

DOCKET NO. 153 - An application of the Connecticut Light and Power Company (CL&P) for a Certificate of Environmental Compatibility and Public Need for the construction of a new substation and its connection to an existing 115-kV transmission line on a 6.1 acre site owned by CL&P located about 1/2 mile south of Route 34 and about 640 feet to the east of Great Ring Road in the Sandy Hook section of the Town of Newtown, Connecticut.

: Connecticut
 : Siting
 : Council
 : April 7, 1993

Findings of Fact

Introduction

1. On May 29, 1992, in accordance with sections 16-50g through 16-50z of the Connecticut General Statutes (CGS) and section 16-50j-1 et seq., of the Regulations of State Agencies (RSA), the Connecticut Light and Power Company (CL&P) submitted an application to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need (Certificate) for the construction, operation, and maintenance of a new substation and its connection to an existing 115-kV transmission line off of Great Ring Road in the Sandy Hook section of the Town of Newtown, Connecticut. (CL&P 1, p. 1)
2. Pursuant to CGS section 16-501(b), CL&P published notice of the application in The Hartford Courant on May 22 and 25, 1992, and in The Newtown Bee on May 22 and May 28, 1992. (CL&P 1, p. 23)
3. Pursuant to CGS section 16-50m, the Council, after giving due notice thereof, held a public hearing on the proposed application on September 15, 1992, beginning at 3:00 p.m. and reconvening at 7:00 p.m. in the Edmond Town Hall, 45 Main Street, Newtown, Connecticut. On December 2, 1992, the Council reopened the proceeding and voted to hold an additional public hearing to receive new evidence on the effects of electric and magnetic fields and on alternative sites off of Still Hill Road and Hoseye Coach Road in Newtown. The hearing was held February 3, 1993, beginning at 10:00 A.M. in Hearing Room One of the Department of Public Utility Control, One Central Park Plaza, Main Street, New Britain, Connecticut. (Public Hearing Notice, June 30, 1992; Tr. September 15, 1992, 3:00 p.m., September 15, 1992; Tr., 7:00 p.m., September 15, 1992; Public Hearing Notice, December 8, 1992)

4. The Council and its staff made a field inspection of the proposed site off of Great Ring Road and a rejected alternate site off of Hoseye Coach Road in Newtown, Connecticut, on September 15, 1992. On January 29, 1993, the Council revisited those two locations and a parcel of land off of Still Hill Road in Newtown, Connecticut. (Public Hearing Notice, June 30, 1992; Public Hearing Notice, December 8, 1992)

Need

5. On April 12, 1989, the Council approved CL&P's statement of intent to acquire real property in Newtown as a potential site for a future substation on a 6.1-acre lot, east of Great Ring Road, but conditioned the approval on the need to acquire a Certificate of Environmental Compatibility and Public Need. CL&P purchased the property on January 30, 1991. (CL&P 1, Ex. 13; CL&P 7, Q. 1)
6. Pursuant to section 16-50z of the CGS, no person engaged in the transmission of electric power or fuel in the State shall acquire real property in contemplation of a possible future transmission facility other than a facility for which the Council has issued a Certificate or one which the Council has found will have no substantial adverse environmental effect, except as provided by regulations adopted by the Council. (CGS Section 16-50z(a))
7. Pursuant to section 16-50p(e) of the CGS, the Council shall in no way be limited by the fact that the applicant may already have acquired land or an interest therein for the purpose of constructing the facility which is the subject of its application. (CGS section 16-50p(e))
8. The need for a new bulk power substation within CL&P's forecast period of 1992-2011 in the Newtown area was identified by CL&P in its March 1, 1992, Forecast of Loads and Resources. (Council Administrative Notice item 5, p. V-2)
9. CL&P currently operates two existing bulk-supply substations on its 115-kV transmission system in the Newtown area, the Newtown Substation and the Stevenson Substation. Using 8.32-kV and 13.8-kV feeder lines, these two substations supply customers in the Newtown area. The Stevenson Substation also supplies a distribution substation in Monroe via two 27.6-kV lines. (CL&P 1, p. 4)
10. Distribution lines from the Monroe Substation operate at 8.32-kV and 23-kV, the latter distribution voltage being established in 1990 to correct voltage and reliability problems within Monroe. CL&P is phasing out the 8.32-kV distribution voltage in this area. (CL&P 1, p. 4)

11. Monroe and portions of Newtown experienced severe electrical service reliability problems in the late 1980s. CL&P therefore added a 27.6- to 23-kV, 12.5 MVA transformer at its Monroe Substation and converted some 8.32-kV distribution lines to 23-kV. Additionally, a second and more reliable 27.6-kV supply from the Stevenson to Monroe substations was installed. (CL&P 1, p.5)
12. The Newtown and Stevenson substations each have one power transformer to serve electrical load in the area. The combined transformer capacity of these two substations during the summer is 55 MW. The combined 1991 summer peak load was 51.6 MW. The 1991 actual peak load at Stevenson substation was 23 MW. The 1992 summer peak load was 21.5 MW for the Stevenson Substation, and 27.2 MW for the Newtown Substation. The combined 1992 summer peak load was 48.7 MW. CL&P anticipates summer peak load will exceed 55 MW by 1994. (CL&P 1, p.4; CL&P 2, Q.14; Tr., September 15, 1992, 3:00 p.m., p. 31; CL&P 6, p.3)
13. Customer load dropped by transformer failure at either the Monroe or Stevenson Substations cannot be temporarily picked up from another substation. The existing Newtown Substation is too distant, serves a different distribution voltage, and has little reserve transformer capacity. (CL&P 1, p. 5)
14. Two of the four 13.8-kV feeder lines out of the Newtown Substation have experienced overload and voltage problems at times of peak load. (CL&P 6, p. 3)
15. New load in the Newtown area of particular concern to CL&P is the commercial growth developing in Monroe along Route 25 and steady residential growth in the Towns of Newtown and Monroe. (Tr., September 15, 1992, 3:00 p.m., p. 34)
16. Projected future CL&P loads in Newtown include Fairfield Hills Hospital air conditioning, 3000 KVA, and the Newtown Jail, 1250 KVA, which is planned to be in service in the summer of 1993. Projected future loads in Monroe include Payday Associates, 6000 KVA, and the Trefoil Industrial Park, 7000 KVA. While these areas are distant from the proposed substation, they are in the general service area that would need to be served with distribution voltage. (CL&P 2, Q. 11; CL&P 1, p. 4)

Alternatives to a New Substation

17. CL&P investigated several alternatives to building a new Sandy Hook Substation. CL&P evaluated adding a 115-kV to 23-kV, 25 MVA transformer at its existing Newtown Substation and adding two 23-kV feeder positions. The expected cost for this alternative, including distribution work, would be approximately \$5,588,800. This alternative would solve the Newtown Substation's capacity and feeder problems, but due to the distance between the Newtown Substation and the Monroe Substation, a 23-kV source at the Newtown Substation would only be capable of picking up a relatively small portion of the Monroe/Stevenson load. (Tr., September 15, 1992, 7:00 p.m., p. 62; CL&P 1, p. 6)
18. If a new 25 MVA transformer were installed at the Newtown Substation, CL&P area load projections show that by 1997, CL&P would again need an additional bulk capacity source closer to the Stevenson Substation, thereby offering only temporary relief. Another disadvantage is that the feeder exit routes at the Newtown Substation are now crowded, and further congestion would have a negative effect on reliability. (CL&P 1, p. 6; CL&P 6, p. 4; Tr., September 15, 1992, 3:00 p.m., p. 33)
19. Another alternative CL&P examined was to expand the existing Stevenson Substation by adding a 115- to 23-kV transformer. However, this transformer would not be capable of supplying loads along Route 25 due to distance. To meet all of the area's needs, this transformer would have to be installed together with a new 23-kV source at the Newtown Substation at a total cost of \$6,199,100. In addition, the Stevenson Substation is built on a narrow parcel of land along the Housatonic River, where available land is limited, and the site offers limited feeder exit routes. (CL&P 1, p. 7; CL&P 3, Q. 28)
20. CL&P considered providing additional 27.6-kV transformer capacity at the Stevenson Substation to supply the Monroe Substation, and then transfer some of the load from Route 25 to a new 23-kV feeder from Monroe Substation. This alternative, including distribution work, would cost an estimated \$4,779,100. This alternative would add only about 10 MVA of capacity to the area, leaving little growth capacity. Additionally, load projections indicate that by 1996 additional bulk substation capacity would be needed. (CL&P 1, p. 7)

21. CL&P estimates that by 1996, load would be about five MW over the current combined capacities of the Newtown and Stevenson substations. To preclude the need for the proposed Sandy Hook Substation, a five MW reversal of load growth would be needed, above what is incorporated into CL&P's forecast of loads and resources due to conservation and load management programs. (Tr., September 15, 1992, 3:00 p.m., pp. 30-31)

Proposed Substation

22. The proposed Sandy Hook Substation would supply 23-kV feeders, and its location would enable the existing Monroe Substation and proposed Sandy Hook Substation to back each other up. All Monroe feeders are eventually being converted to 23 kV. About 3.6 MW of peak load could be transferred to the proposed Sandy Hook Substation from the Stevenson Substation by converting one of its 8.32-kV feeders to 23-kV. About 7.1 MW of load in the Route 25 area could be transferred to the proposed Sandy Hook Substation from the Newtown Substation via a converted feeder source. All three bulk-supply substations would thereby have spare transformer capacity. (CL&P 1, p. 6; CL&P 6, p. 3)
23. When demand from the Monroe-Newtown area exceeds the capacity of the proposed Sandy Hook Substation transformer, CL&P would add a second transformer. CL&P does not expect to add a second transformer at the proposed substation within the next 10 years. (CL&P 7, Q. 29)
24. The proposed Sandy Hook Substation would consist of a 115-kV transmission line terminal structure, connections for a mobile emergency transformer, one 115- to 23-kV, 25 MVA transformer, and one 23-kV metal clad switch gear enclosure with a 23-kV bus and two 23-kV feeder positions. The new transformer would be connected to the existing 115-kV Stevenson-Newtown transmission line via a tapped line span approximately 35 feet high and 100 feet long. (CL&P 1, p.2)

Site Search Process

25. In its search for a potential substation site in Newtown, CL&P identified a search range. This search range is dependent on its proximity to an existing 115-kV transmission line. This search range was identified between Toddy Hill Road and Bradley Cemetery along the existing 115-kV transmission line between the Newtown Substation and Stevenson Substation. CL&P began the site selection process in early 1988. (CL&P 1, p.8, Ex. 3; CL&P 6, p. 5)

26. After determining a search range, CL&P identified undeveloped lots within this search range, especially those lots occurring in areas where the transmission line crosses existing roads. (CL&P 6, p. 5)
27. To evaluate potential sites within the search range, CL&P considered such factors as the adaptability of the site to reliable and economic distribution connections; accessibility of the site from existing roads; proximity to customer load; proximity of the site to regulated inland wetlands; topography and existing screening; availability of buffer space; feasibility of additional landscaping; subsurface site conditions, including bedrock and groundwater; and any constraints which might affect site development. (CL&P 6, p. 5; CL&P 1, p. 8)
28. CL&P evaluated seven potential substation sites within the search range. One additional site was evaluated outside the search range, near Lake Zoar. (CL&P 6, p. 5)
29. CL&P considered and rejected five of the six sites within the search range in Newtown, and one Monroe site, at Lake Zoar, outside of the search range. The sixth site within the search range became the proposed site off of Great Ring Road. (CL&P 6, p. 5; CL&P 1, Ex. 3)
30. Two potential sites east of the intersection of High Rock Road and Grays Plain Road were rejected due to the presence of inland wetlands, including standing water; lack of effective screening; the presence of homes within 100 feet; and the necessity of extensive blasting. (CL&P 1, p. 9; DEP Comments, 7/21/92, p. 4)
31. A site investigated on Toddy Hill Road was rejected due to proximity to nearby residences and the need for extensive blasting on the site. Additionally, since this site is farther away from CL&P's load, longer distribution feeders would be required and would increase feeder vulnerability and cost. (CL&P 1, p. 10, p. 12)
32. A site on Bradley Lane was rejected due to lack of available screening, proximity to nearby residences, and disturbance to inland wetlands during construction. (CL&P 1, pp. 11-12; DEP Comments, 7/21/92, p. 3)
33. A site between Route 34 and Lake Zoar in Monroe on land owned by CL&P was evaluated. Access into the site is acceptable, there are no wetlands present, and the nearest residences are 400 to 500 feet distant. However, screening would not be adequate to screen the view of approximately 20 houses southwest of the site and the distance of this site from CL&P's load would require longer feeders which would increase feeder vulnerability and cost. (CL&P 1, p. 11)

Investigation of Hoseye Coach Road Property

34. CL&P investigated a parcel of land directly west of Hoseye Coach Road, along the existing ROW. The property to the north is part of a 22-acre parcel owned by Katherine Kazan et al; the property to the south is part of a 325-acre parcel owned by James Massey, III. To develop a substation here, CL&P would need to purchase land along the existing transmission line ROW to establish a lot of five to six acres for a substation site. (CL&P 13, p. 2)
35. The property off of Hoseye Coach Road identified by CL&P as a possible substation site is in the southwest quadrant of the intersection of the existing ROW and Hoseye Coach Road. The northwest quadrant of this area has wetlands with standing water up to two feet deep with wetlands extending along 200 feet north of the ROW. The northeast quadrant is relatively flat with large boulders, ledge outcrops, and slopes down approximately 20 percent to wetlands. The southeast quadrant has slopes over 25 percent, a swale 20 feet deep, and wetlands. (CL&P 12, Q. 37-6; CL&P 9, Q. 36)
36. At the Hoseye Coach Road location, the nearest substation equipment would be approximately 220 feet from the eastern property boundary, 100 feet from the western boundary, 130 feet from the southern boundary, and 275 feet from the northerly boundary along the ROW. (CL&P 16)
37. The Hoseye Coach Road location is zoned two acre Farming and Residential, and has no existing homes within a 1000-foot radius, the nearest home being 1800 feet to the south. Residential development has been planned for the area, but has not yet been submitted for approval to the Town of Newtown. (Tr., February 3, 1993, p. 224; CL&P 12, Q. 37; CL&P 13, p. 3; Town of Newtown Zoning Map)
38. The area surrounding the Hoseye Coach Road location is undeveloped, with mature dense deciduous vegetation. The property contains substantial wetlands, including three to five acres within the ROW north of the potential substation location. The wetland includes inland wetland soils, is seasonally flooded with one half to two feet of water and includes swamp azalea, sweet pepperbush, buttonbush, and highbush blueberry. The nearest portion of wetland would be approximately 100 feet north of the substation fence line. The transmission line tap would cross wetlands to connect to the existing transmission line. (CL&P 13, p. 3; CL&P 13A, p. 3; CL&P 12, Q. 37; Tr., February 3, 1993, pp. 30-32)

39. The placement of pole structures in the wetlands would probably require blasting which could open large fractures in the bedrock and thereby change surface hydrology. A permit from the Army Corps of Engineers might be required for such construction, which could impact 7000 to 8000 square feet of wetlands. Extensive blasting would also be required along Hoseye Coach Road where ledge outcrops occur. Some placement of fill would also take place in wetlands. Approximately 550 trees would have to be removed during substation construction and connection to the transmission line. (Tr., February 3, 1993, pp. 220-219; CL&P 13, p. 3; CL&P 13A, p. 4)
40. The northern edge of the substation area is partially open as it borders the existing ROW. The substation would be up slope from the wetland in a moderately sloping terrain of glacial till soils, including Hollis-Charlton Rock outcrop soils. Elevations within the substation's proposed property lines range from 550 feet above mean sea level (AMSL) to 570 feet AMSL. (Tr., February 3, 1993, p. 226; CL&P 13A, pp. 3-4; CL&P 9, Q. 36)
41. Any future residential development along this area of Hoseye Coach road would have direct views of the substation from the north and west due to flat higher terrain. Screening to the south would be more substantial. (CL&P 13, p. 1; Tr, February 3, 1993, p. 53)
42. Access to the substation would be via Hoseye Coach Road, a 10-foot wide unimproved road. Approximately 2700 feet of Hoseye Coach Road would have to be modified, including two sections of approximately 300 feet which have steep grades which would have to be paved, and other sections widened and straightened to allow transport of substation equipment. This would require the clearing of approximately 800 to 1000 trees. (Tr., February 3, 1993, p. 40, pp. 45-46; CL&P 13A, pp. 3-4; CL&P 13, p. 1; Town of Newtown 3)
43. The Hoseye Coach Road property is in the upper watershed of Keating Pond Brook. Because construction of the road and substation could cause erosion and downhill sedimentation, the construction of a stormwater detention basin might be necessary near the intersection of Still Hill Road and Hoseye Coach Road, which would require additional tree clearing and grading. CL&P would have to acquire additional property for the stormwater detention basin and its discharge area. (Tr., February 3, 1993, p. 223; CL&P 13, p. 3)
44. One of the Hoseye Coach Road property owners, Mr. Massey, has indicated to CL&P through his attorney that he is not interested in considering an offer from CL&P. (CL&P 13, p. 2; CL&P 8, Q. 34)

Other Sites

45. The Department of Environmental Protection (DEP) identified two potential sites across from the rejected Bradley Lane site. The closest home to the sites is approximately 500 feet away. The sites would have substantial screening, but poor construction access. (DEP Comments, 7/21/92, pp. 3-5)

Investigation of Still Hill Road Property

46. CL&P investigated a 400-foot by 350-foot parcel on a 108-acre property at the end of an 1800-foot private driveway south of Still Hill Road owned by Thomas S. Langner and zoned two acre Farming and Residential. There is one existing home within a 1000-foot radius of the site location. The nearest home is approximately 430 feet northeast of the investigated property. This site location is farther west than the Hoseye Coach Road location and proposed Great Ring Road site, and not as well centered to serve the electrical load. (Tr., February 3, 1993, p. 228, p. 231; CL&P 13A, p. 4; CL&P 12, Q. 37; CL&P 8, Q. 33, Q. 34-4; Town of Newtown Zoning Map)
47. At the Still Hill Road location, the nearest substation equipment would be approximately 200 feet from the eastern property boundary. The northern boundary would be 150 feet distant and the southern and western boundaries 125 feet distant. (CL&P 8, Q. 33-3)
48. The investigated parcel is in a field with scattered shrubs and small trees south of the existing transmission line ROW. Plans for residential development in the area are underway, but have not been filed with the Town. (CL&P 13, p. 5; Tr., February 3, 1993, p. 234)
49. The Still Hill Road property has an elevation of approximately 490 feet AMSL. The location is on a knoll which slopes down to wetlands to the east, south, and west. The edge of the nearest wetlands is approximately 50 feet to the east of the substation parcel, and contains a shallow pond approximately 400 feet in length. A settling basin might be required due to the proximity of these wetlands. (Tr., February 3, 1993, p. 228; CL&P 9, Q. 36-2; CL&P 12, Q. 37-2)
50. A substation at this location would be visible from the nearest house at the end of the private driveway. New distribution lines from this substation would pass within 50 feet of an existing home and would exit the substation and proceed north to Still Hill Road to connect to existing distribution feeders. No blasting would be required to construct this substation. (CL&P 12, Q. 37; CL&P 13A, p. 5; Tr., February 3, 1993, p. 233, p. 250)

51. Access to the Still Hill Road location would be via a 10-foot wide private driveway serving four residences. This driveway is owned in part by Thomas S. Langner, in part by M. Daniel Arvidson, and in part by Richard E. Cooke, Sr. This driveway would need to be widened and regraded, and approximately 200 trees would have to be removed to allow tractor trailers and trucks to transport substation equipment. Access via the private driveway would be between an existing tennis court and a swimming pool. (Tr., February 3, 1993, pp. 229-230; CL&P 13, pp. 4-6; CL&P 8, Q. 33-3; CL&P 12, Q. 37-6)
52. The owner of the Still Hill Road parcel is unwilling to consider any offer from CL&P to purchase land for a potential substation. CL&P has not contacted any of the other owners of the driveway which would serve as an access road. (CL&P 13, pp. 5-6; CL&P 13E)
53. CL&P examined adjacent areas of the Langner property as potential substation sites. A substation north of the ROW at the end of the private driveway would be within 150 feet of the nearest home. A site 300 feet east of the investigated location across a pond and north of the ROW would be within 150 feet of wetlands to the east and west and 400 feet from the nearest home. (CL&P 12, Q. 37-6)

Proposed Site

54. The proposed Sandy Hook Substation site is a 6.1 acre parcel of land approximately one-half mile south of Route 34 and 640 feet east of Great Ring Road in Newtown. The proposed site is approximately midway between the Stevenson Substation and the Newtown Substation. (CL&P 1, p. 2, p. 9; CL&P 1, Ex. 3)
55. At the proposed Great Ring Road site, the nearest substation equipment would be approximately 80 feet from the eastern property boundary, 150 feet from the western boundary, 200 feet from the southern boundary, and 380 feet from the northern boundary. (CL&P 1, Ex. 2, Rev.1)
56. The proposed site is zoned two acre Farming and Residential and is within an approved but undeveloped subdivision east of Great Ring Road. (CL&P 2, Q. 2; CL&P 1, p. 13)
57. The proposed site is designated as Lot 21 in the Half Farm Estates subdivision. Final approval for this subdivision was granted by the Town of Newtown on September 6, 1990. A proposed cul-de-sac in this subdivision, Farmery Lane, has not been constructed. (CL&P 2, Q. 10)

58. If Farmery Lane is built, CL&P would construct a driveway between Farmery Lane and the proposed Great Ring Road substation for access. Until Farmery Lane is built, CL&P has the right to use the existing access road and the transmission line right-of-way (ROW) during construction and thereafter for operation. If Farmery Lane is ever constructed and then accepted as a Town road, access to the proposed site would shift to Farmery Lane. (CL&P 2, Q. 10; Tr., 9/15/92, 3:00 P.M., pp. 65-70)
59. The two nearest homes are 680 feet to the west and 820 feet to the southwest of the proposed site. There are a total of three existing homes within a 1000-foot radius of the proposed site. Six of the proposed Half Farm Estates subdivision home sites are within a 1000-foot radius of the proposed site. The nearest subdivision home would be approximately 200 feet from the boundary of the proposed substation site, and approximately 80 feet from the center of the existing transmission line. (CL&P 1, p. 9; CL&P 2, Q. 3; CL&P 7, Q. 10)
60. The fenced area of the proposed site would measure 147 feet by 174 feet, is wooded, and would be bordered on three sides by deciduous forest. The major tree species on the proposed site are red maple, white oak, and pin cherry, reaching a height of approximately 50 to 60 feet. The soil type is Paxton fine sandy loam, a well-drained soil. (DEP Comments, 7/21/92, p. 1; CL&P 1, p. 2; CL&P 5, Ex. 5K, p. 2)
61. There are two areas of inland wetland on the proposed site, with a total acreage of 0.81 acres. The wetland boundaries on the proposed site were mapped by a certified soil scientist. The nearest construction activity would take place approximately 120 feet from the nearest inland wetland area, which measures approximately 15 feet by 135 feet. Construction activity would be approximately 240 feet away from an irregularly shaped inland wetland area, measuring approximately 360 feet in length and 120 feet in width at the widest point. (CL&P 1, p. 13, Ex. 11; CL&P 5, Ex. 5K, p. 1)
62. The proposed site is moderately sloped, dropping approximately 22 feet from its southwest to northeast corners. Borings have indicated no bedrock is present, and no blasting would be required for the proposed substation. (CL&P 1, p. 15; CL&P 1, Ex. 17, p.1; CL&P 6, p. 6)
63. The top portion of the terminal structure and connecting lines might be visible during the winter months, although no portion of the proposed substation yard would be visible from Great Ring Road. Visibility of the proposed

substation would be low due to favorable topography, the adjacent woods, and stands of white pine north and south of the transmission line ROW, which shield the proposed site from views from the west. (DEP Comments, 7/21/92, p. 2; Tr., September 15, 1992, 3:00 p.m., pp. 17-18; CL&P 1, p. 15)

Proposed Substation Equipment

64. CL&P designed the proposed substation and line connections in accordance with the standards of the National Electrical Safety Code, the American National Standards Institute, the Institute of Electrical and Electronics Engineers, and the National Electrical Manufacturers Association. (CL&P 1, p. 3)
65. The metal enclosure of the proposed substation would be approximately 30 feet long, 14 feet wide, and 11 feet high, and would contain two 23-kV feeder-breaker positions as well as all of the substation's relaying, control, and monitoring equipment. The enclosure would be connected to the power transformer by a 20-foot long overhead bus. (CL&P 1, p. 3)
66. The power transformer would be a three phase, 115 to 23-kV transformer with a 25 MVA nameplate capacity. The transformer would contain approximately 6000 gallons of insulating oil, which has been classified as non-PCB by the United States Environmental Protection Agency. (CL&P 1, p. 2)
67. A sump with a capacity 200 percent of the volume of oil contained in the transformer would temporarily contain any spills from the transformer. Alarms would alert CL&P personnel of any large oil spill. Weekly inspections would be conducted to detect smaller spills. (CL&P 1, p. 2; Tr., September 15, 1992, 3:00 p.m., pp. 28-29)
68. The sump would be designed to retard the flow of any spilled oil away from the transformer and keep it from going under the transformer foundation. As rain water accumulated in the sump, it would flow off the polyethylene liner into the earth. If the containment system filled with water on a regular basis, it would be pumped out. (Tr., September 15, 1992, 3:00 p.m., pp. 26-29)
69. The transformer would be equipped with high-speed protective relays which would de-energize the transformer in the event of a transformer fault and reduce the probability of a fault leading to a fire. The transformer would be equipped with temperature and oil level monitors to alert the CL&P regional dispatch center in Norwalk if a transformer overheated or the oil level were low. (CL&P 3, Q. 20)

70. To detect fires, smoke detectors which would send an alarm to CL&P's regional dispatch center in Norwalk would be installed in the switchgear building. A wheeled fire extinguisher would be installed in the substation yard. (CL&P 3, Q. 20)
71. The transmission line terminal would be a 55-foot high steel A-frame structure from which three 1272 kcmil aluminum conductor steel reinforced conductors, each approximately 100 feet long, would be installed below and connected via vertical taps to existing 115-kV transmission line conductors. These three conductors would terminate on a new guyed, three-pole wood structure approximately 30 feet tall. A new guyed, three pole wood structure approximately 60 to 65 feet tall would be installed to raise the existing line and provide sufficient clearance for the substation connection. (CL&P 1, p. 3)
72. The proposed substation 115-kV bus would be 15 to 21 feet above grade, and the 23-kV connection between the power transformer and the metal enclosure would be 18 feet above grade. A 17-foot high wood structure would support the 23-kV disconnect switch and underground cable riser to accommodate the low voltage side connection of an emergency mobile transformer. Other substation equipment to support 115- or 23-kV bus and switches would be of galvanized steel and placed on concrete foundations. (CL&P 1, p. 3)
73. All of the substation equipment would be enclosed within a 174-foot by 147-foot fenced area with a traprock surface. The fenced area could eventually accommodate a second line position, second transformer, and a second switchgear enclosure should additional capacity be needed in the future. The fence surrounding the proposed substation would be seven feet in height with a one-foot strand of barbed wire on top. (CL&P 1, pp. 2-3)
74. Distribution lines would run underground in a common duct bank from the proposed substation to riser poles on Great Ring Road, a distance of approximately 700 feet. The duct bank would be within the existing ROW. It is CL&P's policy to have underground get-a-ways from substations, to reserve space for future transmission lines. (Tr., September 15, 1992, 7:00 p.m., pp. 127-128; CL&P 1, p. 17)

Proposed Site Construction

75. Clearing of the proposed site would be limited to the 0.52-acre substation yard, leaving 5.58 acres of the proposed site undisturbed. The proposed site of the substation yard presently slopes northeasterly from 720 feet AMSL to 698 feet AMSL. Grading would involve an approximate five-foot cut at the southwest corner of the proposed substation and an approximate nine-foot fill on the northeast corner. The proposed substation yard elevation would range from approximately 716 feet AMSL to approximately 707 feet AMSL at a five percent slope. Side slopes would be two horizontal to one vertical. (CL&P 1, p. 14; CL&P 1, Ex. 10)
76. A six-inch to nine-inch depth grass swale would carry runoff around the west side of the substation and discharge at existing grade elevation 700 feet AMSL, where traprock would be placed. The substation yard inside the fence would be covered with a four-inch layer of traprock. (CL&P 1, p. 14, p. 18)
77. Erosion controls, including silt fences, would be installed prior to grading. Slopes would be immediately stabilized with seed, mulch, and netting following final grading. (CL&P 1, p. 14; CL&P 1, Ex. 10)
78. Telephone service would be brought into the proposed site underground. (Tr., 3:00 p.m., September 15, 1992, p. 22)
79. The portion of the proposed substation yard which would remain vacant, would facilitate substation construction and make the movement of heavy equipment easier. CL&P is also preparing for the possible need to bring in a mobile emergency transformer in the event the proposed transformer failed. If the proposed transformer had to be removed for repairs, the emergency transformer could be in place four to six months. (Tr., September 15, 1992, 3:00 p.m., pp. 35-37)
80. Installation of heavy electrical equipment is planned to begin on the proposed site in the spring of 1993. During the installation of the transformer, oil-handling equipment would be brought to the substation for the vacuum filling of the transformer with insulating oil, which might take 12 to 24 hours. The oil filling would be performed and monitored by specially trained personnel. The wiring of components, installation of power cables, and system testing is planned to be completed by the summer of 1993 before the final connection to the transmission line. (CL&P 1, p. 19; CL&P 3, Q. 22)

81. The construction period would last approximately 10 months and would require the use of large vehicles and heavy equipment, ranging from half-ton trucks to a 100-ton capacity crane. Other equipment would include bulldozers, backhoes, compressors, and drilling rigs. (CL&P 1, p. 18)
82. Construction access into the proposed site would be via an existing construction road on the transmission line ROW. Some gravel would be placed on the access road to develop a roadway into the proposed substation. No substantial widening of the existing access road would be required. The existing access road would be adequate to bring an emergency mobile transformer into the proposed site. (CL&P 1, p. 18; Tr., September 15, 1992, 3:00 P.M.; pp. 37-38, p. 85)
83. Some limited blasting might be required to set two transmission wood pole structures in place and for the foundation of the terminal line structure. (CL&P 1, p. 20)

Environmental Effects

84. During construction, approximately 450 saplings and pole-sized trees would have to be removed from the proposed site. About 60 saplings and trees would have to be removed from the path of the access road. Trees would have to be removed to a distance of about 30 feet outside the fence line to allow for grading, and the removal of any danger trees, which include weak trees or trees with overhanging branches. (CL&P 2, Q. 4; Tr., September 15, 1992, 3:00 p.m., pp. 19-20)
85. CL&P conducted test borings of three locations on the proposed site. The borings varied in depth from nine to 14 feet and indicated no presence of groundwater. (CL&P 3, Q. 21)
86. The construction of the proposed substation would have no direct effect on inland wetlands at the proposed site. (CL&P 6, p. 6)
87. There are no known existing populations of Connecticut Species of Special Concern or federally endangered or threatened species occurring at the proposed site. (CL&P 1, Ex. 9)
88. The construction of the proposed substation at the proposed site would have no direct effect on the State's cultural or historical resources. (CL&P 1, Ex. 8)

89. CL&P conducted sound level measurements along the property line of the proposed site in April and September of 1991. Existing ambient sound levels ranged between 29 and 35 dBA in April and between 55 and 57 dBA in September. Calculated highest sound levels due to the transformer would be as follows along the property line of the proposed site: 37 dBA at the westerly boundary; 36 dBA at the southerly boundary; 42 dBA at the easterly boundary; and 32 dBA at the northerly boundary. (CL&P 1, p. 15; CL&P 2, Q. 5)
90. The combined sound levels at the two nearest residences to the proposed site would increase by 0.5 dBA and 0.3 dBA respectively, due to the proposed transformer. These conservative calculations do not take into consideration the sound buffering effects of topography and vegetation. (CL&P 2, Q. 3, Q. 5)
91. If sound levels due to the transformer exceeded allowable levels, CL&P would install sound absorbing and blocking noise barriers. (CL&P 2, Q. 5)
92. Impulse noise from the operation of any of the switching equipment in the proposed substation is not expected to be noticeable beyond the proposed site's property lines. (CL&P 3, Q. 26)
93. Vacuum oil filling of the power transformer would take 12 to 24 hours in a continuous process which might be expected to generate some noise. If the oil filling equipment were powered from distribution lines on Great Ring Road, expected sound levels at the property boundaries of the proposed site would be 40 dBA to the west; 38 dBA to the south; 40 dBA to the east; and 34 dBA to the north. If a temporary auxiliary power source were used on the proposed site, the expected sound levels at the property boundaries would be 64 dBA to the west; 63 dBA to the south; 64 dBA to the east; and 58 dBA to the north. The sound level at the nearest home would be below 50 dBA if the auxiliary power source were used. (CL&P 3, Q. 30)
94. CL&P would plant new trees and shrubs outside the perimeter of the substation fence, including 23 eastern white pine and five eastern red cedar. Shrubs to be planted include 40 mountain laurel, 30 inkberry, 30 viburnum, and 20 highbush blueberry. (CL&P 1, p. 20; CL&P 1, Ex. 11)
95. CL&P would loam, mulch, and seed all slopes and other disturbed areas. Landscaping would be completed in the spring of 1994. (CL&P 1, p. 19)

Electric and Magnetic Fields

96. The proposed substation would be designed to avoid significant increases in public exposure to 60 Hz electric and magnetic fields. Magnetic fields decrease sharply with distance from their source, are not easily blocked and can pass through buildings, earth, and humans. Electric fields can be blocked by trees, vegetation, buildings, earth, and other objects. (CL&P 1, pp. 15-16; CL&P 6, p. 6; CL&P 2, Q. 18; CL&P 11, p. 1-3)
97. The three sources of magnetic fields in the proximity of the proposed site would be the proposed substation, the existing Newtown to Stevenson 115-kV transmission line, and nearby distribution lines. (CL&P 1, p. 16)
98. Magnetic fields produced by the existing 115-kV transmission line would change minimally due to the proposed substation. The average line current east of the proposed Sandy Hook Substation would increase by approximately 10 amperes while the average line current west of the proposed substation would decrease by about 20 amperes. Current flowing in the existing transmission line from east to west which formerly passed by the proposed substation site to reach the Newtown Substation would no longer pass that way. The opposite effect would occur on the other side because about three MW of load now being served at the Stevenson Substation would no longer be needed to supply that load. (CL&P 1, p. 16; Tr., September 15, 1992, 3:00 P.M., pp. 57-58; CL&P 13, pp. 3-4)
99. If a substation were constructed at the Hoseye Coach Road location, the home nearest the proposed Great Ring Road site would experience a slight increase in magnetic field levels from the existing transmission line. A slight decrease in magnetic field levels would occur at the home on Great Ring Road nearest the proposed substation, if a substation were built at the proposed Great Ring Road site. (CL&P 1, p. 16; Tr., September 15, 1992, 3:00 p.m., pp. 57-58; CL&P 13, pp. 3-4)
100. The maximum magnetic fields along the western boundary of the proposed Great Ring Road site, based on maximum loads of 435 amperes, with the substation in place would decrease by approximately 2.1 mG 40 feet north of the centerline of the transmission line and decrease by 0.1 mG 240 feet north of the centerline of the transmission line. (CL&P 2, Q. 18)
101. Based on maximum loads of 435 amperes, with the substation in place, the maximum magnetic fields along the eastern boundary of the proposed Great Ring Road site would increase by approximately 1.4 mG 40 feet from the centerline of the transmission line and by 0.5 mG 90 feet

from the centerline of the transmission line. At a point 290 feet from the transmission line centerline and 120 feet from the centerline of the substation equipment along the eastern boundary, there would be no change in magnetic fields. At a point 240 feet from the centerline of the substation equipment and 80 feet from the transmission line centerline the magnetic field would increase by 0.5 mG along the southeastern boundary. The initial loading of the proposed substation would be less than 13.7 MVA. If the substation load reached the 25 MVA rating of the transformer in the future, the increase in the magnetic field from present levels along the easterly property line of the proposed Great Ring Road site would be slightly under two mG. (CL&P 2, Q. 18)

102. Along the southern boundary of the proposed Great Ring Road site at maximum loads of 435 amperes, magnetic fields would increase by 0.3 mG at the southeast property line 280 feet from the centerline of the substation equipment and 120 feet from the centerline of the transmission line, and decrease by 0.3 mG 210 feet from the centerline of the substation equipment and 120 feet from the centerline of the transmission line, at the southwest boundary. (CL&P 2, Q. 18)
103. The maximum electric fields along each boundary of the proposed Great Ring Road site, Still Hill Road location, and Hoseye Coach Road location with the proposed substation in place, would be unchanged based on maximum loads. In calculating these conservative levels, the effects of shielding objects such as trees and fences was neglected. (CL&P 2, Q. 18)
104. For the Still Hill Road and Hoseye Coach Road locations, at a distance of 100 feet to the nearest property line from the centerline of substation equipment at full loading, magnetic fields from substation equipment would be less than 2.0 mG. At distances to the nearest property line of greater than 100 feet, magnetic fields would continue to decrease with distance. Substation equipment could introduce a magnetic field of up to 0.6 mG at a property line of 105 feet from the substation equipment. At any point on a property line within 125 feet of the center of a transmission line, magnetic fields from the transmission line would be greater than those from the substation. Beyond a distance of 125 feet, the substation magnetic fields would combine with magnetic fields from the transmission line and cause a change of up to several tenths of one mG. (Tr., February 3, 1993, pp. 241-242; CL&P 8, Q. 35)

105. The distribution lines placed underground in a common duct bank within the ROW would not change the magnetic field levels off the ROW, due to very close spacing of the phase conductors and neutral wires, resulting in a substantial cancellation of the magnetic fields from each conductor. The underground distribution lines would make no contribution to electric fields. (CL&P 1, p. 17; CL&P 2, Q. 18; Tr., September 15, 1992, 7:00 p.m., pp. 75-76)
106. Underground distribution cables would emerge out of the substation at approximately the drive entrance gate to the proposed site, and cross the property line at the center of the ROW. If fully loaded, magnetic fields would be 10 to 15 mG directly over the lines, receding to background levels 20 to 25 feet either side of the line. The ROW in the vicinity of Great Ring Road is 110 feet in width. (Tr., February 3, 1993, p. 235; CL&P 1, Ex. 2)
107. CL&P would install its underground distribution lines on Great Ring Road north to the first pole past 27 Great Ring Road, with one 23-kV underground cable rising up that pole and the next 23-kV circuit rising above ground up the next pole north on Great Ring Road. Magnetic fields would be higher than present close to the riser cable or directly above the underground cables. Use of compact configuration of the underground and overhead lines would result in maximum magnetic field cancellation, yielding magnetic fields which would recede to background levels 20 to 25 feet from the lines. (Tr., February 3, 1993, pp. 87-90; p. 235)
108. At the Hoseye Coach Road and Still Hill Road locations, distribution lines would also exit via underground cables to or beyond property lines. To avoid wetlands near the Hoseye Coach Road location, underground cables would be routed east to Hoseye Coach Road, about 200 feet south from the center of the transmission line. At the property line along Hoseye Coach Road, the distribution line magnetic field would be greater than the transmission line magnetic field for a short distance on each side of the cables. The underground distribution cables would rise up on poles on Hoseye Coach Road and proceed north as overhead lines. Near the riser poles, increased magnetic fields would occur. Beneath the overhead distribution lines, magnetic fields would be less than levels over the underground cables. (CL&P 8, Q. 35)
109. Transmission lines would tend to be a higher source of magnetic fields than underground distribution cables. At the edge of the ROW or property boundary, the fields from distribution lines would be negligible compared to transmission lines. (Tr., February 3, 1993, pp. 212-213)

110. Although magnetic fields of 2 mG are not unusual in homes, the state of scientific knowledge at this time does not permit firm judgments about possible adverse effects of extremely low frequency magnetic fields on human health. Absolute proof of the occurrence of adverse effects of such fields at prevailing magnitudes cannot be found in the available evidence, and the same evidence does not permit a judgment that adverse effects could not occur. Connecticut has not established any standards for electric or magnetic fields. No national standards exist for the regulation of long-term health effects from 60 Hz electric or magnetic fields. (CL&P 11, p. 6-4; Council Administrative Notice, Electromagnetic Field Health Effects, Connecticut Academy of Science and Engineering, April 1, 1992, p. 7; CL&P 1, p. 16; Tr., February 3, 1993, p. 131)

Schedule

111. CL&P expects construction of the proposed substation to take approximately 10 months. (Tr., September 15, 1992, 3:00 p.m., p. 15; Tr., 7:00 p.m., p. 47)

Costs

112. The estimated costs to construct the proposed Great Ring Road substation are as follows:

Site acquisition	\$ 450,000
Site development	94,000
Access road improvement	0
Distribution lines interconnection, underground portion	487,100
Distribution lines interconnection, overhead portion, including tree trimming	207,600
Substation material	1,196,000
Substation labor	545,000
Substation engineering	223,500
Substation equipment	77,500
Transmission line interconnection	<u>87,000</u>
Total (without contingencies)	\$3,367,700

(CL&P 8, Q. 33)

113. The estimated costs to construct a substation on the Still Hill Road parcel are as follows:

Site acquisition	\$ 250,000
Site development	83,000
Access road improvement	37,000
Distribution lines interconnection (underground portion)	245,300
Distribution lines interconnection including tree trimming (overhead portion)	174,100
Distribution lines interconnection (all underground alternative, in lieu of prior two items)	956,337
Substation material	1,196,000
Substation labor	545,000
Substation engineering	223,500
Substation equipment (vehicles, cranes, etc.)	77,500
Transmission line interconnection	<u>87,000</u>
Total (without contingencies)	\$2,918,400

(CL&P 8, Q. 33)

114. The estimated costs to construct a substation on the Hoseye Coach Road parcel are as follows:

Site acquisition	\$ 350,000
Site development	159,000
Access road improvement	66,000
Distribution lines interconnection (underground portion)	271,600
Distribution lines interconnection including tree trimming (overhead portion)	235,700
Distribution lines interconnection (all underground alternative, in lieu of prior two items)	1,407,900
Substation material	1,196,000
Substation labor	545,000
Substation engineering	223,500
Substation equipment (vehicles, cranes, etc.)	77,500
Transmission line interconnection	<u>89,000</u>
Total (without contingencies)	\$3,213,300

(CL&P 8, Q. 33)

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