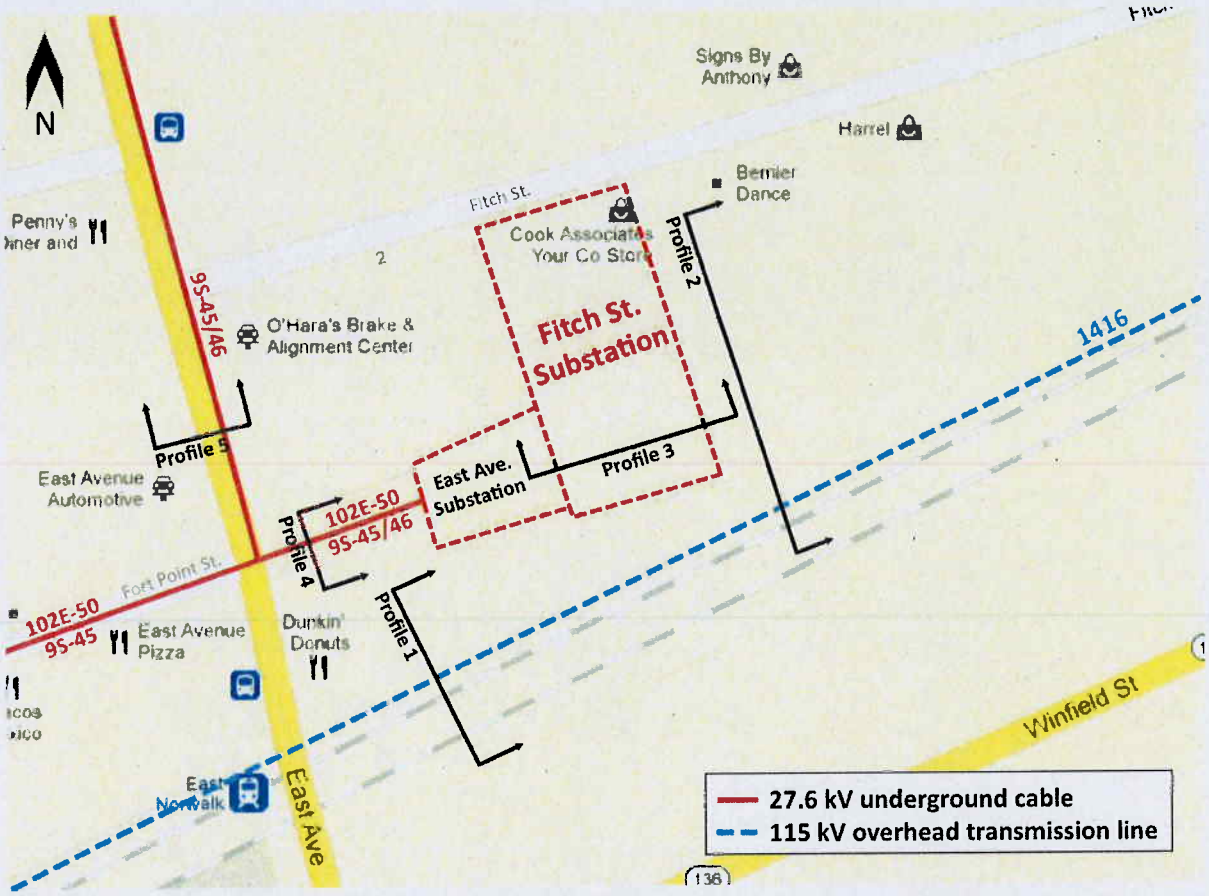

Figure 1. Overview of the proposed site of the Fitch Street Transmission Substation, showing the location of Profiles 1-5, as well as the route of existing 27.6-kV underground cables and the 115-kV overhead transmission line 1416.

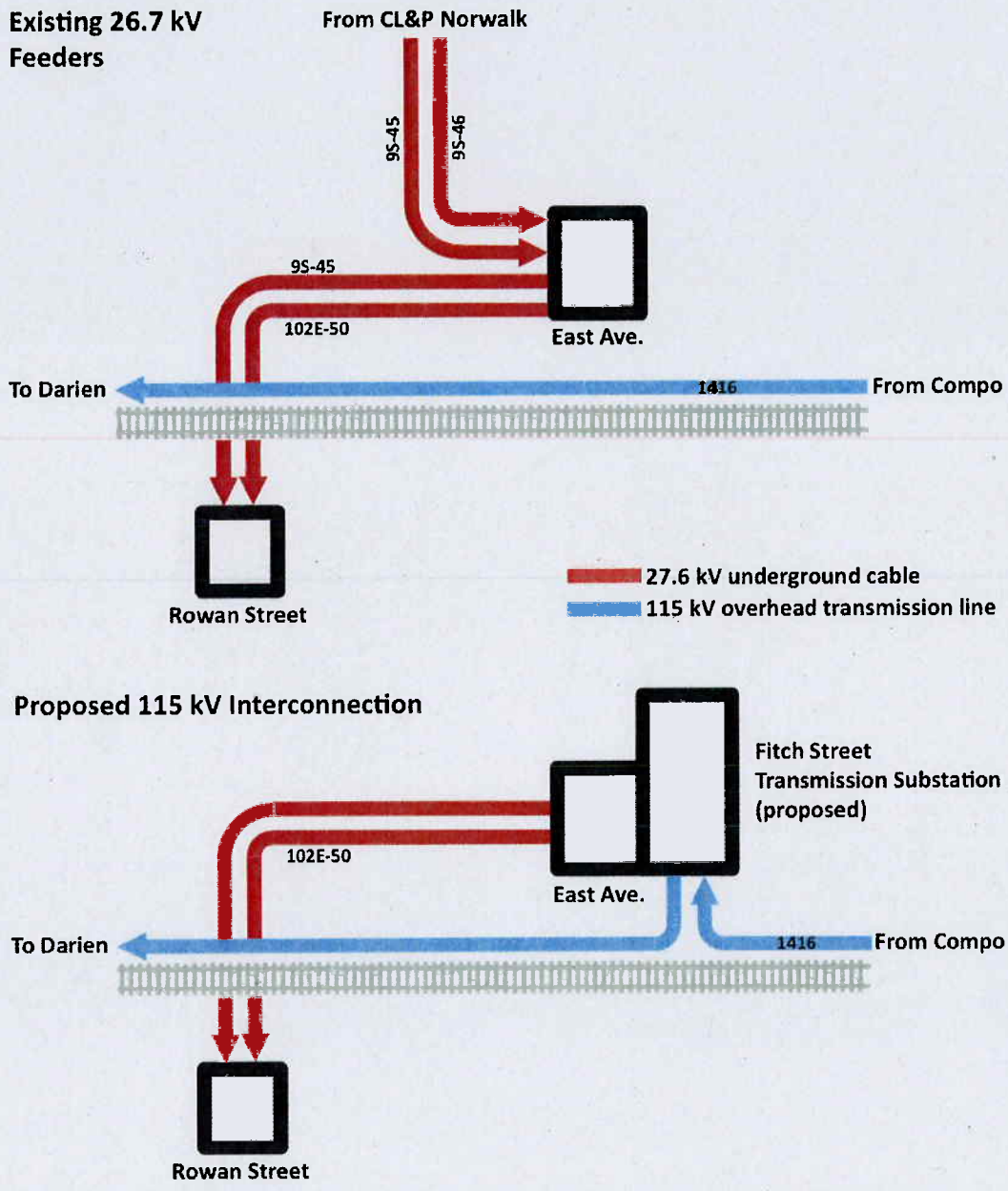

Figure 2. Existing and proposed configurations of the TTD electrical interconnection.

In the proposed configuration, two 20/30/40 MVA 115-27.6-kV transformers are installed at the Fitch Street site. The transformer secondaries connect, via the adjacent East Avenue Substation, to the former 9S-45 and 9S-46 feeder positions, and the 9S-45 and 9S-46 circuits are separated from CL&P.

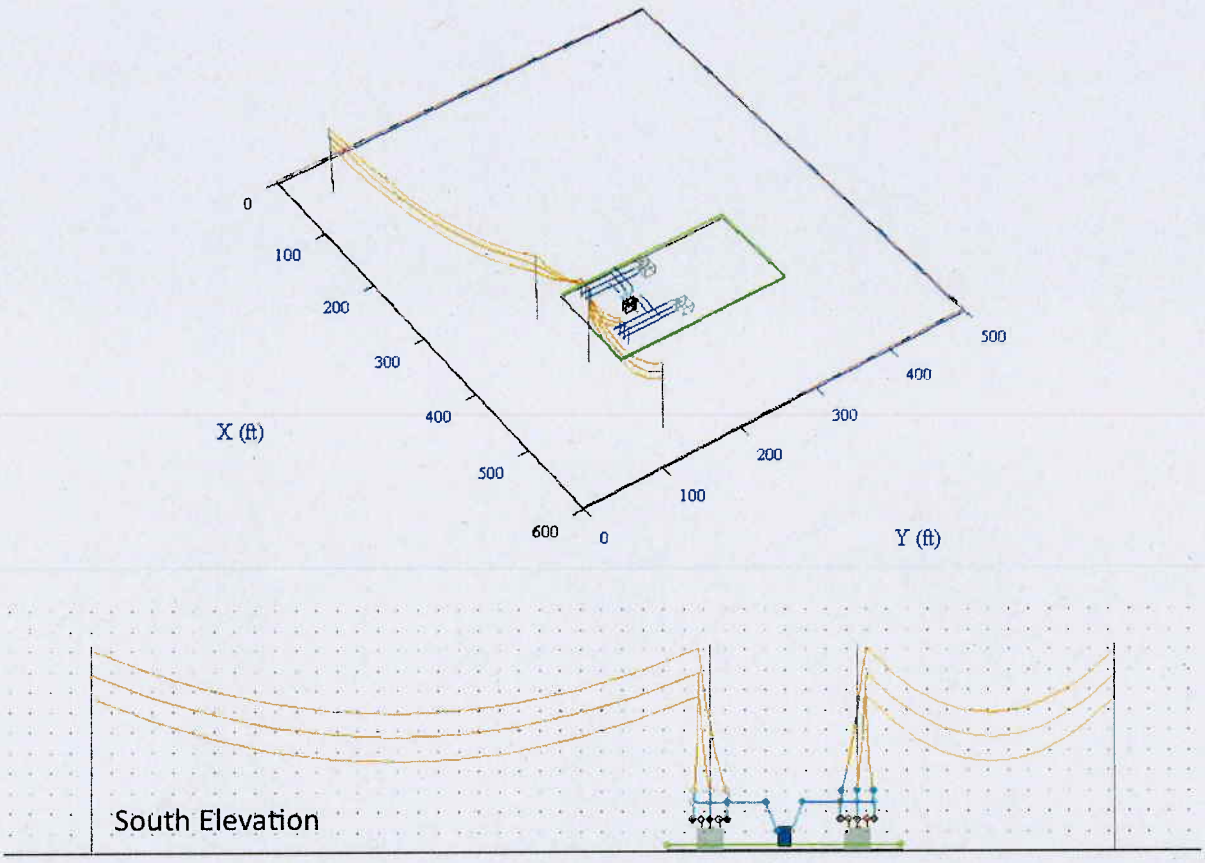

Figure 3. Representation of the current-carrying elements of the Fitch Street Substation and proposed interconnection, showing the location of two new transformers (T1 and T2) and two new vertical monopoles to the south of the proposed site.

An elevation view of these elements (view facing north at ground level) is shown in the bottom of the figure.

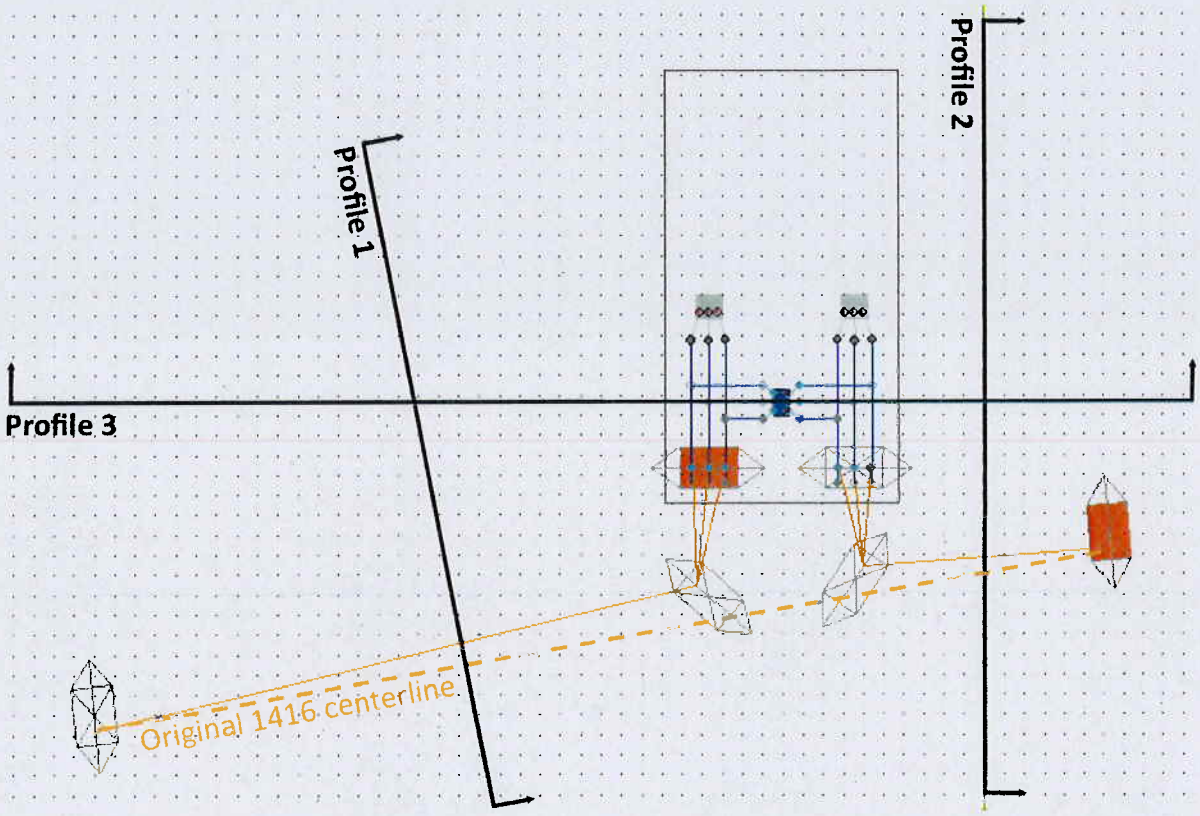

Figure 4. Schematic top-down view of the current-carrying elements of the Fitch Street substation, showing the location of Profiles 1-3 relative to substation equipment and 115-kV structures.

Profile 1 is located near midspan of the rebuilt portion of the 1416 line to the west of the proposed interconnection. Profile 2 is located to the east of the proposed interconnection, 40 feet east of the perimeter of the Fitch Street Substation. Profile 3 is aligned with the buswork and tie breaker within the substation, where calculated magnetic field levels are highest at the substation perimeter.

Methods

The levels of EMF on and around the proposed substation location were characterized by measurements of fields from existing sources and modeling of future magnetic fields associated with the proposed 115-kV interconnection.

Measurements

EMF measurements were recorded at a height of 1 meter (3.28 feet) above ground in accordance with standard methods for measuring EMF near power lines (IEEE Std. C95.3.1, 2010). Both electric fields and magnetic fields were expressed as the total field computed as the resultant of field vectors measured along vertical, transverse, and longitudinal axes.[5] The magnetic field was measured in units of mG by orthogonally-mounted sensing coils whose output was recorded by a digital meter (EMDEX II) manufactured by Enertech Consultants of Campbell, California.

Electric fields were measured in units of kV/m with a single-axis sensor accessory for the EMDEX II meter. The sensitive axis of the electric-field sensor was successively oriented in the vertical, transverse, and longitudinal directions to measure vectors from which the resultant electric field level is computed at particular points. These instruments meet the IEEE instrumentation standard for obtaining accurate field measurements at power-line frequencies (IEEE Std.1308-1994). The meters and the electric field probes were calibrated by the manufacturer by methods described in IEEE Std. 644-1994a.

Modeling

The magnetic fields along Profiles 1-3, as well as around the perimeter of the proposed Fitch Street Substation, were modeled using SUBCALC, which is part of the Enertech EMF Workbench Suite. SUBCALC models the magnetic fields in and around substations, accounting for the breakers, transformers, and the three-dimensional arrangement of buswork and transmission conductors. Figures 3 and 4 depict the substation equipment included in the SUBCALC model, which was built using substation plan and profile data provided by Tighe & Bond. Magnetic field levels were calculated at 1 meter (3.28 feet) above ground, in accordance with IEEE Std. C95.3.1-2010, and are reported as resultant quantities in units of mG.[6] South of the proposed site, the ground elevation increases by approximately 15 feet beyond a retaining wall adjoining the Metro North commuter rail parking lot. To account for this change in elevation, an additional 15 feet was added to the height of the 1416 transmission structures south of the retaining wall. Profiles 1 and 2 therefore were calculated at a height of 18.28 feet above the model reference elevation to report magnetic-field levels 1 meter above grade.

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[5] Magnetic field measurements along the vertical, transverse, and longitudinal axes were recorded as root-mean-square (rms) magnitudes. RMS refers to the common mathematical method of defining the effective voltage, current, or field of an AC electrical system.

[6] The resultant magnetic field is the Euclidian norm (square root of the sum of the squares) of the component magnetic-field vectors calculated along vertical, transverse, and longitudinal axes.

Magnetic fields surrounding the existing and proposed substation depend on current, which increases with increasing load. Measurements and calculations of the magnetic field present a "snapshot" for the load conditions at one moment in time. On a given day, throughout a week, or over the course of months and years, the magnetic-field level can change depending upon the patterns of power demand on the bulk transmission system. Calculations of magnetic fields at average line and equipment loading were used to estimate exposures under typical conditions. Circuit loadings on the 1416 line, as well as anticipated TTD system load, are summarized in Table 1 as megavolt-amperes (MVA) and current flow in amperes (A) after construction of the Fitch Street Substation.

The 1416 loads in Table 1 are based on elevation factors applied to the 15 gigawatt (GW) and 27.7 GW load cases submitted by CL&P and The United Illuminating Company (UI) to the Connecticut Siting Council (CSC) in Docket 272.[7] In July 2004, the CL&P and UI calculated magnetic-field levels based upon a 15- GW system-wide New England load level and dispatch case for the various right-of-way (ROW) configurations for the Middletown-Norwalk project. This "15-GW Case" was designed to represent typical system conditions, i.e., a load level in which the system operates most of the time as determined using data for the hourly distribution of loads for the years 1999-2002. The 15-GW Case modeled 52nd-percentile loads on substations, and assumed an average or typical generation dispatch. The 15-GW Case also corresponded to the actual average load during 2002. In the 15-GW Case, the power flows on elements of the transmission system differ from the planning loads in the "27.7-GW Case," which represents stressed conditions during a single hour of the year or less.

Based upon measurements in Profile 1, a 125% elevation factor was applied to the 15-GW load for circuit 1416 to match observed magnetic-field levels. This 125% elevation factor was also applied to the 1416 load in the 27.7-GW Case to estimate 2012 peak load for the 115-kV interconnection. Under peak-load conditions, an estimated TTD system load of 20 MVA was added to the pass-through 1416 load east of the proposed interconnection.

Table 1. Estimated circuit 1416 loading and TTD system load for 2012, based on 15-GW and 27.7-GW load cases submitted to the CSC in Docket 272

	Average load		Peak load	
Line/Transformer	MVA	Current (A)	MVA	Current (A)
1416 from Compo	76	382	174	871
1416 to Darien	68	338	154	771
T1 primary	4.4	22	10	50
T2 primary	4.4	22	10	50

[7] See, e.g., CL&P and UI Exhibit 156, Direct Testimony of John Prete Concerning Magnetic Field Modeling.

Results and Discussion

Results from the SUBCALC model for the magnetic field produced by new substation equipment at the perimeter of the Fitch Street Substation are shown in Figure 5 for average-load conditions. Measured magnetic-field levels, also depicted in Figure 5, are highest (<4 mG) adjacent to the East Avenue Substation. The calculated magnetic field from modeled substation equipment is lowest along the northern boundary (0 – 120 feet). Along the eastern boundary of the site (120 – 330 feet) the magnetic-field level is relatively low but increases substantially near the southeast corner of the substation (66 mG) adjacent to 115-kV buswork. Along the south side of the site (330 – 440 feet) the two smaller peaks in the magnetic-field level mark where the 1416 overhead line divides to enter the substation from two new vertical monopoles. The magnetic field level along the western boundary of the substation (440 – 650 feet), adjacent to the existing East Street Substation, is highest closest to the 115-kV buswork (55 mG) near the southwest corner of the site.

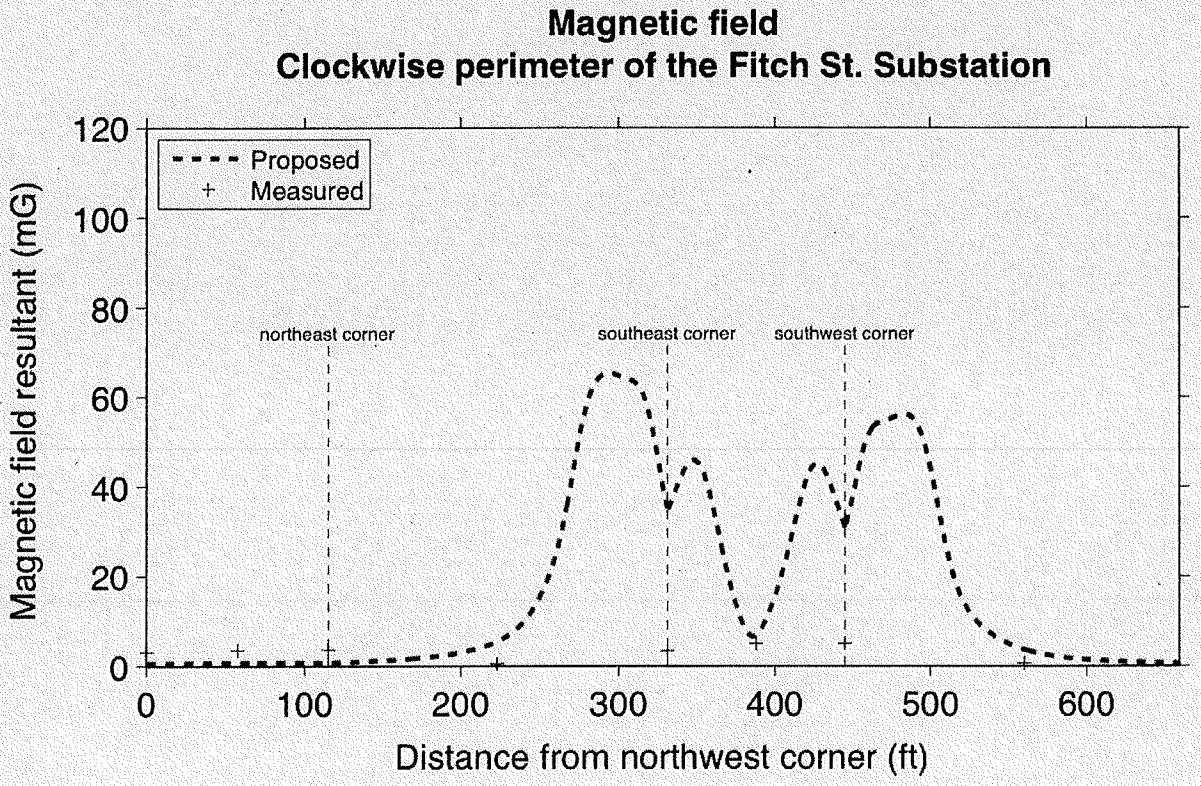

Figure 5. Calculated magnetic field around the perimeter of the Fitch Street Substation site at 1 meter above ground for average-load conditions.

Calculated values from 0 - 120 feet are along Fitch Street, from 120 – 330 feet are along east side of the site, from 330 – 440 feet are along the south side of the site adjacent to a commuter parking lot, and from 440 – 650 feet are along the western boundary shared with the East Avenue Substation (the contribution of equipment from the East Avenue Substation is not included).

Figures 6 and 7 depict the calculated magnetic- and electric-field levels, respectively, along Profile 1. Calculated magnetic-field levels are depicted for average-load conditions, and both profiles were calculated at 1 meter above the elevation of the commuter parking lot. The bottom-most phase of the 1416 line was modeled at a height of 40 feet above ground. Profile 1 is located west of the proposed 115-kV loop feed, and the load in this portion of the 1416 line is not increased by the TTD interconnection. The highest calculated magnetic field is directly below the conductors of the 1416 line (23 mG), falling below 5 mG at 100 feet from the centerline. The maximum value of the electric- and magnetic-field profiles is shifted approximately 10 feet to the north in the proposed configuration, following the shifted centerline of the 1416 conductors (Figure 4). The electric-field level measured in Profile 1 is very low, below 0.127 kV/m and less than the calculated values. Shielding by trees and other conductive objects—as well underbuild present in this span, which was not modeled—contribute to the low measured values.

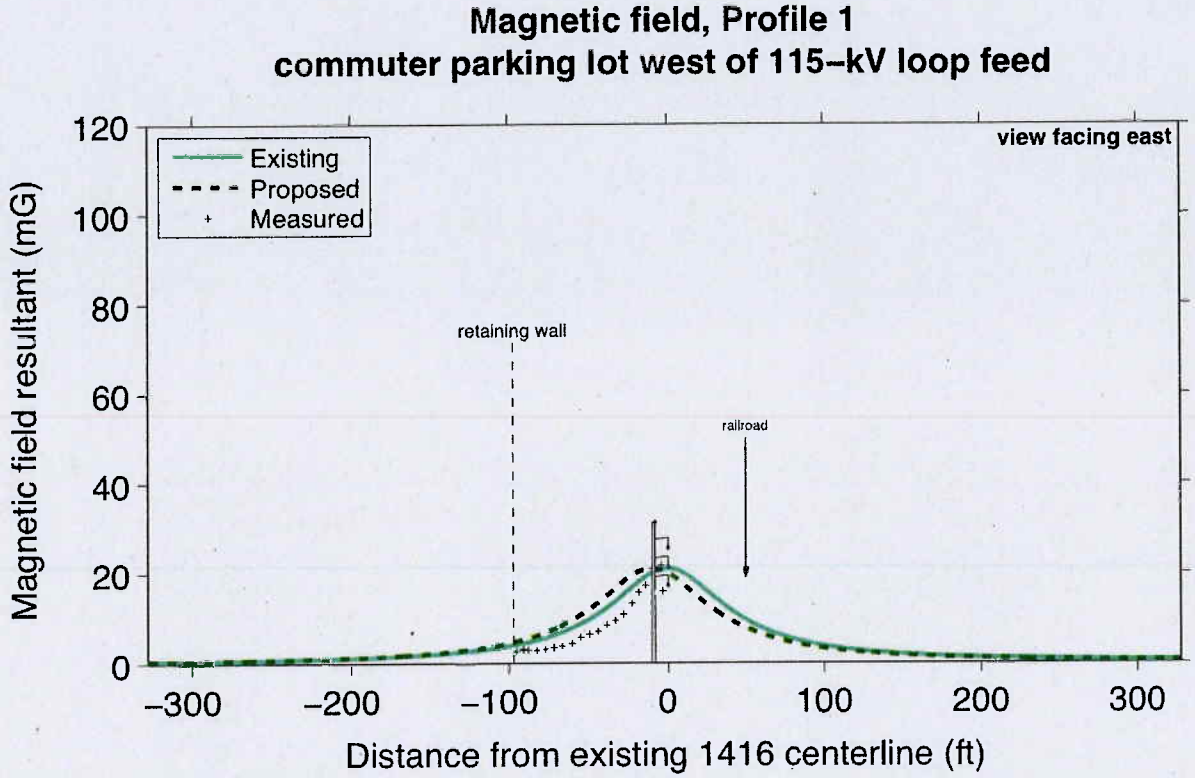

Figure 6. Calculated magnetic-field levels along Profile 1, 1 meter above the elevation of the commuter parking lot for average-load conditions.

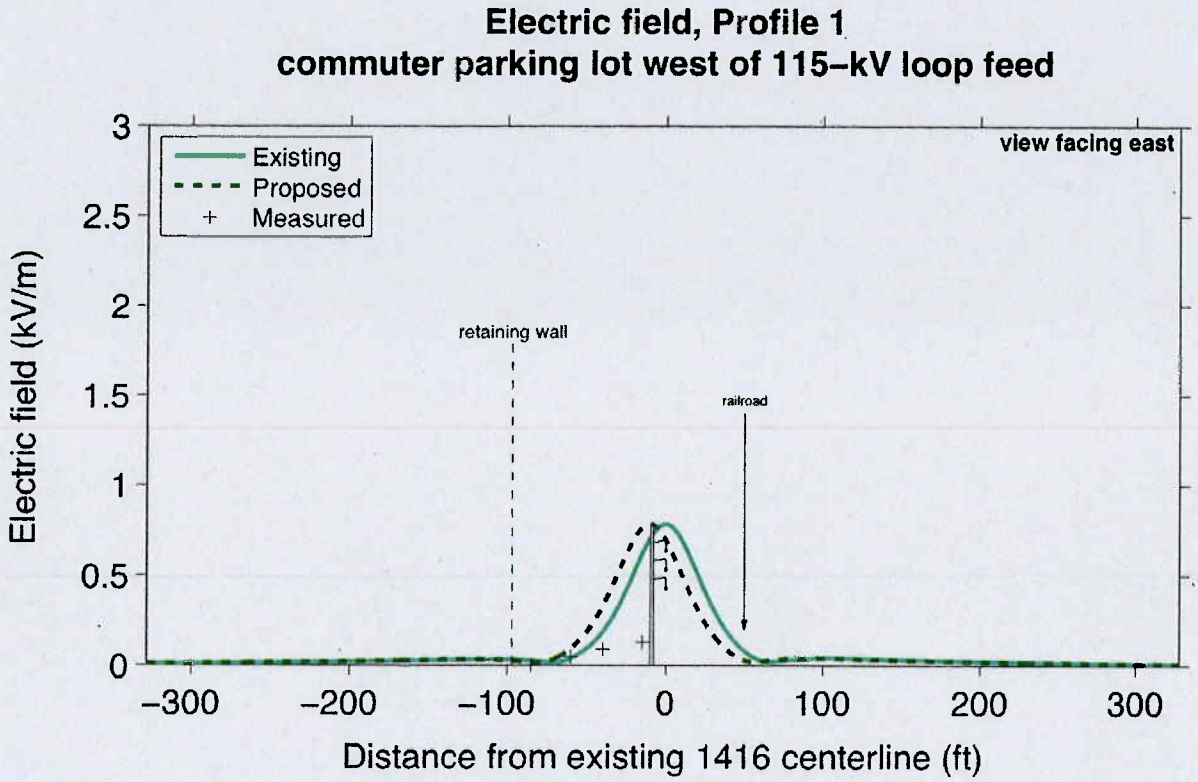

Figure 7. Calculated electric-field levels along Profile 1, 1 meter above the elevation of the commuter parking lot.

While the values shown in Figure 5 characterize the variation in the magnetic field around the site perimeter, they do not describe the levels outside the perimeter, i.e., where people may live and work. Therefore, magnetic-field levels were calculated along Profile 2, which is located 40 feet east of the Fitch Street Substation. There are several buildings along this profile. Since the substation site is roughly 15 feet lower than the ground on which the towers supporting line 1416 are located, the calculation was performed for a reference point 18.28 feet above the ground level of the substation. Calculated at this height, the magnetic field levels from the substation equipment (Figure 8) and line 1416 can be shown on the same horizontal plane. The calculated values for Profile 2 are shown in Figure 8 for average-load conditions. The peak magnetic field level (33 mG) occurs at the centerline of the 1416 transmission line and decreases rapidly in either direction. Where a large building is located along this profile, the magnetic field level is calculated to be in the range of 4-18 mG under average-load conditions. The highest calculated magnetic-field level in Profile 2 is approximately 13 mG higher in the proposed case than in the existing case. This elevation is due to the TTD load, delivered from the east, in portions of the 1416 line east of the substation loop feed.

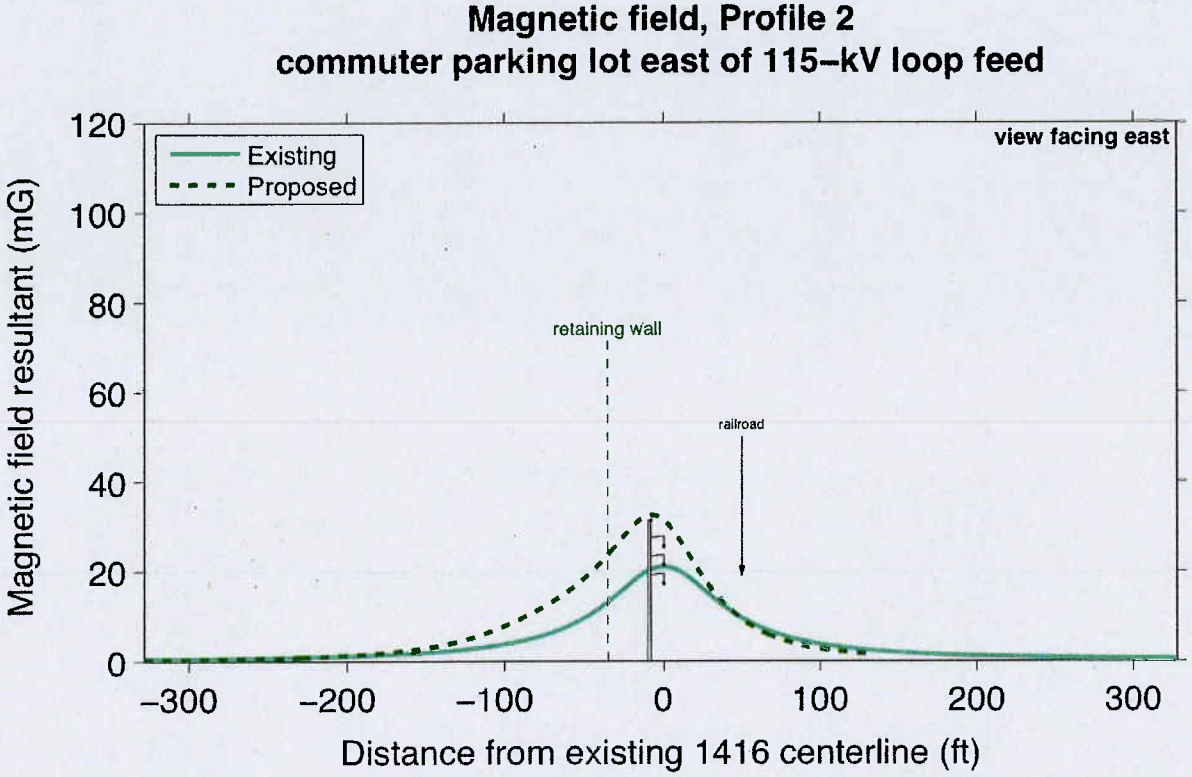

Figure 8. Calculated magnetic field levels along Profile 2, one meter above the elevation of the commuter parking lot for average-load conditions.

The magnetic field along Profile 3 is shown in Figure 9 at a height of 18.28 feet. The highest calculated value in Figure 9 (< 82 mG) is located at the eastern boundary of the substation, and falls off with distance to intersect the calculated value 40 feet east of the substation in Profile 2. When calculated at 1 meter above ground, the magnetic-field level at the eastern substation perimeter is approximately 20 mG lower under average-load conditions, and intersects the calculated perimeter value shown in Figure 5. A lower magnetic field level at 1 meter above ground is explained by the greater distance from equipment within the substation and from the conductors of the 1416 line.

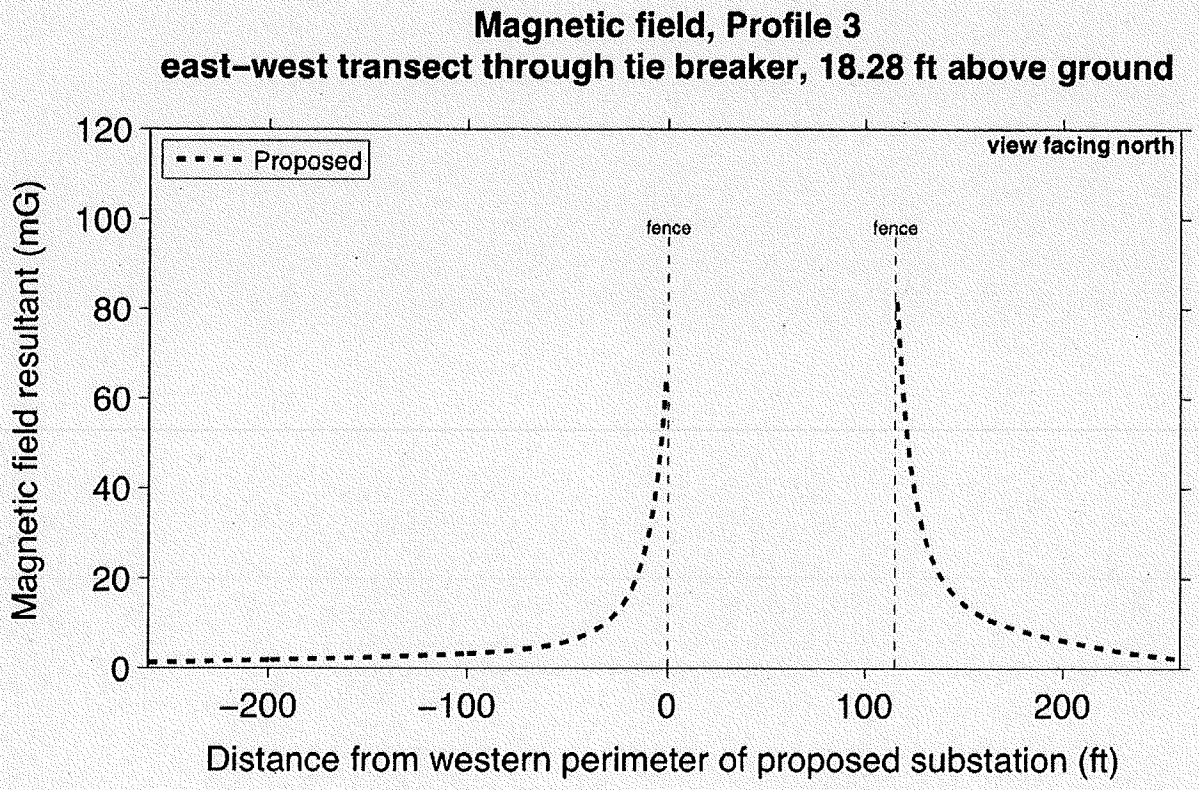

Figure 9. Calculated magnetic-field levels along Profile 3, 1 meter above the elevation of the commuter parking lot (18.28 feet above ground) for average-load conditions.

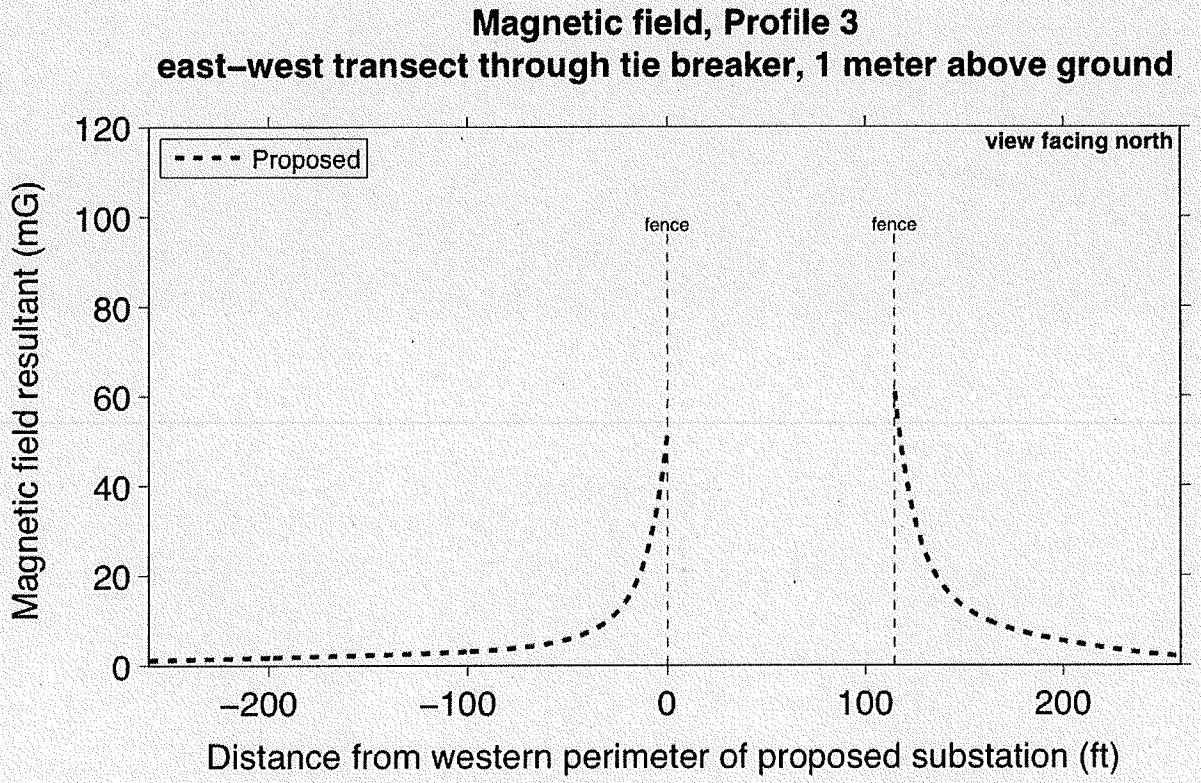

Figure 10. Calculated magnetic-field levels along Profile 3, 1 meter above ground for average-load conditions.

Figures 11 and 12 depict the measured magnetic-field levels along Profiles 4 and 5, respectively. The highest magnetic-field level observed in the vicinity of the proposed substation, approximately 75 mG, was measured in Profile 4 above the underground 26.7-kV cables (102E-50, 9S-45 and 9S-46) on the access road leading west from the East Avenue Substation. In the proposed interconnection, the 9S-45 and 9S-46 circuits will be separated from CL&P, and these magnetic-field sources will be removed from Profiles 4 and 5 and further north along East Avenue.

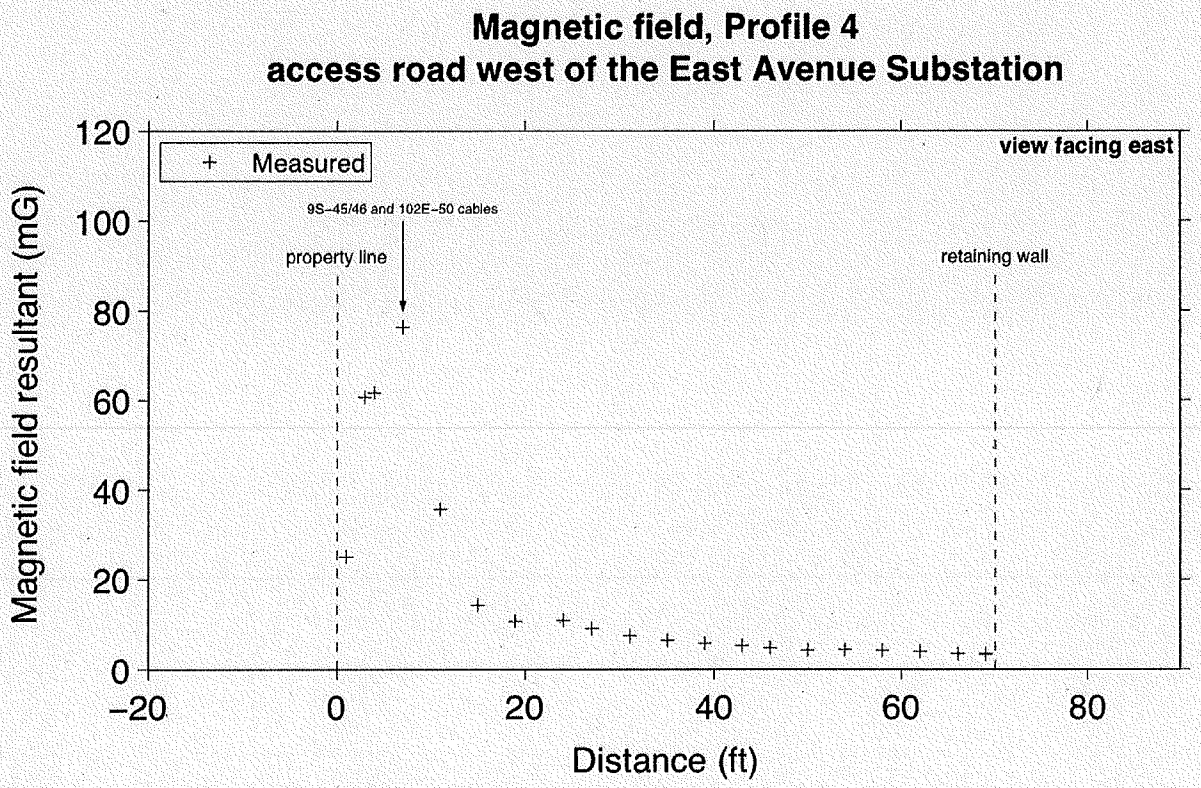

Figure 11. Measured magnetic-field levels along Profile 4, 1 meter above the ground.

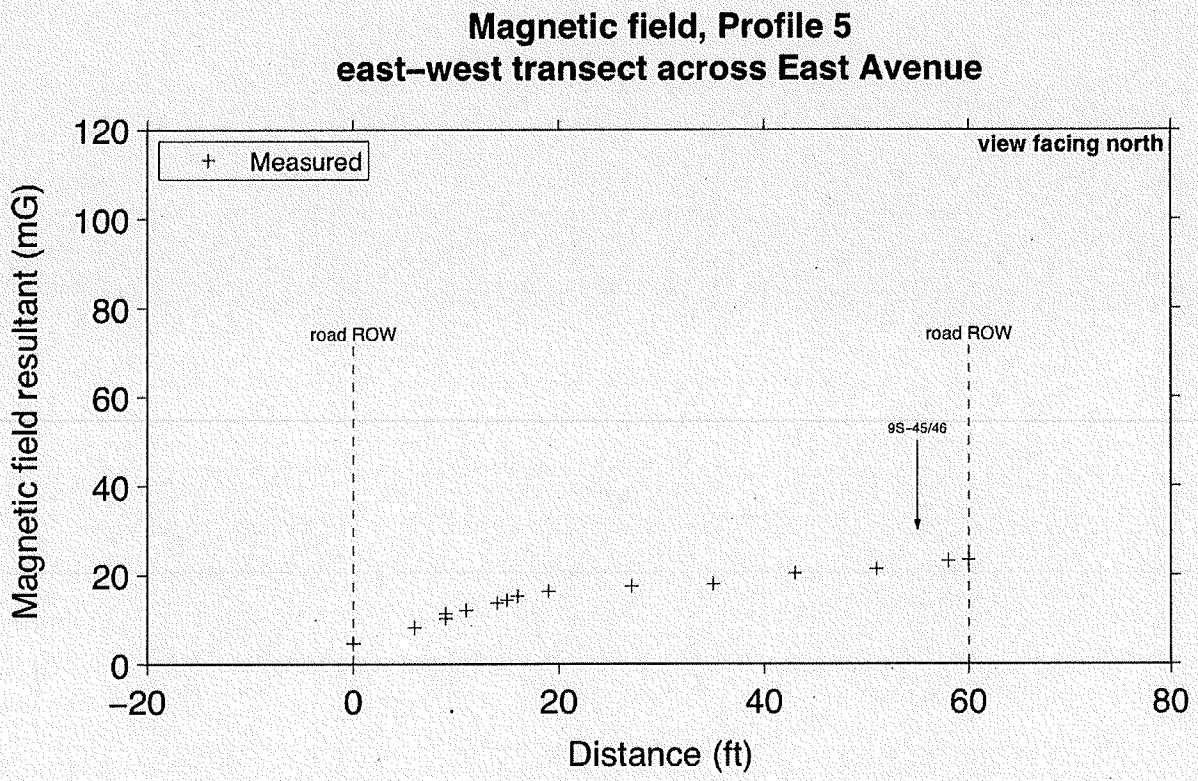

Figure 12. Measured magnetic-field levels along Profile 5, 1 meter above the ground.

Consistency with Connecticut Siting Council Policies

Neither the federal government nor Connecticut has enacted standards for magnetic fields or electric fields from power lines or other 60-Hz sources. Several other states have statutes or guidelines that apply to fields produced by new transmission lines, but these guidelines are not health based. For example, New York and Florida have limits on EMF that were designed to limit fields from new transmission lines to levels produced by existing transmission lines, i.e., to maintain the status quo.

More relevant are exposure limits recommended by scientific organizations that were developed to protect health and safety that are based upon reviews and evaluations of relevant health research. These include exposure limits for the general public recommended by the International Committee on Electromagnetic Safety (ICES) in 2002 and by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 2010 to address health and safety issues.

The calculated values of the electric fields and magnetic fields produced by existing sources in the site vicinity and the proposed substation in the future are well below the reference levels published by these two organizations, as summarized in Table 2. Measured or calculated field levels below these reference values are deemed to be below biologically-determined basic restrictions on internal fields and currents in the body.

Table 2. Reference levels for whole body exposure to 60-Hz fields: general public.

Organization, recommended limit	Magnetic Fields	Electric Fields
ICNIRP, reference level	2,000 mG	4.2 kV/m
ICES, maximum permissible exposure (MPE)	9,040 mG	5 kV/m 10 kV/m[1]

[1] This is an exception within transmission line ROWs because people do not spend a substantial amount of time in ROWs, and very specific conditions are needed before a response is likely to occur (i.e., a person must be well insulated from ground and must contact a grounded conductor) (ICES, 2002, p. 27).

The CSC has published a guide for applications for Certificates of Environmental Compatibility and Public Need for electric substations that addresses EMF (CSC 2010). The guide calls for information to be provided on a number of topics, including public health and safety in Section I. 1, and on EMF specifically in Section L, where information supporting the consistency of the proposed facility with the CSC's EMF Best Management Practices (BMP) for transmission lines (CSC, 2007) is to be provided.

Interdisciplinary panels of scientists formed by national and international scientific agencies are good sources of information and guidance for governments and the public; these panels have evaluated the scientific research related to health and power-frequency EMF. Research on this topic varies widely in its approach. Some studies evaluate the effects of high EMF exposures

not typically found in our day-to-day lives, while others evaluate the effects of common EMF exposures. The studies evaluate long-term effects (e.g., cancer, neurodegenerative diseases, and reproductive effects) and short-term biological responses. This research includes hundreds of epidemiology studies of people in their natural environment and laboratory studies of animals (*in vivo*) and isolated cells and tissues (*in vitro*). Standard scientific procedures are used by the expert panels to identify, review, and summarize this large and diverse research area.

Major reviews on this topic, in order of the date of recent publication, include those published by the European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN, 2010),[8] the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 2010), the Swedish Radiation Safety Authority (SSM, 2010), the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR, 2009), the World Health Organization (WHO, 2007), and the International Committee on Electromagnetic Safety ICES, 2002). None of the reviews published before or after the CSC's EMF BMP suggests a need for a change.

The general scientific consensus of the health agencies reviewing this research is that at levels associated with the operation of the proposed substation, associated lines, or other common sources of EMF in our environment, the research does not support the conclusion that EMF causes any long-term, adverse health effects.

While neither the CSC nor the above cited national and international health and scientific agencies have concluded that electric or magnetic fields pose a health hazard, the CSC has embraced policies that would tend to minimize public exposure to ensure that a "proposed facility would not pose an undue safety or health hazard" (BMP, Section L).

> The Council recognizes that a causal link between power-line MF exposure and demonstrated health effects has not been established, even after much scientific investigation in the U.S. and abroad. Furthermore, the Council recognizes that timely additional research is unlikely to prove the safety of power-line MF to the satisfaction of all. Therefore, the Council will continue its cautious approach to transmission line siting that has guided its Best Management Practices since 1993. This continuing policy is based on the Council's recognition of and agreement with conclusions shared by a wide range of public health consensus groups, and also, in part, on a review which the Council commissioned as to the weight of scientific evidence regarding possible links between power-line MF and adverse health effects. Under this policy, the Council will continue to advocate the use of effective no-cost and low-cost technologies and management techniques on a project-specific basis to reduce MF exposure to the public while allowing for the development of efficient and cost-effective electrical transmission projects (p. 4).

[8] EFHRAN is funded by the European Commission's Executive Agency for Health and Consumers.

The following features of the proposed Fitch Street Substation and site are consistent with the CSC's recommendations for transmission lines, including:

- The substation and related construction is to be designed to meet or exceed the requirements of the National Electrical Safety Code (NESC).

- The proposed site does not abut statutory facilities defined in Public Act No. 04-246 and no additional buffer beyond that called for by the NESC and standard utility design and practice is required.

- The substation is located adjacent to the existing East Avenue electric substation and the power source is the adjacent existing 115-kV 1416 transmission line. The interconnections of this line to the substation are very short.

- The source of the additional power for the community was determined to be 115 kV. At this voltage the magnetic field level from the proposed interconnecting lines and the substation will be lower than had a lower voltage source been chosen. To deliver the same power at lower voltages, greater current flow (the source of magnetic fields) is required than at higher voltages.

- While the substation will be an additional source of EMF, the field levels will be consistent with the range of EMF associated with the existing sources, particularly the 1416 line, which is a major contributor to EMF levels around the proposed site. At buildings adjacent to the site, the magnetic field-levels will be similar to or lower than those produced by ordinary distribution lines (NIEHS, 2002).

- The new 23.6-kV distribution circuit will exit the substation with the phase conductors in close proximity underground to minimize the magnetic field and totally shield the electric field as compared to an above-ground line.

- Consideration of current scientific research as summarized and evaluated by national and international health agencies reinforces the CSC's BMP policies.

References

Connecticut Siting Council (CSC). Application Guide for an Electric Substation Facility, April 2010. http://www.ct.gov/csc/lib/csc/guides/guidesonwebsite042010/elecsubstationfac0410.pdf

Connecticut Siting Council (CSC). Electric and Magnetic Field Best Management Practices for the Construction of Electric Transmission Lines in Connecticut, December 14, 2007. http://www.ct.gov/csc/lib/csc/emf_bmp/emf_bmp_12-14-07_20080603083907.pdf

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields. Executive Agency for Health and Consumers, 2010.

International Commission on Non-Ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz – 100 kHz). Health Physics 99:818-826, 2010.

International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 3 kHz C95. 6-2002. Piscataway, NJ: IEEE, 2002.

Institute of Electrical and Electronics Engineers (IEEE). IEEE recommended practice for instrumentation: specifications for magnetic flux density and electric field strength meters-10 Hz to 3 kHz. IEEE Standard 1308-1994.

Institute of Electrical and Electronics Engineers (IEEE). IEEE Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic fields with respect to Human Exposure to Such Fields, 0 Hz to 100 kHz. New York: IEEE. IEEE Std. C95.3.1™-2010.

National Institute of Environmental Health (NIEHS). EMF Electric and Magnetic Fields Associated with the use of Electric Power: Questions and Answers. Research Triangle Park, NC: National Institute of Environmental Health Sciences of the U.S. National Institutes of Health, 2002.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) for the Directorate-General for Health & Consumers of the European Commission. Health Effects of Exposure to EMF. January 2009.

Swedish Radiation Safety Authority (SSM). Recent Research on EMF and Health Risks: Seventh annual report from SSMs independent Expert Group on Electromagnetic Fields 2010. Report Number: 2010:44. SSM, 2010.

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. WHO: Geneva, Switzerland, 2007.

TAB H

TTD 115kV Fitch Street Substation Development Schedule
Revision 10 3/27/12

9/1/2011	TTD retains firm to prepare CSC filing
10/25/2011	At a meeting at CL&P, NU determined that they will build the take-off structures on the T-line ROW
11/1/2011	TTD issues RFP re final proposals for a design engineer
11/30/2011	RLC presents study scope to ISO
12/2/2011	TTD submitts letter of understandings to NU
12/15/2011	TTD provides NU conceptual design for the interconnection including A2 quality drawings
12/30/2011	Submitt technical information to City of Norwalk
1/9/2012	Bid opening for EPC/turn key proposals
1/16/2012	RLC submits scope to TTF/STF for interconnection studies
2/1/2012	Receive TTF/STF approval of scope
2/22/2012	Meet with Norwalk Mayor and city personnel to prepare for city review of CSC Application
3/5/2012	Submitt CSC draft to Norwalk Mayor
3/8/2012	Meeting with CL&P & CDOT & Metro North on pole locations at RR Station
3/8/2012	Meet with Norwalk Plan Review Committee on draft applicaton
3/15/2012	Submit RLC's SIS Draft Report to TTF/STFs
3/21/2012	Norwalk Zoning Commission acts on draft CSC application
3/26/2012	Norwalk Mayor waives remaining time for local review of CSC application
3/27/2012	Receive TTF/STF approval of Draft SIS report > Submit PPA to RC
3/30/2012	Engineer finalizes interconnection detail with NU (less detail on protection—follows ISO study approvals)
4/2/2012	Submit CSC application
4/2/2012	Begin Stability Analysis to be complete April 10th
4/11/2012	Select turnkey substation contractor
4/13/2012	Submitt draft Stability Analysis to ISO-NE
4/17/2012	Receive Reliability Committee Recommendation on PPA (I.3.9) Approval (ISO approval letter follows around 1 week later)
4/18/2012	Sign turnkey construction contract
4/20/2012	Submitt final transmission study to working groups for review at April 24/25 meetings
5/16/2012	Prepare and present Solution Study to PAC (with estimate of project cost for update to PAC periodic Project Report Listing)
5/29/2012	Task Forces approvals at mid may teleconference or May 29/30 meetings
6/20/2012	Reliability Committee approval followed by I.3.9 approval
10/1/2012	Engineer releases bid documents including near final design specifications
10/2/2012	Siting Council Decision
11/15/2012	Prepare and file TCA application on project cost with ISO-NE & Reliability Committee
11/15/2012	Project/planning meeting with NU
12/1/2012	Develop D&M Plan; start construction
12/1/2012	File construction management plan with CSC
12/18/2012	Receive Reccomendation from Reliability Committee on TCA application (ISO-NE formal notification occurs at its own timing after an internal review and evaluation)
1/1/2013	Major equipment orders placed
1/1/2013	Start construction--site prep & foundation work
3/1/2013	CMEEC or CTMEEC files for estimated RNS compensation for PTF facilities having an assumed in service date of 10/1/2013
4/15/2013	Planning/Schedule meeing with NU re tie in of new station, final review protection settings
9/15/2013	Project Status review meeting with NU
10/1/2013	Begin acceptance testing
10/15/2013	Notify ISO re new station in service date and notice to include in (2013 PTF catalog update if any) and 2014 catalog
11/1/2013	Station in service
11/1/2013	Terminate TTD participation in WDA
11/30/2013	Substantial completion
3/1/2014	Receipt of letter from ISO re RNS vs LNS qualfication
4/15/2014	Submit RNS Funding Request for 2014-2015 rate year (must be in service before end of year otherwise seek CWIP funding request)
4/15/2014	Update costs of PTF for RNS filing (both true-up of prior estimate and for ongoing rate base)