

ATTACHMENT 1

STATEMENT OF PUBLIC NEED

The proposed facility along Rose Hill Road in Branford will provide reliable wireless communications services to a large area including State Highway 142, Route 1 (West Main Street), Interstate 95, Burban Drive, Alps Road and other local roads in Branford and East Haven. The facility is needed in conjunction with other existing and proposed facilities for AT&T to provide reliable 4G LTE wireless services to the public that are not currently provided in this part of the State. Attached is a Radio Frequency Engineering Report with coverage plots depicting the "Current Coverage" provided by AT&T's existing facilities in this area of the state and "Proposed Coverage" as predicted from the proposed facilities together with existing service from adjacent sites. Additional statistics regarding the overall area, population and roadway miles of expanded and reliable service in the community are included in AT&T's report.

Radio Frequency Analysis Report

CT2454SA
45 Rose Hill Road, Branford, CT



October 30, 2014



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1. Overview

C Squared Systems was retained by New Cingular Wireless PCS, LLC (“AT&T”) to investigate the extent of coverage that could be potentially obtained by constructing the proposed wireless communications facility at 45 Rose Hill Road, Branford, CT at 130 feet AGL.

AT&T is licensed by the FCC to provide wireless communications services throughout the State of Connecticut including the Town of Branford where the proposed facility would be located.

This report addresses AT&T’s need for the proposed wireless facility and confirms that there are no other suitable existing structures that could address the coverage gaps and required capacity relief for their wireless communications network. The coverage analysis completed by C Squared Systems confirms: AT&T has a gap in reliable service in Branford, and that the Proposed Facility provides AT&T with coverage in that service gap. Included as attachments in this report are coverage maps detailing the existing network and expected coverage from the proposed facility, pertinent site information, terrain and network layout maps.

2. Technology Advances & Design Evolution

AT&T provides digital voice and data services using 3rd Generation (3G) UMTS technology in the 800 MHz and 1900 MHz frequency band, and is in the midst of deploying advanced 4th Generation (4G) services over LTE technology in the 700 MHz and 1900 MHz frequency bands as allocated by the FCC. As part of their network expansion and ongoing technology advancements in Connecticut and elsewhere in the Country, the 4G LTE network rollout will build on the existing 3G data services that utilize UMTS technology. These data networks are used by mobile devices for fast web browsing, media streaming, and other applications that require broadband connections. The mobile devices that benefit from these advanced data networks are not limited to basic handheld phones, but also include devices such as smartphones, PDA’s, tablets, and laptop air-cards. With the evolving rollout of 4G LTE services and devices, AT&T customers will have even faster connections to people, information, and entertainment.

It is important to note that with AT&T’s migration from 3G to 4G services come changes in the base station infrastructure and resultant changes in the operating thresholds required by the LTE network. In the past, AT&T has presented receive signal thresholds of -74 dBm for their in-building coverage threshold and -82 dBm for their in-vehicle coverage threshold. Those thresholds were based on network requirements to support 2G/3G data speeds and past usage demand. Today, customers expect low latency and faster data speeds as evidenced by increasing data usage trends and customer demand.

AT&T’s 4G LTE technology is designed to thresholds of -83 dBm and -93 dBm for their 700 MHz LTE and -86 dBm and -96 dBm for their 1900 MHz LTE.¹ The stronger thresholds (-83 dBm and -86 dBm) yield greater throughputs and improved customer experience. The -93 dBm and -96 dBm thresholds are the minimum acceptable levels required to meet customer expectations for 4G service.

¹ The threshold range differences between the 700 MHz and 1900 MHz frequency bands directly correlates to the type branch diversity receivers deployed in AT&T’s receiver design.

3. Coverage Objective

There is a significant coverage deficiency in the existing AT&T wireless communications network along State Highway 142, Route 1 (West Main Street), Interstate 95, Burban Drive, Alps Road and the surrounding residential areas in Branford, CT. In addition to the gaps in coverage, the sites currently serving the targeted area are in need of capacity relief due to the amount of usage in the area. A deficiency in coverage is evidenced by the inability to adequately and reliably transmit/receive quality calls and/or utilize data services offered by the network. Seamless reliable coverage provides users with the ability to successfully originate, receive, and maintain quality calls and/or utilize data applications throughout a service area. While adequate overlapping coverage is required for users to be able to move throughout the service area and reliably “hand-off” between cells in order to maintain uninterrupted connections, excessive overlap can be detrimental to service quality in an LTE system.

Due to terrain characteristics and the distance between the targeted coverage area and the existing sites, AT&T's options to provide services in this area are quite limited (maps of the terrain in this area and the distance to neighboring AT&T sites from the proposed site are included as Attachments 1 & 2, respectively.) AT&T's network requires a deployment of antennas throughout the area to be covered. These antennas are connected to receivers and transmitters that operate in a limited geographic area known as a “cell.” AT&T's wireless network, including their wireless handsets and devices, operate by transmitting and receiving low power radio frequency signals to and from these cell sites. The signals are transferred to and from the landline telephone network and routed to their destinations by sophisticated electronic equipment. The size of the area served by each cell site is dependent on several factors, including the number of antennas used, the height at which the antennas are deployed, the topography of the land, vegetative cover and natural or man-made obstructions in the area. As customers move throughout the service area, the transmission from the portable devices is automatically transferred to the AT&T facility with the best connection to the device, without interruption in service provided that there is overlapping coverage from the cells.

In order to define the extent of the coverage gap to be filled, both propagation modeling and real-world drive testing has been conducted in the area of Branford around the subject areas. Propagation modeling uses PC software to determine the network coverage based on the specific technical parameters of each site including, but not limited to, location, ground elevation, antenna models, antenna heights, and also databases of terrain and ground cover in the area. Drive testing consists of traveling along area roadways in a vehicle equipped with a sophisticated setup of test devices and receivers that collect a variety of network performance metrics. The data are then processed and mapped in conjunction with the propagation modeling to determine the coverage gaps.

Analysis of the propagation modeling and drive testing in and around Branford reveal that AT&T's network is unreliable throughout much of the area due to gaps in coverage, heavy usage on the existing sites in the area, and that there is a service deficiency as a result. In order to fill in these coverage gaps and improve the network reliability to Branford, a new facility is needed in the area.

While AT&T holds licenses in the 700 MHz, 800 MHz (Cellular), 1900 MHz (PCS) and 2300 MHz (WCS) bands, this report will focus on the 1900 MHz LTE coverage since it is this layer that is deficient in Branford and will be essential to AT&T's 4G platform, which is currently being rolled out throughout the market.

Table 1 below approximates the current coverage gap of AT&T's 1900 MHz (PCS) LTE technology in the vicinity of the proposed site.

Existing 1900 MHz LTE Coverage Gap		
Population:²	(\geq -86 dBm)	16,747
	(\geq -96 dBm)	6,890
Area (mi²):		
Area (mi²):	(\geq -86 dBm)	5.95
	(\geq -96 dBm)	3.15
Roadway (mi):		
Roadway (mi):	Main:	3.98
	Secondary:	22.06
	Total:	26.04

Table 1: Estimated Existing Coverage Gap Statistics

² Population figures are based upon 2010 US Census Block Data

Included with this report are Attachments 1-7, which are explained below and help describe AT&T's network in and around Branford, and the need for the proposed facility.

- Attachment 1: “*3D Terrain Map*” details the terrain features around the area of deficient service being targeted by the proposed site in Branford. These terrain features play a key role in determining site designs and dictating the unique coverage achieved from a given location. This map is included to provide a visual representation of the ridges and valleys that must be considered when siting a wireless facility. The darker green and blue shades correspond to lower elevations, whereas the yellow and red shades indicate higher elevations.
- Attachment 2: “*Map of Distance to Neighbor Sites – Branford*” provides an overview of AT&T's network of sites in the area, with distances shown from the proposed Branford site to the existing sites in the surrounding area.
- Attachment 3: “*Neighbor Site Data and Distance to Proposed Site*” provides site specific information of existing neighboring sites used to perform the coverage analysis provided in Attachments 4 and 5.
- Attachment 4: “*Existing 1900 MHz LTE Coverage Current AT&T Network*” depicts 1900 MHz LTE coverage from existing sites and demonstrates that there are currently gaps in 1900 MHz LTE coverage effecting service along State Highway 142, Route 1 (West Main Street), Interstate 95, Burban Drive, Alps Road, and the surrounding residential neighborhoods and roads in Branford and East Haven. The coverage shown is where the signal strengths are > -86 dBm (minimum level required for reliable high quality service and performance at 1900 MHz) and > -96 dBm (the minimum required for adequate level of service at 1900 MHz).
- Attachment 5: “*Existing & Proposed 1900 MHz LTE Coverage*” (with Branford Site in the AT&T Network) shows how this proposed site would fill in the existing coverage gaps and improve AT&T's 1900 MHz LTE network within the targeted areas, as detailed in Table 2.
- Attachment 6: “*Connecticut DOT Average Annual Daily Traffic Data – Branford*” shows the available vehicular traffic volume data for the subject area from the Connecticut Department of Transportation. This data shows as many as 19,700 vehicles per day passing through the subject area on Route 1 (West Main Street) near the border of Branford with East Haven, and as many as 4,300 vehicles passing through State Highway 142
- Attachment 7: “*Connecticut DOT Average Annual Daily Traffic Data – East Haven*” shows the available vehicular traffic volume data for the subject area from the Connecticut Department of Transportation. This data shows as many as 21,400 vehicles per day passing through the subject area on Route 1 (Main Street) near the East Haven/Branford border, and as many as 21,900 vehicles passing through State Highway 142 near the intersection with Coe Avenue.

Table 2 below lists the incremental coverage statistics that were compiled for the proposed site.

Incremental Coverage from Proposed Site (1900 MHz)		
Population Coverage:³	(\geq -86 dBm)	4,975
	(\geq -96 dBm)	3,923
Area Covered (mi²):		
	(\geq -86 dBm)	1.31
	(\geq -96 dBm)	1.46
Roadway Coverage (mi):		
	Main:	2.52
	Secondary:	13.98
	Total:	16.5

Table 2: Coverage Statistics

³ Population figures are based upon 2010 US Census Block Data

4. Conclusion

AT&T has identified an area of deficient coverage affecting a significant portion of Branford, CT, including key traffic corridors through the residential areas of the town. The proposed Branford facility will bring the needed fill-in coverage to significant portions of State Highway 142, Route 1 (West Main Street), Interstate 95, Burban Drive, Alps Road, and the residential neighborhoods in the vicinity of these roads, all of which are currently within this area of deficient coverage. In addition to the needed fill-in coverage, the proposed site will improve dominance, and offload the sites currently serving the targeted area, which are in need of capacity relief due to the amount of usage in the area.

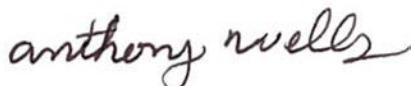
No existing structures were identified and available that would be able to satisfy the coverage and capacity requirements needed for this area. The location and the minimum height selected were chosen to achieve an optimal balance between meeting coverage objectives, overcoming the tree line for signal propagation, minimizing the aesthetic impact to the community, and future collocation.

As discussed in this report and depicted in the attached plots, the proposed AT&T site will provide the public need for service in this area, by providing an appropriate coverage footprint for the Branford community along with effective connectivity to the rest of AT&T's existing network.

Without a site in this area, at the height requested, significant gaps in service will exist within the Town of Branford, and the identified public need for reliable wireless services in this area will not be met.

5. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate.

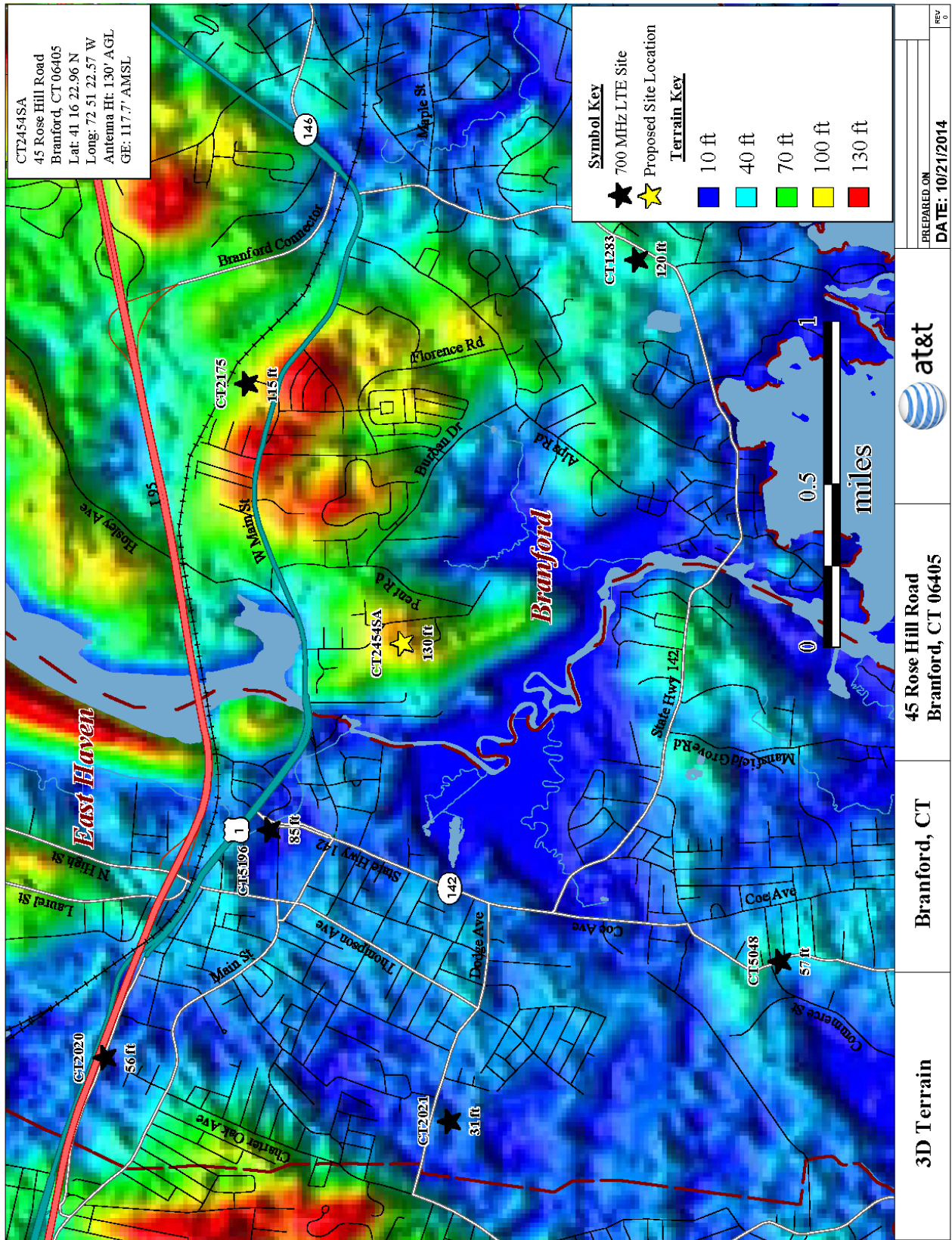


Anthony Wells
C Squared Systems, LLC

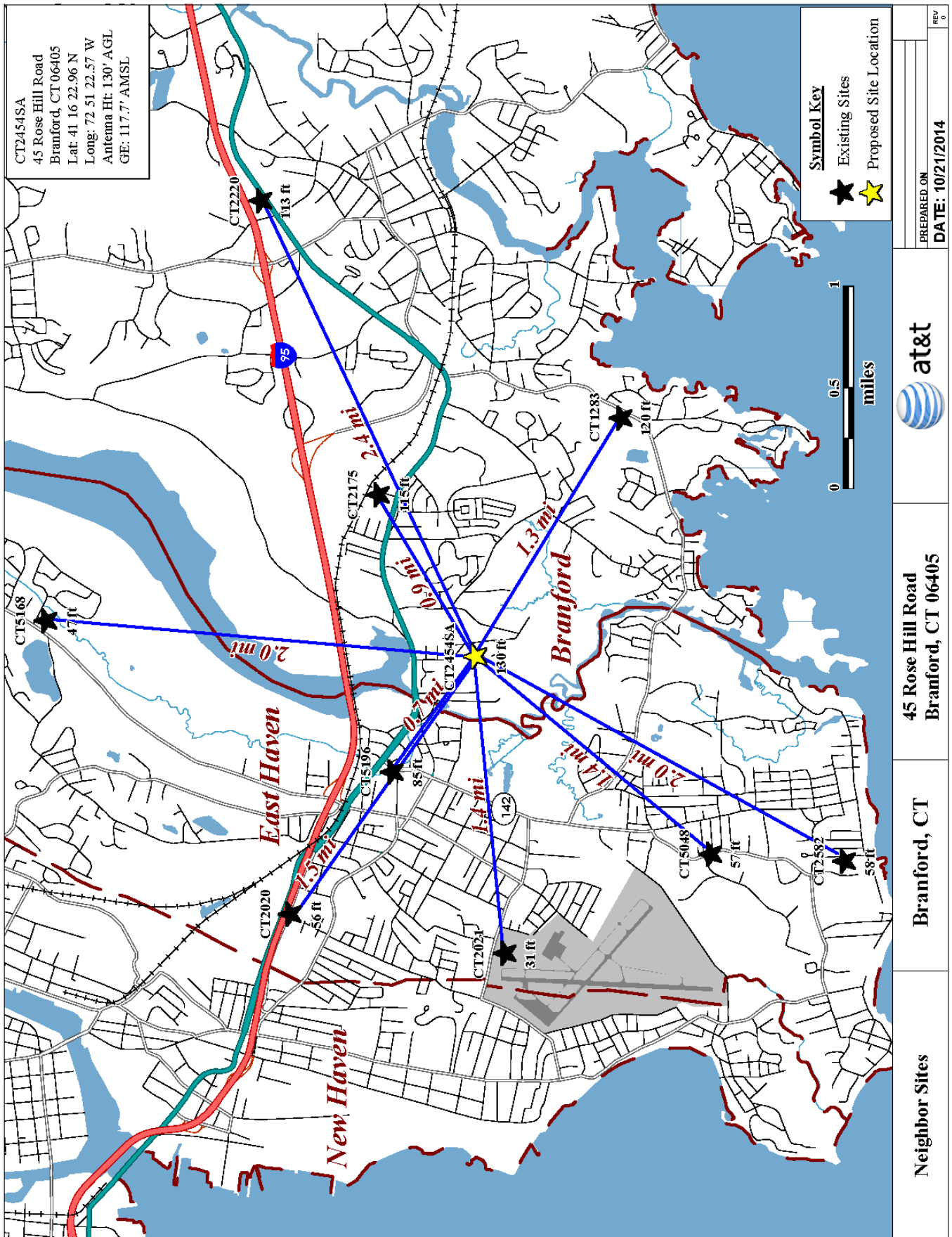
October 22, 2014

Date

6. Attachments



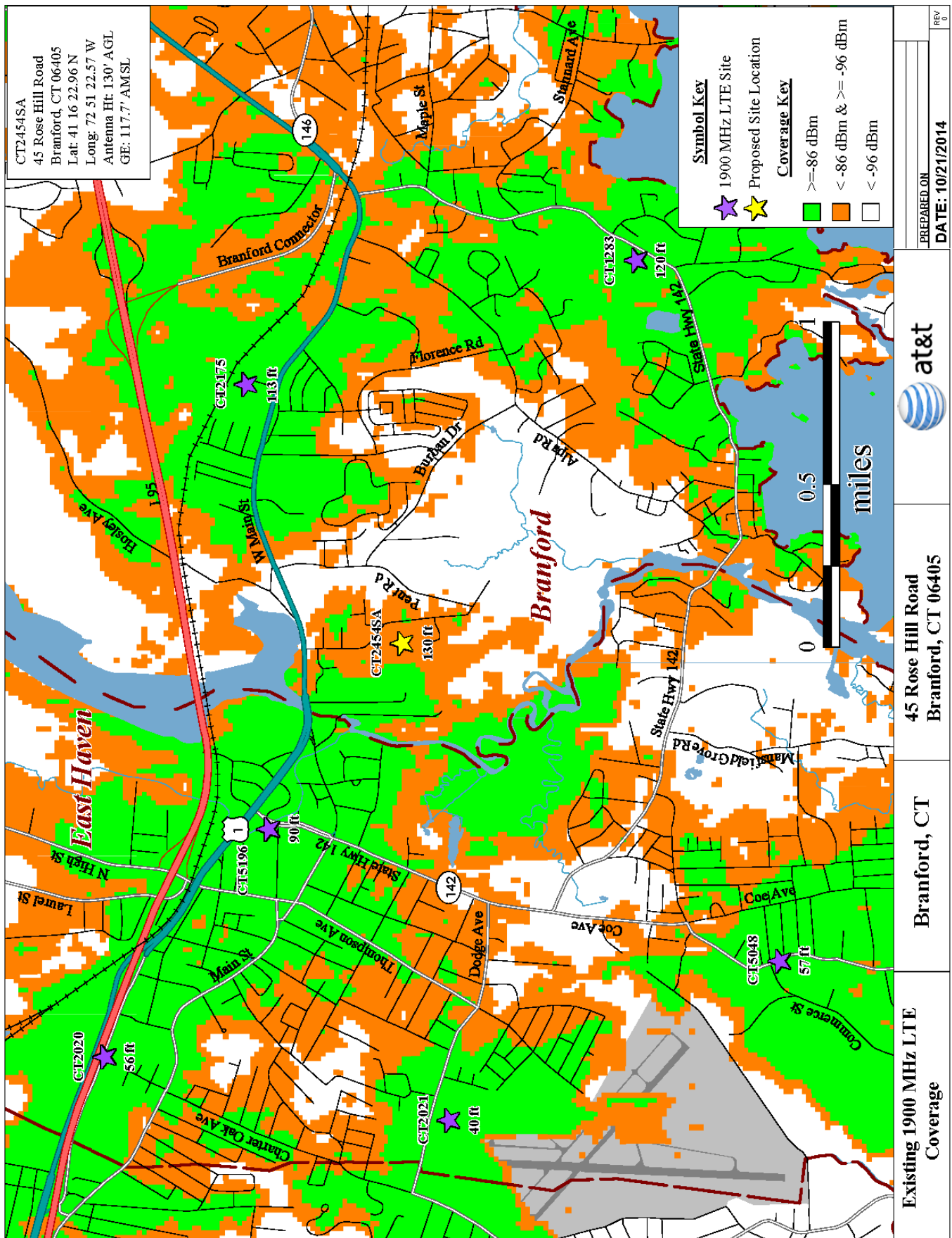
Attachment 1: 3D Terrain Map



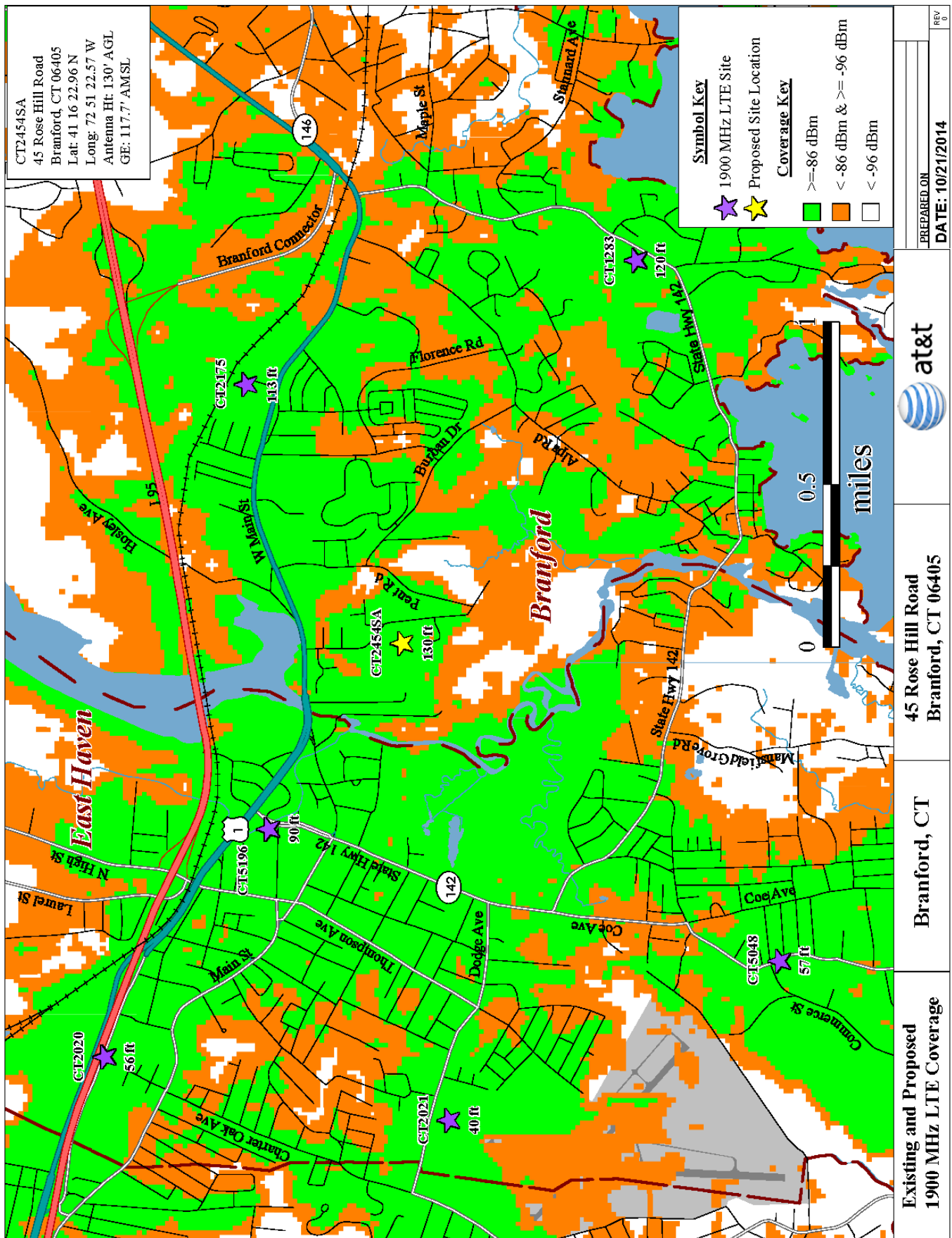
Attachment 2: Map of Distance to Neighbor Sites – Branford

Site ID	Address	Town	Latitude	Longitude	Antenna Centerline (feet)	Distance to Proposed Site (miles)	Structure Type	Ground Elevation (feet)
CT5168	875 North High Street	East Haven	41.304	-72.8537	47	2.0	Stealth	46
CT2020	96 Frontage Road	East Haven	41.2865	-72.88152	56	1.5	Billboard-Sign	22
CT5196	65 Messina Drive	East Haven	41.2792	-72.86805	85	0.7	Rooftop	15
CT2021	290 Dodge Avenue	East Haven	41.2711	-72.88526	31	1.4	Rooftop	25
CT5048	259 Commerce Street	East Haven	41.2564	-72.87584	57	1.4	Monopole	36
CT2582	111 South Shore Drive	East Haven	41.2468	-72.87653	58	2.0	Stealth	44
CT2175	4 Beaver Road	Branford	41.2802	-72.84175	115	0.9	Lattice	96
CT1283	171 Short Beach Drive	Branford	41.2628	-72.83443	120	1.3	Monopole	58
CT2220	150 North Main Street	Branford	41.2886	-72.81386	113	2.4	Monopole	60

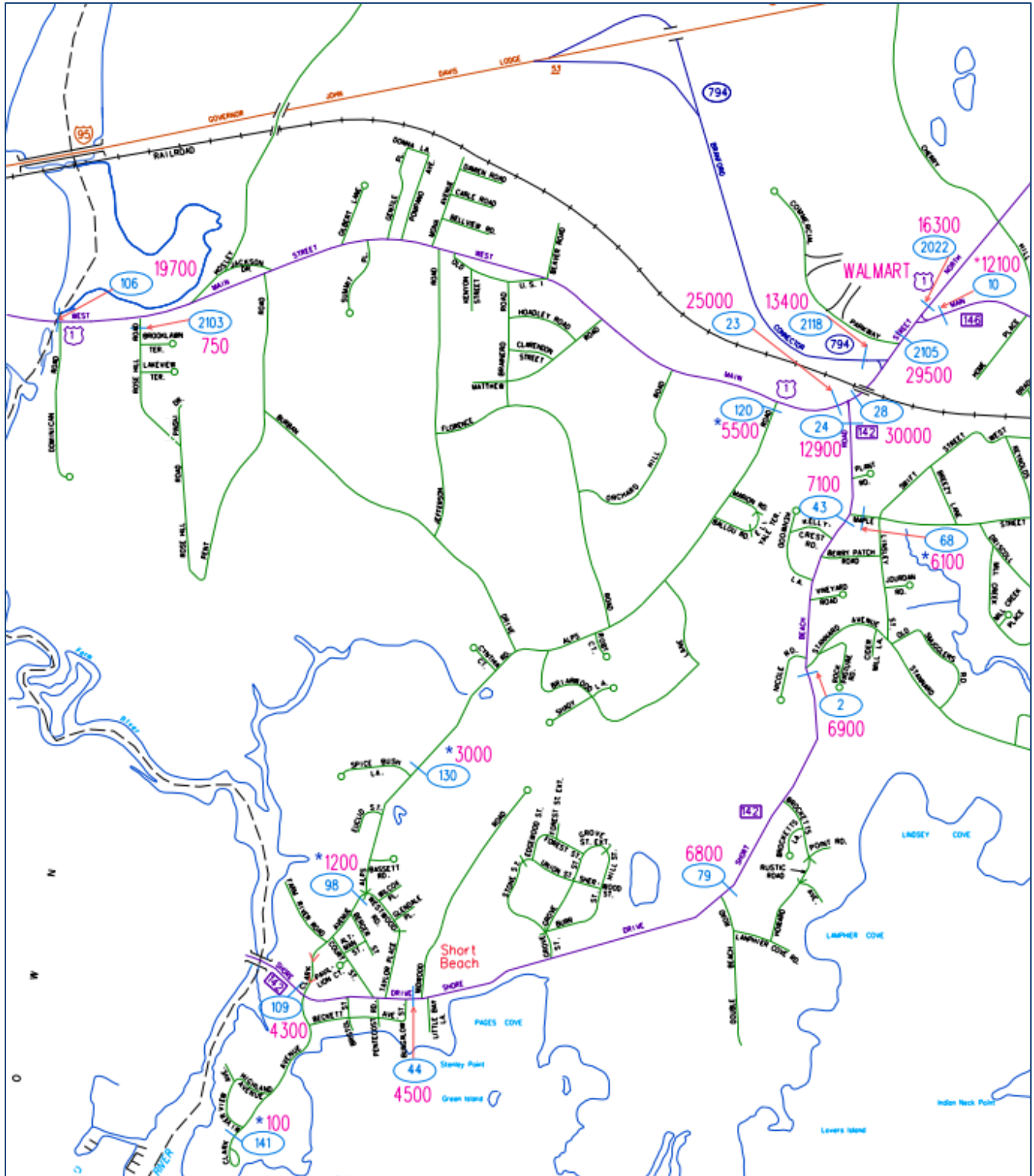
Attachment 3: Neighbor Site Data and Distance to Proposed Site



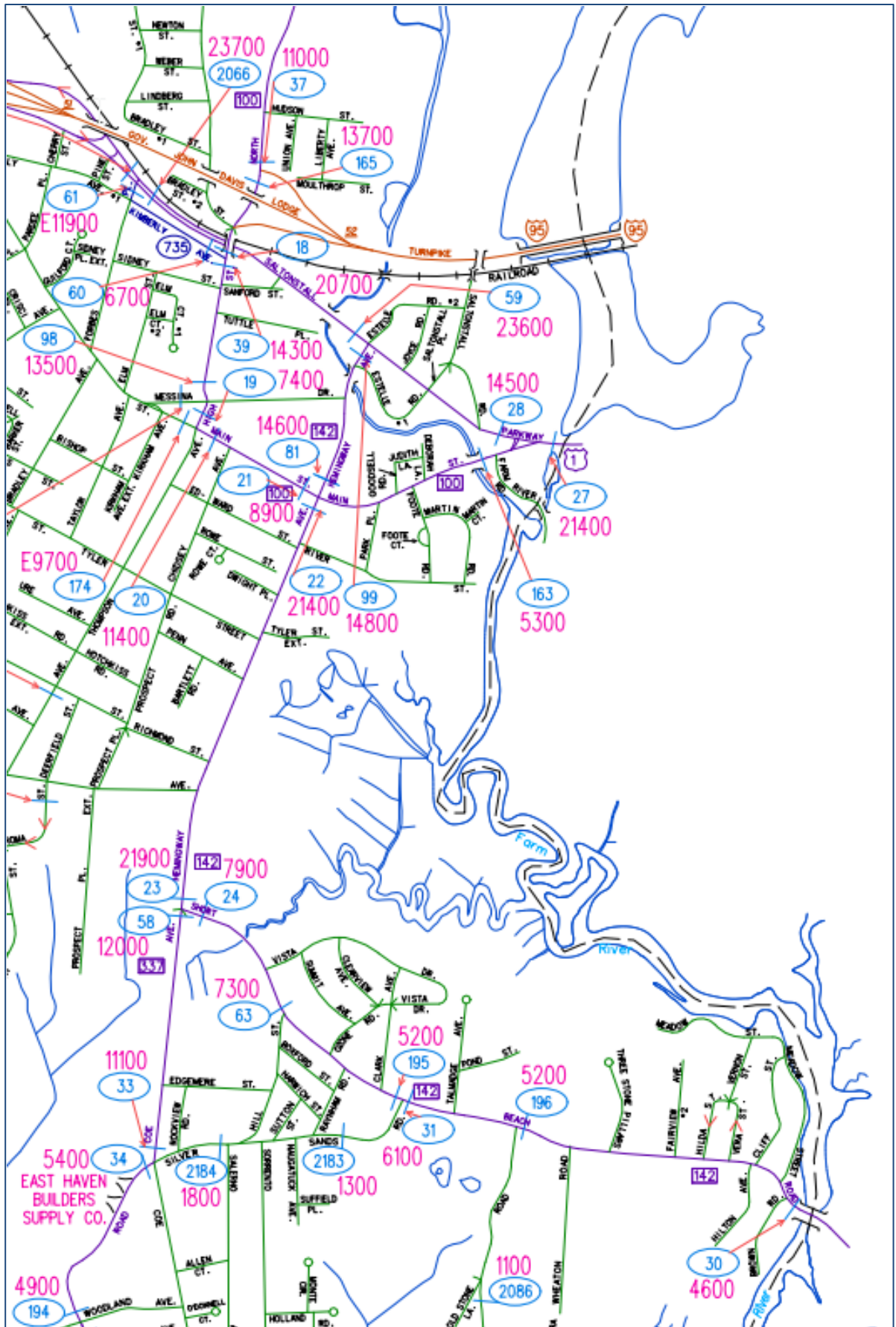
Attachment 4: "Existing 1900 MHz LTE Coverage" (Current AT&T Network)



Attachment 5: “Existing & Proposed 1900 MHz LTE Coverage” (with Branford Site in the AT&T Network)



Attachment 6: Connecticut DOT Average Annual Daily Traffic Data – Branford



Attachment 7: Connecticut DOT Average Annual Daily Traffic Data – East Haven