

2.5.2 Community Characteristics

This subsection describes the following community characteristics potentially affected by the construction and operation of two or more small modular reactors (SMRs): economy, transportation, taxes, land use, aesthetics and recreation, housing, community infrastructure and public services, and education. The geographic area of interest is the area with the greatest potential to be affected by construction and operation of two or more SMRs. For the socioeconomics community characteristics, the geographic area of interest is the four county area (Anderson, Knox, Loudon, and Roane Counties) surrounding and including the CRN Site because the majority of the SMR workforce (both for construction and operations) and families are expected to live within these counties.

2.5.2.1 Economy

Table 2.5.2-1 presents total employment and employment levels by industrial sector (by place of work) for the four counties in the geographic area of interest. The principal economic centers in the geographic area of interest are Knoxville, Tennessee (Knox County); Oak Ridge, Tennessee (Roane and Anderson Counties); and Loudon, Tennessee (Loudon County). Knoxville is the largest of these economic centers.

In Anderson County in 2011, the sectors with the highest employment levels were services (43.4 percent of total employment) and manufacturing (18.8 percent). The industry with the largest growth from 2001 to 2011 was services, with an increase in employment of 119 percent. The industry with the largest decline from 2001 to 2011 was farming (-22.6 percent). Total number of jobs in the county increased from 2001 to 2011 by 6.6 percent, or an average of 0.7 percent annually. (Reference 2.5.2-1)

In Knox County in 2011, the sectors with the highest employment levels were services (48.7 percent) and government (12.8 percent). The industry with the largest growth from 2001 to 2011 was finance, insurance and real estate, with an increase of 36.6 percent. The industry with the largest decline from 2001 to 2011 was manufacturing (-40.8 percent). Total number of jobs in the county increased from 2001 to 2011 by 10.5 percent, or an average of 1.1 percent annually. (Reference 2.5.2-2)

In Loudon County in 2011, the sectors with the highest employment levels were services (34.0 percent) and manufacturing (15.7 percent). The industry with the largest growth from 2001 to 2011 was services, with an increase of 76.6 percent. The industry with the largest decline from 2001 to 2011 was farming (-24.5 percent). Total number of jobs in the county increased from 2001 to 2011 by 19.7 percent, or an average of 2.0 percent annually. (Reference 2.5.2-3)

In Roane County in 2011, the sectors with the highest employment levels were services (43.8 percent) and government (17.7 percent). The industry with the largest growth from 2001 to 2011 was services, with an increase in employment of 43.5 percent. The industry with the largest decline from 2001 to 2011 was manufacturing (-46.7 percent). Total number of jobs in the

county increased from 2001 to 2011 by 5.6 percent, or an average of 0.6 percent annually. (Reference 2.5.2-4)

Table 2.5.2-2 shows employment trends (by place of residence) for Anderson, Knox, Loudon, and Roane counties. A total of 301,164 people were employed in the geographic area of interest in 2011; the total labor force was 325,167 people. From 2001 to 2011, the number of employed people in the geographic area of interest increased an average of 1.0 percent annually. The number of people employed increased the most in Loudon County (average 2.0 percent annually) and increased the least in Anderson County (average 0.2 percent annually). During the same period, employment in Tennessee increased an average of 0.4 percent annually, going from 2,728,528 in 2001 to 2,828,616 in 2011. (Reference 2.5.2-5; Reference 2.5.2-6)

Table 2.5.2-3 lists the top employers in Anderson, Knox, Loudon, and Roane counties. The largest employers within the geographic area of interest are Covenant Health (10,458 employees), with locations in Knox and Anderson counties; the U.S. Department of Energy (DOE) Y-12 National Security Complex, which employs 7000 persons in Anderson County; and Knox County Schools (6804 employees) and University of Tennessee in Knoxville (6660 employees), located in Knox County. The largest employer in Roane County is the DOE Oak Ridge National Laboratory, which employs 4374 persons. The largest employer in Loudon County is Loudon County Schools (600 employees). Kimberly Clark Corporation employs a total of 654 persons in Knox and Loudon counties. (Reference 2.5.2-7)

A total of 24,003 people were unemployed in the geographic area of interest in 2011, while 288,319 were unemployed in the State of Tennessee in 2011 (Table 2.5.2-2). The county in the geographic area of interest with the highest unemployment rate in 2011 was Anderson County with 8.5 percent. The county in the geographic area of interest with the lowest unemployment rate was Knox County with 7.1 percent. The geographic area of interest had an unemployment rate of 7.4 percent in 2011, while the State of Tennessee had an unemployment rate of 9.3 percent. (Reference 2.5.2-5; Reference 2.5.2-6)

Income distribution by household is shown in Table 2.5.2-4 for the three communities closest to the Clinch River Nuclear (CRN) Site (Reference 2.5.2-8). Table 2.5.2-5 presents the per capita income trends for Anderson, Knox, Loudon, and Roane counties. In the geographic area of interest, per capita personal income ranged from a high of \$38,894 in Knox County to a low of \$35,142 in Roane County in 2011. The Tennessee average personal per capita income in 2011 was \$36,567. The state per capita income grew at an average annual rate of 3.3 percent between 2001 and 2011. (Reference 2.5.2-9)

Heavy construction work force data were analyzed for the states of Tennessee, North Carolina, Georgia, and Kentucky because the heavy construction industry would be expected to draw workers from a larger geographic area than would general construction, and the data are not available below the state level. Tennessee had 24,338 people employed in heavy and civil engineering construction in 2002 (Reference 2.5.2-10). By 2007, this number had decreased to 17,810 (Reference 2.5.2-11). North Carolina had 42,925 people employed in heavy and civil

engineering construction in 2002, decreasing to 39,779 in 2007 (Reference 2.5.2-12; Reference 2.5.2-13). Georgia had 52,566 people employed in heavy and civil engineering construction in 2002, decreasing to 37,314 in 2007 (Reference 2.5.2-14; Reference 2.5.2-15). Kentucky had 13,814 people employed in heavy and civil engineering construction in 2002, decreasing to 11,578 in 2007 (Reference 2.5.2-16; Reference 2.5.2-17).

Section 3.10, Workforce Characterization, presents information on the workforce required to construct the plant, including number of workers during the various phases of construction, and how many jobs would be associated with plant operations once construction is complete.

2.5.2.2 Transportation

The area around the CRN Site is served by a transportation network of federal and state highways; three freight rail lines; one major navigable river; one commercial passenger airport, McGhee Tyson Airport; and one reliever airport, Knoxville Downtown Island Airport. Figure 1.1-1 illustrates the road, highway, railroad, and airport systems in the area.

2.5.2.2.1 Roads

Eight federal highways provide access to the geographic area of interest: Interstate (I-) 40, I-75, US 11, US 27, US 70, US 129, US 321, and US 441. The closest interstate highway to the CRN Site is I-40, which runs east to west approximately 0.6 miles (mi) southeast of the CRN Site at its closest border. The two largest nearby populated areas along I-40 are Nashville, Tennessee to the west (135.8 mi) and Knoxville, Tennessee to the east-northeast (24.9 mi). I-75 is located 7.0 mi east of the CRN Site and runs northeast to southwest. The two largest nearby populated areas along I-75 are Knoxville, Tennessee to the east-northeast (24.9 mi) and Chattanooga, Tennessee to the southwest (78.0 mi; Figure 1.1-1).

Tennessee State Highways (TN) in the geographic area of interest include TN 58, TN 95, TN 326, TN 327, TN 61, TN 62, and TN 1. TN 58 (Gallagher Road/Oak Ridge Turnpike) and TN 95 (White Wing Road) are the primary roadways near the CRN Site. TN 58 runs northeast to southwest approximately 0.9 mi northwest of the nearest border of the CRN Site. TN 95 runs north to south approximately 2.6 mi east of the nearest border of the CRN Site and connects to the City of Oak Ridge, Tennessee business district approximately 10 mi to the northeast. The junction of TN 58 and TN 95 is located approximately 3.2 mi north-northeast of the nearest border of the CRN Site (Figure 1.1-1).

Construction workers and plant staff would be expected to commute because there are no provisions for housing at the CRN Site. Driveway access to and from the CRN Site would be from one roadway, Bear Creek Road (Figure 1.1-1). For workers who live in Roane, Anderson, Loudon, and Knox counties, TN 58 and TN 95 provide access to Bear Creek Road. For workers commuting from the north and south, there are interchanges on I-40 for both TN 58 and TN 95. For workers commuting from the west, TN 61 and TN 62 provide access to Bear Creek Road via TN 327. From the east, US 321/TN95 intersects with Bear Creek Road. The roadway

configuration results in a concentration, or funneling, of facility-related traffic onto Bear Creek Road.

2.5.2.2.2 Road Conditions and Mileage

Each of the four counties in the geographic area of interest has hundreds of miles of public maintained roadways. Anderson County contains 12 interstate road miles (RM), 127 state RM, 428 county RM, and 281 city RM (Reference 2.5.2-18). Knox County contains 69 interstate RM, 225 state RM, 1501 county RM, and 942 city RM (Reference 2.5.2-19). Loudon County contains 24 interstate RM, 92 state RM, 455 county RM, and 106 city RM (Reference 2.5.2-20). Roane County contains 23 interstate RM, 127 state RM, 632 county RM, and 209 city RM (Reference 2.5.2-21).

2.5.2.2.3 Traffic Conditions

Vehicle volume on roads is provided by the Tennessee Department of Transportation in the form of estimated annual average daily traffic (AADT) counts. The AADT counts for the primary access roads to the CRN Site were last updated in 2012.

TN 58 (Gallaher Road/Oak Ridge Turnpike) is a five-lane northeast/southwest principal arterial north of the CRN Site that connects I-40 to TN 95 via an interchange carrying approximately 10,500 vehicles per day with 3 percent heavy vehicles. Posted speed limits along TN 58 vary between 45 and 55 mi per hour (mph). Bear Creek Road is accessed from northbound TN 58 shortly after crossing the Clinch River bridge. Access to Bear Creek Road is provided by a loop ramp that travels underneath TN 58. (Reference 2.5.2-22)

TN 95 (White Wing Road/Oak Ridge Turnpike) is a two-lane north/south principal arterial approximately 2.6 mi east of the CRN Site that connects I-40 to TN 58 (eventually to the City of Oak Ridge, Tennessee). TN 95 is joined by TN 58 north of the CRN Site via an interchange carrying approximately 6600 vehicles per day with 3 percent heavy vehicles. Posted speed limits along TN 95 are primarily 55 mph. Several locations along TN 95 contain 35 mph advisory speed limits signs due to the horizontal (corners/bends) and vertical (hills/valleys) curvature. (Reference 2.5.2-22)

TN 327 (Blair Road) is a two-lane north/south major collector that connects TN 58 to TN 61 carrying approximately 3000 vehicles per day with 2 percent heavy vehicles. TN 61 connects the towns of Oliver Springs and Harriman, Tennessee. Posted speed limits along TN 327 are primarily 35 mph. (Reference 2.5.2-22)

Bear Creek Road is a two-lane northeast/southwest roadway that connects TN 58 to TN 95 (Figure 1.1-1) carrying approximately 500 vehicles per day with up to 10 percent heavy vehicles. Posted speed limits along Bear Creek Road are primarily 45 mph. Access to and from the CRN Site would be provided by a single driveway on Bear Creek Road. (Reference 2.5.2-22)

Capacity analyses were performed for the four intersections most likely to be affected by the construction and operation of the proposed project at the CRN Site (Reference 2.5.2-22). Figure 2.5.2-1 shows the locations of the intersections investigated during the traffic study. These intersections are TN 58 at Bear Creek Road ramp (Location 1), TN 58 at TN 327 (Location 2), TN 95 at Bear Creek Road (Location 3), and Bear Creek Road at Bear Creek Road ramp (Location 4). Capacity analyses were performed for 2013 AM and PM peak hours for all the intersections analyzed.

The traffic carrying ability of a roadway is described by level of service (LOS), which ranges from LOS A (progression is extremely favorable) to LOS F (poor progression, extreme delay) (Table 2.5.2-6). Typically, LOS C is considered the minimum acceptable LOS at an intersection (signalized or unsignalized) in a rural setting. (Reference 2.5.2-23)

TN 58 at Bear Creek Road Ramp

This unsignalized intersection currently operates at an LOS B in the AM peak hour and an LOS C during the PM peak hour. No significant queuing is present at this intersection. (Reference 2.5.2-22)

TN 58 at TN 327

This signalized intersection currently operates at an LOS A in the AM and PM peak hours. No significant queuing is present at this intersection. (Reference 2.5.2-22)

TN 95 at Bear Creek Road

This unsignalized intersection currently operates at an LOS B in the AM peak hour (eastbound approach) and a LOS C during the PM peak hour (westbound approach). In the morning peak hour, the major turning movement is the southbound left-turn from TN 95 onto East Bear Creek Road. In the afternoon, most of the vehicles leaving East Bear Creek Road use the designated right-out only exit, located approximately 1000 feet (ft) north of this study intersection. Traffic volumes on movements to and from West Bear Creek Road (proposed access to the CRN Site) are very low and traffic is minimal along TN 95. No significant queuing is present at this intersection. (Reference 2.5.2-22)

Bear Creek Road at Bear Creek Road Ramp

The unsignalized intersection currently operates at an LOS A in the AM and PM peak hours. In the AM peak hour, the major turning movement is the southbound left-turn from Bear Creek Road ramp onto Bear Creek Road. This movement is stop-controlled; however, low volumes on Bear Creek Road allow this stop-controlled intersection to operate with minimal delay. In the afternoon, most of the vehicles turn right onto Bear Creek Road ramp from Bear Creek Road. This movement operates under yield control with minimal delay. The west leg (Bear Creek Road) of this intersection carries minimal traffic because it is restricted to personnel entering the

DOE's Oak Ridge Reservation (ORR) as indicated on a sign. No significant queuing is present at this intersection. (Reference 2.5.2-22)

2.5.2.2.4 Traffic Accidents

The three primary roadways providing access to the CRN Site via Bear Creek Road are TN 58, TN 95, and TN 327. Crash data (from February 2008 through November 2012) were analyzed for segments of these three roadways to determine rates of traffic accidents and related injuries and fatalities. Traffic accident data for the primary CRN Site roadways are presented in Table 2.5.2-22. Of the three roadways, TN 95 had the greatest number of accidents, injuries, and fatalities; and TN 327 had the fewest.

2.5.2.2.5 Road Modifications

In 2013, approximately nine state road improvement projects were in progress in Anderson County, 47 projects were in progress in Knox County, 14 projects were in progress in Loudon County, and 24 projects were in progress in Roane County (Reference 2.5.2-24; Reference 2.5.2-25). Of the projects in Roane County, two are located on access routes to the CRN Site within Oak Ridge. The other projects in all four counties are located on roads that are not on the access routes to the CRN Site. The Roane County road improvement projects in the vicinity of the CRN Site include intersection improvements at TN 95 and Bethel Valley Road, and reconstruction of approximately 3 mi of TN 95 from TN 58 to near Westover Drive (which has been completed). (Reference 2.5.2-25) There are seven future state road improvement projects scheduled in Knox County and one future state road improvement project in Loudon County. All of these projects are scheduled on roads that are not on the access routes to the CRN Site. There are no future modifications planned for state roads in either Roane County or Anderson County. (Reference 2.5.2-26) Tennessee's 25-Year Transportation Plan presents a statewide 10-year (yr) corridor initiative to improve the operation of key corridors, including the roads that serve the Oak Ridge and Knoxville areas (Reference 2.5.2-27).

2.5.2.2.6 Railroads

Figure 1.1-1 shows railways within the area surrounding the CRN Site. In Oak Ridge, Energy Solutions, LLC operates the 11.5-mi Heritage Railroad shortline serving the East Tennessee Technology Park (ETTP) (Reference 2.5.2-28). A second shortline, operated by Knoxville and Holston River Railroad, extends 18 mi from Knoxville through Knox County (Reference 2.5.2-29). Both of these lines connect with rail lines operated by Norfolk Southern Railway Company. Norfolk Southern rail lines are located approximately 7.5 mi northwest and 9 mi southeast of the CRN Site. The line to the southeast runs through Knoxville, Tennessee, connecting Chattanooga, Tennessee with Johnson City and Kingsport, Tennessee (Reference 2.5.2-30). A rail spur (EnergySolutions Heritage Railroad) is located approximately 2.5 mi north-northwest of the center point of the CRN Site, northwest of TN 58 (Figure 2.1-2) (Reference 2.5.2-31).

2.5.2.2.7 Waterways

The CRN Site is immediately adjacent to the Clinch River (Clinch River arm of the Watts Bar Reservoir) between approximately Clinch River Miles (CRMs) 14.5 and 19 (Reference 2.5.2-32). The Clinch River is a major tributary of the Tennessee River. The Tennessee River has a main navigable channel 652 mi long beginning at Knoxville and merging with the Ohio River in Paducah, Kentucky. This channel is controlled by a series of nine mainstream dams and locks which are part of Tennessee Valley Authority's (TVA's) integrated river control system consisting of a total of 49 dams and 15 navigation locks (Reference 2.5.2-33). Commercial navigation occurs on the Clinch River for 61 mi (Reference 2.5.2-34). The commercially navigable portion of the Clinch River extends from its mouth near Kingston, Tennessee upstream to Clinton, Tennessee (Reference 2.5.2-35). The navigable portion of the Clinch River includes a navigation lock at the Melton Hill Dam. The lock is 75 ft by 400 ft and has a maximum lift of 60 ft. (Reference 2.5.2-36)

2.5.2.2.8 Airports

The closest commercial airport to the CRN Site is the McGhee Tyson Airport in Alcoa, Tennessee. This airport is approximately 22.0 mi east-southeast of the CRN Site. Approximately 1,600,000 passengers (813,000 arrivals and 817,000 departures) traveled through the McGhee Tyson Airport in 2013 (Reference 2.5.2-37). Five operating airlines scheduled services out of this airport that carried approximately 89 percent of the passengers: ExpressJet, PSA, Endeavor Air (formerly Pinnacle), Allegiant, and American Eagle. (ExpressJet, PSA, and Endeavor Air are regional carriers that operate flights for Delta, United, and American Airlines, respectively (Reference 2.5.2-38; Reference 2.5.2-39).) Approximately 96 million pounds of freight were transported through the airport in 2013 (Reference 2.5.2-37). Another smaller airport, the Knoxville Downtown Island Airport, is located in Knoxville. It is a reliever airport, designed to provide additional capacity for the McGhee Tyson Airport (Reference 2.5.2-40). It has a single runway and is a base for over 100 private and corporate aircraft (Reference 2.5.2-41).

The Metropolitan Knoxville Airport Authority is planning the development of a general aviation airport located in Oak Ridge, Tennessee. The airport would be funded by federal, state and local funds. The proposed airport would be constructed on the site of a large industrial complex (ETTP) that is being redeveloped, located approximately 3.5 mi north of the CRN Site. Although the final plans have not yet been completed, the airport design includes a 5000-foot runway which could be used by corporate jets, private airplanes, and Emergency Medical Service aircraft. The current design would impact Blair Road (TN 327) to the east of the industrial park. Construction could begin as early as the end of 2017. (Reference 2.5.2-42)

2.5.2.2.9 Public Transportation

Public transportation is available in all four counties within the geographic area of interest. The East Tennessee Human Resource Agency (ETHRA) provides bus transportation to the sixteen

county area of East Tennessee including Anderson, Knox, Loudon, and Roane Counties. The ETHRA provides special purpose bus transportation service and medical transportation (not on fixed, scheduled routes) to the general public. (Reference 2.5.2-43) ETHRA also operates Oak Ridge Transit, which provides bus service within Oak Ridge City limits (Reference 2.5.2-44). Knoxville Area Transit (KAT) provides bus transportation primarily within the City of Knoxville but also within Knox County outside of city limits. KAT provides fixed route bus service, downtown trolley routes, University of Tennessee campus service, and paratransit services. The Knox County Community Action Committee Transit provides service to Knox County residents who have no other means of transportation. (Reference 2.5.2-45)

2.5.2.3 Taxes

The tax structure for all of Tennessee, unless specifically noted at the city or county level, is found in Title 67 of the Tennessee Code Annotated (TCA) and its revisions. Anderson, Knox, Loudon, and Roane counties, are the tax districts that are assumed to be most directly affected by the construction and operation of two or more SMRs. Table 2.5.2-7 shows total annual revenues for Anderson, Knox, Loudon, and Roane Counties for fiscal year (FY) 2010-2011 through FY 2013-2014.

Several tax revenue categories would be affected by the construction and operation of new power production units. These include income taxes on corporate profits, and sales and use taxes on construction- and operation-related purchases and on purchases made by project-related workers. Table 2.5.2-8 shows tax collections by category for Anderson, Knox, Loudon, and Roane counties. The percentage of property tax assessments by category for the State of Tennessee are shown in Table 2.5.2-9.

Corporate income taxes are levied pursuant to guidelines contained in Title 67 of the TCA. Businesses in Anderson, Knox, Loudon, and Roane counties have tax incentives available to them, including capital-investment tax credits (Reference 2.5.2-46; Reference 2.5.2-47; Reference 2.5.2-48; Reference 2.5.2-49).

Corporate taxes, sales and use taxes, and property taxes contribute to the total funds for the State of Tennessee. The percentage of appropriation by category for state funds for FY 2012-2013 (July 2012 through June 2013) is shown in Table 2.5.2-10.

Under Section 13 of the TVA Act of 1933, TVA makes tax-equivalent payments to eight states, including the State of Tennessee. TVA pays 5 percent of its gross proceeds from the sale of power (with certain exclusions) to states and counties where its power operations are carried out (the State of Tennessee and Roane County for the construction and operation of two or more SMRs). Payments to each state are determined based upon the proportion of TVA power property and power sales, in each state, compared to TVA's total power property and power sales, respectively.

The State of Tennessee then allocates its tax-equivalent payments from TVA in accordance with Title 67 “Taxes and Licenses”, Chapter 9 “Payments in Lieu of Taxes”, Part 1 “Tennessee Valley Authority (Tennessee State Revenue Sharing Act)”. The TVA tax-equivalent payments are divided as follows:

- 48.5 percent is retained by the State of Tennessee
- 48.5 percent is distributed to local governments
- 3 percent is paid to impacted local governing areas that are experiencing TVA construction activity on facilities made to produce power. Such impacted areas are designated by TVA. Such payments to impacted areas are made during the period of construction activity and for one full year after completion of such activity. If, in any fiscal year, there are no impacted areas, the funds are allocated in accordance with § 67-9-102(b)(3). (Reference 2.5.2-50).

Of the 48.5 percent distributed to local governments, 70 percent is distributed to counties and 30 percent to municipalities. For the county distributions, 30 percent of the total is distributed based on the percent of state population, 30 percent is distributed based on the percent of state land, and 10 percent is distributed based on the county’s percent of TVA acreage in Tennessee. The distribution to municipalities is determined solely based on the percent of state population.

Following the payment distributions outlined above, the State of Tennessee allocation paid by TVA during FY 2013-2014 was \$331.6 million. Tennessee paid \$96.1 million to counties throughout the state during its 2013-2014 fiscal year. Of this Anderson County received \$1.1 million, Knox County received \$3.4 million, Loudon County received \$1.1 million, and Roane County received \$1.6 million. The Tennessee Department of Revenue estimates that the allocation for the State of Tennessee is to increase by approximately \$18.9 million for FY 2014-2015. It is estimated that for FY 2014-2015, the State of Tennessee allocation is to be \$350.6 million. From that, Tennessee is to pay an estimated \$100.8 million to counties throughout the state in FY 2014-2015. Of this, Anderson County is to receive an estimated \$1.2 million, Knox County an estimated \$3.6 million, Loudon County an estimated \$1.1 million, and Roane County an estimated \$1.6 million. (Reference 2.5.2-51) TVA tax-equivalent payments for FY 2010-2011 through FY 2014-2015 are provided in Table 2.5.2-11.

The State of Tennessee sets aside a percentage of the tax equivalent payments received from TVA each year to redistribute to counties designated by TVA as affected by construction of major facilities used by TVA to produce electric power. These Impact Payments are received by Tennessee counties directly from the State. TVA’s designation of counties is based on anticipated effects such as an increase in local traffic, larger numbers of school-age children entering the county school systems, and a greater demand for the county’s health and safety services. (Reference 2.5.2-52)

2.5.2.4 Land Use

The CRN Site is located within the Oak Ridge city limits in eastern Roane County. The northwestern portion of Loudon County and part of the southwestern portion of Anderson County are included within the CRN Site vicinity, defined as a 6-mi radius from the center of the CRN Site. Figure 1.1-1 shows the location of communities in the CRN Site vicinity. Section 2.2, Land, describes the existing land use at the CRN Site and in its vicinity. Land use based on land-cover classification categories developed by the U.S. Geological Survey (USGS) and the latest data from the National Land Cover Database is shown in Figure 2.2-4 for the CRN Site and vicinity. The vicinity of the CRN Site is primarily rural, consisting of forest and pasture/hay. Based on the USGS land-cover data, land use within the vicinity is categorized and shown in Table 2.2-4. Examination of historic aerial photographs and topographic maps shows that historic land use patterns have remained largely unchanged within the CRN Site vicinity and the region. Small areas of development have occurred in isolated locations throughout the region. Greater amounts of development have occurred in and around the urban and suburban areas. It is anticipated that land use changes would continue in a similar fashion in the future with no large scale changes likely.

The Watts Bar Reservoir Land Management Plan specifies two different land use zones for the CRN Site. The majority of the CRN Site is designated as Zone 2 – Project Operations. A strip along the reservoir shoreline is designated Zone 3 – Sensitive Resource Management. (Reference 2.5.2-53)

Land use in the unincorporated areas of the geographic area of interest (i.e., outside of city limits) is regulated by the counties, primarily through zoning and subdivision regulations. Control of land use in the cities is regulated by the individual municipalities, which have zoning authority for the lands within their boundaries. Counties and municipalities use comprehensive plans to guide land use. The CRN Site is located within the city limits of Oak Ridge, Tennessee. However, although the CRN Site is within the city limits, Oak Ridge zoning does not apply to federal property.

In Anderson County outside of the corporate city limits, land use is regulated by the county zoning resolution, which establishes zoning districts and development-related requirements (Reference 2.5.2-54). The five municipalities in Anderson County, including Clinton, Oak Ridge (partially in Roane County), Rocky Top (formerly Lake City), Oliver Springs (partially in Roane and Morgan Counties), and Norris, have zoning ordinances (Reference 2.5.2-55; Reference 2.5.2-56; Reference 2.5.2-57; Reference 2.5.2-58; Reference 2.5.2-59). Anderson County does not have a current land use plan. The county is in the process of updating its 20-yr-old growth plan. However, the Anderson County Growth Plan Map was updated in 2007. It identifies urban growth boundaries encompassing planned growth areas adjacent to the cities of Clinton, Rocky Top (formerly Lake City), Norris, and Oak Ridge (Reference 2.5.2-60)

The Knox County zoning ordinance regulates land use in the unincorporated areas of the county and provides standard requirements for development of property (Reference 2.5.2-61). The two

municipalities within Knox County, Farragut and Knoxville, have zoning ordinances (Reference 2.5.2-62; Reference 2.5.2-63). The Knoxville-Knox County General Plan 2033 was adopted in 2003. It is a 30-yr comprehensive plan for Knoxville and Knox County that includes physical and economic development policies and future land use recommendations for the city and county. (Reference 2.5.2-64)

In the unincorporated areas of Loudon County, the county zoning ordinance regulates land use and imposes development requirements (Reference 2.5.2-65). The five municipalities within Loudon County, including Philadelphia, Lenoir City, Greenback, Loudon, and Farragut, have zoning ordinances (Reference 2.5.2-66; Reference 2.5.2-67; Reference 2.5.2-68; Reference 2.5.2-69; Reference 2.5.2-62). The *Loudon County Growth Management Plan – 20-Year Land Use Plan* map identifies future land use for the county and municipalities, with nonresidential uses concentrated in the cities of Loudon and Lenoir City and along major highways (Reference 2.5.2-70).

In Roane County outside of the corporate city limits, land use is regulated by the county zoning resolution, which establishes zoning districts and development standards (Reference 2.5.2-71). The five municipalities in Roane County, including Harriman, Kingston, Oak Ridge, Oliver Springs, and Rockwood, have zoning ordinances (Reference 2.5.2-72; Reference 2.5.2-73; Reference 2.5.2-56; Reference 2.5.2-58; Reference 2.5.2-74). The Roane County Future Land Use Plan, adopted in 1998, covers the unincorporated areas of the county. The plan identifies the best direction for growth and recommends future land use patterns for the year 2020 based on land suitability and future land use demands. (Reference 2.5.2-75)

The Roane Alliance is the primary economic development organization for Roane County. This organization works in coordination with the Roane County Chamber of Commerce and Roane County Industrial Development Board to attract new industries to the county and promote existing industries. The Anderson County Economic Development Association, in association with the Anderson County Development Corporation, promotes the location of new industries in the county and fosters the expansion of existing industries. The Development Corporation of Knox County provides assistance to and promotes the growth of businesses in the county. The Loudon County Economic Development Agency provides economic and community development programs for the county and the cities of Lenoir City and Loudon.

The supply of vacant land available for industrial development in each of the four counties within the geographic area of interest is discussed below:

- A combined 140 acres (ac) are available for industrial development in four industrial parks in Clinton, Anderson County (Reference 2.5.2-76). An additional 144 ac of industrial land is available in three industrial parks in Oak Ridge, Anderson County (Reference 2.5.2-77).
- A combined 164 ac are available for industrial development in the two industrial parks in Knox County. Of this amount, 153 ac are located in the Mascot community of northeast Knox County and 11 ac are located in west Knox County (Reference 2.5.2-78).

- A combined 1783 ac are available for industrial development within six industrial parks in Loudon County. Of this amount, 484 ac are located in Loudon, Tennessee; 99 ac are located in Lenoir City, Tennessee; and 1200 ac are located in Greenback, Tennessee. (Reference 2.5.2-79)
- A combined 1004 ac are available for industrial development in six industrial parks in Roane County. Of this amount, 424 ac are located in Oak Ridge, Tennessee (the former DOE property in the ETP); 256 ac are located in Kingston; 233 ac are located in Rockwood, Tennessee; and 91 ac are located in Harriman. (Reference 2.5.2-80; Reference 2.5.2-81) An additional 160 ac of DOE property, located across TN 58 from the ETP, also is available (Reference 2.5.2-82).
- A combined 245 ac are available for industrial development in the Roane Regional Business and Technology Park, which is located approximately half a mile east of the CRN Site. This park, the nearest to the CRN Site, occupies 655 ac extending from I-40 north to the Clinch River shoreline. (Reference 2.5.2-80)

2.5.2.5 Aesthetics and Recreation

Aesthetics in the context of this subsection refers to the quality of visual resources or the visual experience. Aesthetics and recreation are linked because common outdoor recreational activities typically take place in areas with visual appeal. The aesthetic and recreational resources potentially affected by the construction and operation of two or more SMRs are those in the vicinity of the CRN Site within Roane County.

2.5.2.5.1 Aesthetics

The physical, biological, and man-made features seen in the landscape provide any selected geographic area with its particular visual qualities and aesthetic character. The varied combinations of natural features and human alterations that shape landscape character also help define their scenic importance. The presence or absence of these features along with aesthetic attributes such as uniqueness, variety, pattern, vividness, contrast, and harmony make the visual resources of an area identifiable and distinct. The scenic value of these resources is based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures, and visual composition seen in each landscape.

Current methods used by TVA for analysis of visual resources involve measures for identifying the scenic and aesthetic character of the existing landscape and assessing the visibility of the CRN Site from public viewpoints. These measures for assessing the aesthetic quality of visual resources include:

- Scenic attractiveness (based on the intrinsic beauty of natural features)
- Scenic integrity (based on the visual unity of the landscape and the degree of harmony versus disruption in its elements, such as disruption due to human alterations)

- Scenic visibility (based on viewer context and sensitivity and the effects of viewing distance on the level of detail that can be seen)
 - Sensitivity (based on the concern of people for the scenic qualities of the project area and considerations such as the type and number of viewers, frequency and duration of viewing, and influence of adjacent scenery)
 - Viewing distance (based on how far away a subject can be seen and the degree of visible detail). Viewing distance may be divided into three categories: foreground (0 to 0.5 mi from the observer, where most details of objects are clearly seen), middleground (0.5 to 4 mi from the observer, where single objects or groups tend to merge into larger patterns), and background (4 mi to the horizon, where objects are seen as broad outline patterns and forms, and details and colors are not readily discernible unless they are large, stand alone, or have strong contrast). (Reference 2.5.2-83)

Overall scenic value generally is assessed on the basis of the combined ratings of these measures, as well as consideration of the capacity of the landscape to absorb visual change. The greater the absorption capacity of a landscape, the greater its ability to accept human alteration without substantial loss of its scenic quality.

The overall scenic value of the CRN Site under current conditions is good. Its scenic attractiveness is of common quality, with generally positive but typical attributes and a basic variety of forms, colors, and textures that are normally seen in the landscape.

The scenic integrity of the CRN Site is moderate, with areas that have been altered but with the deviations subordinate to the overall landscape and largely natural in appearance. The topography in the vicinity of the CRN Site is characterized by parallel elongated ridges and valleys that run from northeast to southwest. The difference in height between the valleys and ridges is generally about 300 to 350 ft, and the ridges have steep profiles, often steeper than 45 degrees. (Reference 2.5.2-84) The topography of the CRN Site was altered during construction related to the Clinch River Breeder Reactor Project (CRBRP) in the 1980s. Approximately 240 ac of the CRN Site were disturbed by the CRBRP, including the removal of approximately 3 million cubic yards of earth and rock (Reference 2.5.2-85). This excavation area has become revegetated over the years and now is covered by open areas with herbaceous vegetation and eastern red cedars scattered throughout. However, the excavation area remains a prominent feature in the landscape due to the severe topographic contrast on all sides of the project area. The remainder of the CRN Site topography includes both steep hills and flat meadows, with elevations that range from approximately 745 ft above mean sea level (msl) at the shoreline of Watts Bar Reservoir to approximately 940 ft msl in the northern portion of the CRN Site. (Reference 2.5.2-86; Reference 2.5.2-87) Vegetation covering most of the CRN Site is dense and consists of a mixture of mature hardwood forest, stands of evergreen trees, and shrubs.

Scenic visibility of the CRN Site from surrounding areas is moderate. Land uses in the areas surrounding the CRN Site generally are rural, agricultural, or undeveloped. However, several major industrial developments are located in the immediate vicinity of the CRN Site:

- Clinch River Industrial Park, adjoining the northwestern side of the Clinch River Property, on Bear Creek Road
- ETPP, approximately 1 mi to the north
- Oak Ridge National Laboratory, approximately 2.5 mi to the east
- Roane Regional Business and Technology Park, approximately 0.5 mi to the southeast (Reference 2.5.2-88)

The ORR adjoining the CRN Site to the northeast is mostly undeveloped. The ORR was acquired by the federal government in the 1940s; since then, the majority of the reservation has reverted from agricultural fields to forest. (Reference 2.5.2-84)

Scenic views are common in the area surrounding the CRN Site and typically include contrasts between features such as forested ridges and relatively flat valleys, including agricultural fields and reservoirs. The aesthetic appeal of the scenery in the area derives predominantly from a natural landscape that provides ample opportunities for visual appreciation, with relatively limited visual interruptions due to industrial and other highly developed areas. The thickly forested slopes and valleys help to hide and soften the appearance of the industrial areas.

Views of the CRN Site from surrounding areas beyond the river valley to the east, south, and west are characterized by the waters within the winding channel of the Clinch River arm of the Watts Bar Reservoir; forested shorelines, bluffs, and ridges; and areas of old fields in the south central portion of the CRN Site affected by the earlier CRBRP. Views of the CRN Site from the north are blocked by Chestnut Ridge. The areas across the river from the CRN Site are rural and sparsely populated. Minor human alterations may be seen in the foreground but are barely noticeable in the middleground. The principal aesthetic disturbances on the CRN Site when viewed from the areas across the river are the two transmission lines that cross the CRN Site. The transmission lines are minor visual intrusions that can be seen from most locations in the foreground and middleground distances. Smaller structures currently present on the CRN Site, such as the construction trailers, also are minor intrusions on the landscape. These structures are relatively unobtrusive and small in comparison to the overall landscape. Views from the Clinch River arm of the Watts Bar Reservoir adjacent to the CRN Site are dominated by the forested riparian zone and are interrupted by the two transmission lines that cross overhead. The view from higher surrounding areas also includes the Clinch River arm of the Watts Bar Reservoir and agricultural fields associated with the floodplain in the foreground to middleground, and forested hills in the background. Additional information about the features and appearance of the CRN Site is provided in Subsection 2.2.1.1; additional information about the vicinity of the CRN Site is provided in Subsection 2.2.1.2.

Key observation points were identified through visual modeling analysis of the CRN Site. As stated in Table 3.1-2 item 1.1.1, the maximum height of any structures at the facility is anticipated to be 160 ft. Assuming the entire footprint of the plant would be constructed to the maximum height of 160 ft, visual modeling analysis determined locations in the surrounding vicinity from which the plant could potentially be visible. Key observation points were identified by considering the land use and socioeconomic characteristics of these areas from which the plant could potentially be visible. Photographs were collected from these points in December 2013 to establish the baseline viewshed conditions. Figure 5.8-1 shows the location of the key observation points.

2.5.2.5.2 Recreation

Recreational activities that could be affected by the construction and operation of two or more SMRs include mainly outdoor, nature-oriented activities such as boating, fishing, hunting, camping, bicycling, and hiking. Public recreation facilities in the vicinity of the CRN Site include:

- Clinch River arm of the Watts Bar Reservoir
- Melton Hill Reservoir and Melton Hill Dam Reservation
- Gallaher Recreation Area
- ETTP Visitor's Overlook
- Oak Ridge State Wildlife Management Area (WMA) (Reference 2.5.2-88)

The Clinch River arm of the Watts Bar Reservoir, Melton Hill Reservoir, and the Melton Hill Dam Reservation have public facilities for boating, fishing, swimming, hiking, walking, bicycling, picnicking, and nature observation. The Melton Hill Dam Reservation also has camping facilities and features a sustainable facilities and technologies demonstration project. (Reference 2.5.2-89; Reference 2.5.2-88)

The Gallaher Recreation Area, located on the left descending bank of the Clinch River arm of the Watts Bar Reservoir southwest of the CRN Site, is a 45-ac, state-owned facility that is managed by the City of Oak Ridge. It features a parking area, boat ramp, and small beach. (Reference 2.5.2-88)

The ETTP Visitors Overlook includes a pavilion, historic marker, historic display, parking, and picnic areas. It commemorates the role of Oak Ridge as part of the Manhattan Project during World War II and through the Cold War. The overlook provides a view of the Technology Park, which is owned by the DOE. (Reference 2.5.2-88)

The Oak Ridge State WMA on the ORR is jointly managed by the Tennessee Wildlife Resources Agency (TWRA) and DOE. A joint management agreement provides for protection and restoration of wildlife habitat and regulated public hunting. Within the Oak Ridge WMA, approximately 2920 ac along the Clinch River on the eastern boundary of the ORR are

managed by TWRA as the Three Bend Scenic and Wildlife Management Refuge Area. (Reference 2.5.2-84) Portions of the WMA are open to seasonal hunting for white-tailed deer, wild turkeys, Canada geese, and ducks. Access to the ORR is restricted, and public recreational activities other than permitted hunting are not known to occur there. The CRN Site was included in the WMA until 2011, when TVA requested that it be removed. (Reference 2.5.2-90) Beginning in the fall of 2014, limited hunting has been allowed on the CRN Site under a revised agreement with TWRA that incorporated the CRN Site into the Oak Ridge WMA managed-hunt program for deer and wild turkey (Reference 2.5.2-91).

Private recreational opportunities in the area include:

- Private boat ramps
- Wheat Community African Burial Ground
- Southern Appalachian Railway Museum
- Soaring Eagle Campground and recreational vehicle (RV) Park (Reference 2.5.2-88)

The Wheat Community African Burial Ground, located near the visitors overlook, commemorates the graves of unknown slaves from the mid-1800s. The Burial Ground consists of a fenced cemetery at the end of a short gravel drive, a marker with historical information, and a monument. (Reference 2.5.2-88)

The Southern Appalachian Railway Museum is across TN 58 from the Burial Ground. This small museum consists of a converted guardhouse and 12 restored rail cars and operates the Secret City Scenic Excursion Train. (Reference 2.5.2-88)

The Soaring Eagle Campground and RV Park is privately owned and operated. The campground includes 90 camp sites for tents or recreational vehicles, and is used by approximately 13,000 patrons per year. Amenities at the campground include a boat ramp and dock, swimming pool and play area, picnic pavilions, bathhouse, and other facilities. The boat ramp at the campground provides access to Caney Creek embayment, which connects to Watts Bar Reservoir south of the southernmost tip of the CRN Site peninsula (Reference 2.5.2-88). Recreation activities at the campground include camping, swimming, boating, fishing, water skiing, and nature walks (Reference 2.5.2-92).

2.5.2.6 Housing

Construction workers and plant staff for the CR SMR Project would require temporary and permanent housing, except for those who already reside near the CRN Site. Employees would be expected to reside in the geographic area of interest. As an indication of the potential pattern of residence, 87 percent of the federal and contractor employees at the DOE Oak Ridge facilities live in four counties, with over 40 percent living in Knox County, followed by Anderson, Roane, and Loudon counties (Reference 2.5.2-93). Within the 50 mi CRN Site region, residential areas are found in cities, towns, smaller rural communities, and farms. Within the

vicinity of the CRN Site, the residents are concentrated in neighborhoods within the cities of Oak Ridge, Harriman, Kingston, and Lenoir City, and the town of Farragut, Tennessee.

Table 2.5.2-12 presents detailed 2010 Census data on housing in Anderson, Knox, Loudon, and Roane counties and communities in the vicinity of the CRN Site. Total housing units, occupation status, vacant housing units, and housing units for rent and for sale in each of these counties and communities are provided. Table 2.5.2-13 shows the age of housing in the communities in the vicinity of the CRN Site, including the percentage of houses built per decade.

Anderson County has a total of 34,717 housing units, 31,253 of which are occupied. Of the total housing units, 9377 are renter occupied (27 percent), 21,876 are owner-occupied (63 percent), and 3464 units (10 percent) are vacant. Of the vacant housing units, 1087 are for rent and 523 are for sale. The remainder of vacant housing units is classified by the U.S. Census Bureau as: rented, not occupied; sold, not occupied; for seasonal, recreational, or occasional use; for migratory workers; or "other vacant." (Reference 2.5.2-94)

The City of Oak Ridge, located in Anderson and Roane Counties, has a total of 14,494 housing units, 8230 of which are owner occupied (56.8 percent), 4542 of which are renter occupied (31.3 percent), and 1722 of which are vacant units (11.9 percent). Of the vacant housing units, 762 are for rent and 303 are for sale. (Reference 2.5.2-95)

Knox County has a total of 194,949 housing units, 177,249 of which are occupied. Of the total housing units, 117,412 are owner-occupied (60.2 percent), 59,837 are renter occupied (30.7 percent), and 17,700 are vacant (9.1 percent). Of the vacant housing units, 6777 are for rent and 3747 are for sale. (Reference 2.5.2-96) The Town of Farragut, in Knox County, has a total of 7982 housing units, 6724 of which are owner occupied (84.2 percent), 942 of which are renter occupied (11.8 percent), and 316 of which are vacant units (4.0 percent). Of the vacant housing units, 52 are for rent and 136 are for sale. (Reference 2.5.2-97)

Loudon County has a total of 21,725 housing units, 19,826 of which are occupied. Of the total available units, 4291 are renter occupied (19.8 percent), 15,535 are owner occupied (71.5 percent), and 1899 are vacant (8.7 percent). Of the vacant housing units, 360 are for rent and 431 are for sale. (Reference 2.5.2-98) Lenoir City, in Loudon County, has 3703 total housing units, 1987 of which are owner occupied (53.7 percent), 1382 of which are renter occupied (37.3 percent), and 334 of which are vacant units (9.0 percent). Of the vacant housing units, 103 are for rent and 66 are for sale. (Reference 2.5.2-99)

Roane County has a total of 25,716 housing units, 22,376 of which are occupied. Of the total housing units, 5547 are renter occupied (21.6 percent), 16,829 are owner occupied (65.4 percent), and 3340 (13.0 percent) are vacant. Of the vacant properties in the county, 760 are for rent and 419 are for sale. (Reference 2.5.2-100) The City of Kingston, in Roane County, has a total of 2814 housing units, 1763 of which are owner occupied (62.7 percent), 793 of which are renter occupied (28.2 percent), and 258 of which are vacant units (9.2 percent). Of the vacant housing units, 79 are for rent and 61 are for sale. (Reference 2.5.2-101) The City of Harriman,

also in Roane County, has a total of 3185 housing units, 1484 of which are owner occupied (46.6 percent), 1172 of which are renter occupied (36.8 percent), and 529 of which are vacant units (16.6 percent). Of the vacant housing units, 201 are for rent and 66 are for sale. (Reference 2.5.2-102)

Knoxville is the largest housing market in the geographic area of interest. As of the second quarter 2013, the Knoxville area had a 13-month supply of homes and sales had increased by 18 percent over the previous year (Reference 2.5.2-103).

In addition to the housing supply counted in the 2010 Census, as discussed above, there are new housing units under construction in the geographic area of interest. (These are considered future housing units and are not included in the count of existing housing.) There are two large housing developments in progress in Oak Ridge: Centennial Bluffs, a retirement community, and Rarity Ridge. Both developments faced financial difficulties. Centennial Bluffs is a planned \$120 million dollar development of 406 condominiums in 15 buildings in eastern Oak Ridge overlooking the Melton Hill Reservoir in Anderson County. Started in 2007, only the clubhouse, one condominium building and a portion of the main road had been constructed as of 2012. Centennial Bluff, LLC filed for bankruptcy in March 2012, one day before a foreclosure auction was to occur. (Reference 2.5.2-104) As of 2015, condominiums were still being offered for sale at \$209,500 to \$300,000 (Reference 2.5.2-105). Only a small portion of the development is complete.

Rarity Ridge is a planned 1217-ac housing development with many amenities, located in western Oak Ridge, Tennessee along the Clinch River in Roane County. By 2010, fewer than 150 of the planned 3000 units had been completed. The property has been purchased by a realty management company and is now called The Preserve at Clinch River (Reference 2.5.2-104). This development is only partially complete. Amenities at The Preserve include the Discovery Center, Wellness Center, water complex, tennis courts, children's playground and a private community marina on the Clinch River (Reference 2.5.2-106).

Rarity Pointe is a luxury waterfront community on Tellico Reservoir in Lenoir City, Loudon County, Tennessee. The properties at Rarity Pointe were foreclosed in 2012 and purchased by a real estate investment company, WindRiver Investments, LLC. (Reference 2.5.2-107) The name was changed to WindRiver. The partially-completed development includes more than 180 residential lots and an operational golf course. (Reference 2.5.2-108) Amenities at WindRiver include WindRiver Marina on Tellico Lake. WindRiver construction projects scheduled for 2015 include a six-acre lakefront community park, a floating restaurant, and a Sports and Wellness Club. New single-family residences are also being constructed. (Reference 2.5.2-107)

Two large apartment complexes were permitted in Knox County in 2013. The Preserve at Hardin Valley (296 units) is located in the northwest sector of the county and University Walk (207 units) is in the central sector of the city Knoxville, Tennessee (Reference 2.5.2-109). A large mixed-use redevelopment project in Knoxville, Tennessee was announced in June 2013, Bridges at Riverside. Plans include a riverfront apartment complex with 300 luxury apartments

and 225 student apartments, as well as a 150-room hotel and office and retail space. Construction was slated to begin in the end of 2013 and to be completed by 2015. (Reference 2.5.2-110) In January 2015 demolition of previous buildings was still continuing and construction of the Bridges at Riverside was behind schedule, with anticipated start date later in 2015 (Reference 2.5.2-111).

Some construction workers and some visiting operational staff may have a need for temporary housing in the vicinity of the CRN Site. Temporary housing could include hotels, seasonal homes (for long-term rentals), and RV parks and campgrounds. There are 176 hotels listed on the Tennessee Department of Tourism Development website in the Knoxville/Middle East Tennessee region. According to the Visit Knoxville website, there are over 8100 hotel rooms in the Knoxville area (Reference 2.5.2-112). The Oak Ridge Convention and Visitors Bureau lists seven hotels with a total of 680 rooms (Reference 2.5.2-113). The Roane Alliance lists 10 hotels with a total of 517 rooms in Roane County (Reference 2.5.2-114). The Loudon County Chamber of Commerce lists six hotels and motels in Loudon and Lenoir City in Loudon County with a total of 194 rooms (Reference 2.5.2-115; Reference 2.5.2-116; Reference 2.5.2-117; Reference 2.5.2-118). The Anderson County Tourism Council lists ten hotels in Clinton and Oak Ridge in Anderson County with a total of 474 rooms (Reference 2.5.2-119; Reference 2.5.2-120; Reference 2.5.2-121; Reference 2.5.2-122; Reference 2.5.2-123; Reference 2.5.2-124; Reference 2.5.2-125; Reference 2.5.2-126).

Seasonal homes are classified by the U.S. Census Bureau as vacant for seasonal use (Reference 2.5.2-127). According to the 2010 Census, Anderson County has 297 seasonal housing units, Knox County has 1048 units, Loudon County has 373 units, and Roane County has 611 units (Reference 2.5.2-128).

Temporary housing also includes recreational facilities. Within the four-county area there are many opportunities for camping, including campgrounds, RV sites, and cabins. Recreational facilities that can provide temporary housing, subject to possible limits on long-term camping, are presented in Table 2.5.2-14.

2.5.2.7 Community Infrastructure and Public Services

Public services and community infrastructure consist of the political structure, public water and wastewater treatment systems, police and fire departments, medical facilities, and schools. These elements are typically located within municipalities or near population centers. Schools are described in Subsection 2.5.2.8 Education. The other infrastructure and service elements are described in the following subsections.

2.5.2.7.1 Political Structure

The CRN Site is located in Roane County, approximately 10 mi southwest of the City of Oak Ridge business district and within the Oak Ridge city limits. The City of Oak Ridge lies within Roane and Anderson counties.

There are two congressional districts, Tennessee Districts 2 and 3, located within the geographic area of interest (Reference 2.5.2-129). The CRN Site is located within Tennessee General Assembly House District 32 (Reference 2.5.2-130).

Clinton is the Anderson County seat (Reference 2.5.2-131). There are five incorporated municipalities in the county, as well as unincorporated areas, and the services offered by each vary. The incorporated municipalities include Clinton, Norris, Oak Ridge, Oliver Springs, and Rocky Top (formerly Lake City). (Reference 2.5.2-132; Reference 2.5.2-133) (A portion of Oak Ridge is located in Roane County, parts of Oliver Springs are located in Roane and Morgan counties, and Rocky Top extends into Campbell County). Each of the municipal governments within Anderson County has a mayor and three to six council members (Reference 2.5.2-134; Reference 2.5.2-135; Reference 2.5.2-136; Reference 2.5.2-137; Reference 2.5.2-138). The Anderson County Commission is the governing body for Anderson County government. This Commission consists of 16 members, which include two members representing each of the county's eight election districts. Anderson County also has a county mayor, who is elected for a four-year term, and nine other elected county officials. (Reference 2.5.2-131; Reference 2.5.2-139)

Knoxville is the Knox County seat. There are two incorporated municipalities in the county, as well as unincorporated areas, and the services offered by each vary. The incorporated municipalities are categorized as a city (Knoxville) and a town (Farragut). A portion of Farragut is also located in Loudon County. (Reference 2.5.2-140) Knoxville has a mayor and nine council members (Reference 2.5.2-141; Reference 2.5.2-142). Farragut has a mayor and four aldermen (Reference 2.5.2-143). The Knox County Commission is the governing body for Knox County government. This Commission consists of 11 members, representing each of the county's 11 election districts. Knox County also has a county mayor who is elected for a four-year term and seven other elected county officials. (Reference 2.5.2-144)

Loudon is the Loudon County seat (Reference 2.5.2-145). There are four incorporated municipalities in the county, as well as unincorporated areas, and the services offered by each vary. The incorporated municipalities are categorized as cities (Greenback, Lenoir City, and Philadelphia) and a town (Loudon). (Reference 2.5.2-146) Each of the city and town governments within Loudon County has a mayor and two to six council members (Reference 2.5.2-147; Reference 2.5.2-148; Reference 2.5.2-149; Reference 2.5.2-150). The Loudon County Commission is the governing body for Loudon County government. This Commission consists of 10 members representing the county's seven election districts (Districts 1, 2, and 5 each elect two commissioners). Loudon County also has a county mayor who is elected for a four-year term and seven other elected county officials. (Reference 2.5.2-145)

Kingston is the Roane County seat (Reference 2.5.2-151). There are five incorporated municipalities in Roane County, as well as unincorporated areas, and the services offered by each vary. The incorporated municipalities are categorized as cities (Harriman, Kingston, Oak Ridge, and Rockwood) and a town (Oliver Springs). Oak Ridge is located in both Anderson and Roane counties and Oliver Springs is primarily within Anderson County. (Reference 2.5.2-133;

Reference 2.5.2-152) Each of the three city governments located entirely within Roane County has a mayor and four or five council members (Reference 2.5.2-153; Reference 2.5.2-154; Reference 2.5.2-155). The Roane County Commission is the governing body for Roane County government. This Commission consists of 15 members representing the county's seven election districts. Roane County also has a county executive, who serves as the chief financial officer of the county, and six other elected county officials. (Reference 2.5.2-151)

Each of the four counties in the geographic area of interest has emergency management offices which support local efforts to prepare for, respond to, and recover from disasters. Anderson and Roane counties each have an Office of Emergency Management and Homeland Security (Reference 2.5.2-156; Reference 2.5.2-157). Knox County has an Emergency and Bioterrorism Preparedness Department and Loudon County has an Emergency Management Agency (Reference 2.5.2-158; Reference 2.5.2-159). Emergency planning for radiological events related to the CRN Site are addressed in ESPA Part 5, Emergency Plan.

The cities and towns located in the CRN Site vicinity either provide and maintain their own community services and infrastructure or contract with one another to provide specific services to their individual populations. Anderson, Knox, Loudon, and Roane counties each maintain and build county roads, maintain county property records, perform district and circuit court actions, and operate the Sheriff's Department. Each county's Sheriff's Department provides law enforcement and protection for the unincorporated areas of the county. The Public Works Departments in Anderson, Knox, Loudon, and Roane Counties oversee public works projects throughout each county including responsibility for maintaining county roads.

Information about distinctive communities within the geographic area of interest, which have unique economic, social, or human health circumstances and lifestyle practices, is provided in Subsection 2.5.4.4 and Tables 2.5.4-1 and 2.5.4-2.

2.5.2.7.2 Public Water Supplies and Wastewater Treatment Systems

There are over 20 public water systems providing potable water to the residents of Anderson, Knox, Loudon, and Roane counties, Tennessee (Reference 2.5.2-160). Table 2.5.2-15 summarizes the water source type, maximum daily capacity, and average daily consumption for each of the water systems in the geographic area of interest. Water systems in the four counties are operating below capacity. One water supplier, the Knox-Chapman Utility District, is expanding its daily capacity. TVA expects to obtain potable water for human consumption at the CRN Site from the City of Oak Ridge Public Works Department, which draws water directly from Melton Hill Reservoir.

Wastewater treatment is provided by local jurisdictions. Currently, there are five wastewater treatment systems in Anderson County (including the City of Oak Ridge), eight in Knox County, three in Loudon County, and six in Roane County (not including the City of Oak Ridge). The Rarity Ridge treatment facility operated by the City of Oak Ridge would be expected to provide wastewater treatment for the CRN Site. This plant has a maximum capacity of 0.6 million

gallons per day (mgd) and is currently operating at 0.09 to 0.1 mgd. Table 2.5.2-16 summarizes the public wastewater treatment facilities, their capacities, and their average daily utilization for Anderson, Knox, Loudon, and Roane counties. Households in rural areas of Anderson, Knox, Loudon, and Roane counties generally operate on septic systems.

There are five landfills in the geographic area of interest that could receive construction debris and waste from the CRN Site. One landfill located in Anderson County is legally allowed to accept inert and sanitary waste. It is estimated the landfill can operate for approximately 50 more years at normal projected growth. One landfill located in Loudon County is able to accept solid and municipal waste. This landfill is expected to be able to be expanded as needed. Three landfills located in Knox County are able to accept construction debris. It is estimated these landfills can operate for approximately 17 to 24 yr at normal projected growth.

Solid waste from the CRN Site operations would be managed by a TVA-approved solid waste disposal vendor. The waste would be processed at the Meadowbranch Landfill in Athens, Tennessee (located in McMinn County). The Meadowbranch Landfill under its current permit can operate for approximately 6.5 yr at normal projected growth. Property has been acquired, designs have been drafted, and a new permit application is in progress for an expansion to the Meadowbranch Landfill. Under the expansion the landfill could operate for approximately 50 to 60 yr at normal projected growth.

For a discussion of groundwater availability and uses, refer to Section 2.3.

2.5.2.7.3 Police, Fire, and Medical Services

As discussed in Subsection 2.5.1, as of 2010, the population of Anderson County was 75,129; the population of Loudon County was 48,556; the population of Knox County was 432,226; and the population of Roane County was 54,181.

Police Services

Based on the Federal Bureau of Investigations data, current as of 2013, the numbers of sworn law enforcement officers by county range from 33 in Roane County to 458 in Knox County (Reference 2.5.2-161). In addition, individual cities maintain their own police departments with jurisdictions usually limited by the city limits. The numbers of sworn law enforcement officers by city range from 12 in Kingston, Tennessee to 393 in Knoxville, Tennessee (Reference 2.5.2-162). Information on sworn law enforcement officers by county and city is shown on Table 2.5.2-17.

The recommended police officer-to-resident ratio is between 1 and 4 officers per 1000 residents, or a police-to-resident ratio between 1:250 and 1:1000 (Reference 2.5.2-163). Tennessee currently has one law enforcement officer per approximately 400 residents (Reference 2.5.2-164). Officer-to-resident ratios by county range from 1:1000 in Knox County and Loudon County to 1:1600 in Roane County (Reference 2.5.2-161; Reference

2.5.2-165). Approximate officer-to-resident ratios by city range from 1:350 in Clinton, Lenoir City, and Harriman, Tennessee to 1:500 in Oak Ridge, Kingston, and Knoxville, Tennessee (Reference 2.5.2-162). Table 2.5.2-17 presents officer-to-resident ratios by county and city.

The State of Tennessee overall and all of the municipalities are well within the recommended range, whereas the counties are slightly under the recommended ratios.

Fire Services

Fire departments staffed by volunteer and/or paid firefighters provide fire services in the geographic area of interest. The number of volunteer and career firefighters in each county, as reported in 2013, are:

- Anderson County – 106 volunteer and 110 career firefighters
- Knox County – 94 volunteer and 510 career firefighters
- Loudon County – 141 volunteer and 60 career firefighters
- Roane County – 155 volunteer and 109 career firefighters

In addition, the Oak Ridge National Laboratory fire department has 40 career firefighters. (Reference 2.5.2-166)

The National Fire Protection Association estimates that in 2012 there were 1,129,250 firefighters in the United States (Reference 2.5.2-167). Dividing the 2012 estimated population of the United States (313,914,040) by the number of firefighters provides a ratio of 1 firefighter for every 278 persons (Reference 2.5.2-168). The approximate firefighter-to-resident ratio by county is:

- 1:350 in Anderson County
- 1:715 in Knox County
- 1:240 in Loudon County
- 1:205 in Roane County

This indicates that the firefighter ratios in the area, with the exception of Knox County, are close to the national average.

The City of Oak Ridge Fire Department (ORFD) would provide the primary fire and emergency medical services (EMS) emergency response to the CRN Site. The ORFD employs 73 firefighters at four fire stations. The department owns the following equipment:

- 8 pumper trucks and one ladder truck
- 4 rescue trucks

- 2 hazmat vehicles
- 2 ambulances
- 5 command staff vehicles
- 13 utility and special use vehicles
- 16 trailers to support special operations
- 4 diesel powerplants
- 3 boats

The ORFD Station 4, located at the ETTP, would be the first responder and ORFD Station 2, located on the Oak Ridge Turnpike, would be the secondary responder. The City of Kingston Fire Department would be the primary backup for the CRN Site.

Medical Services

There are 11 medical centers in the geographic area of interest for the CR SMR Project. Two medical centers are located in Anderson County (in Oak Ridge) with a total of 275 beds. Seven medical centers are located in Knox County with a total of 1839 beds. One medical center is located in Loudon County with 40 beds. One medical center is located in Roane County with 36 beds. (Reference 2.5.2-169; Reference 2.5.2-170) These medical centers, along with their locations, number of physicians, and number of beds, are listed in Table 2.5.2-18.

Five nursing homes are located in Anderson County with a total of 596 beds. Fifteen nursing homes are located in Knox County with a total of 1933 beds. Two nursing homes are located in Loudon County with a total of 286 beds. Three nursing homes are located in Roane County with a total of 467 beds. (Reference 2.5.2-171) These nursing homes, along with their locations and number of beds, are shown on Table 2.5.2-19.

The health departments in the geographic area of interest provide general medical services, such as pediatric and women's health clinics, immunization programs, environmental health, and social services, for example. The Anderson County Health Department is located in Clinton; the county's Emergency Preparedness Department and Disaster Response Team are affiliated with the Health Department (Reference 2.5.2-172; Reference 2.5.2-173). The Knox County Health Department is located in Knoxville; emergency preparedness is managed through the Knox County Health Department (Reference 2.5.2-159). The Roane County Health Department is located in Rockwood (Reference 2.5.2-174). General health services in Loudon County are provided by the Tennessee Department of Health (Reference 2.5.2-158; Reference 2.5.2-175).

In addition to the ORFD EMS described previously, there are several county-based EMS services within the geographic area of interest. Anderson County EMS operates six full time Advanced Life Support (ALS) paramedic units on duty 24 hours (hr) per day, 7 days per week. To supplement the ALS units, Anderson County EMS operates five Basic Life Support units on

a limited schedule. (Reference 2.5.2-176) Rural/Metro Corporation provides EMS services 24 hr per day, 7 days per week for Knox and Loudon counties and other counties in East Tennessee. The company has a fleet of emergency and non-emergency vehicles available. (Reference 2.5.2-177) The Roane County Office of Emergency Services EMS Division operates four ALS units 24 hr per day, 7 days per week in response to both emergency and non-emergency requests for service (Reference 2.5.2-178).

2.5.2.8 Education

The Tennessee Department of Education oversees all county and local school districts. Statewide reforms (First to the Top) currently are underway to improve the achievement levels of all students in the state. In 2010, the state received \$501 million from the federal government's Race to the Top program. In 2012, Tennessee was granted a waiver from the federally mandated No Child Left Behind program, and the state enacted its own accountability measures for teacher effectiveness. Tennessee now has a comprehensive student-outcome-based teacher evaluation system using the Tennessee Educator Acceleration Model. The Common Core Standards assure that the state curriculum requirements provide students with the knowledge necessary for college and potential employment. (Reference 2.5.2-179)

The 50 mi region encompasses 24 county school districts containing 348 schools that serve over 190,000 elementary, middle, and high school students. For the 2010 academic year, the overall student-teacher ratio for these schools was 15:1. (Reference 2.5.2-180) Primary, secondary, and higher education are addressed for the geographic area of interest, where the construction and operations workforce and their families principally would reside. Because students are more likely to travel longer distances for higher education, colleges and universities within the 50 mi region are also addressed. Table 2.5.2-20 provides information on the primary and secondary schools for each county within the geographic area of interest, including the number of schools, total students enrolled, and spending per pupil. Table 2.5.2-21 lists the institutions of higher learning located within the 50 mi region.

Anderson County

In 2010 in Anderson County, Tennessee, approximately 12,800 students were enrolled in public schools (Table 2.5.2-20) (Reference 2.5.2-181). The county contains 28 public schools and three private schools. Of the public schools, 16 are elementary schools, six are middle schools, three are high schools, two are preschools, and one is a vocational school. The three private schools enroll pre-kindergarten or kindergarten through 12th grade students. (Reference 2.5.2-182) In the 2009-2010 academic year, Anderson County spent \$9617 per pupil including federal, state, and local funding (Reference 2.5.2-183). Within Anderson County, the City of Oak Ridge has its own school district containing eight public schools, including four elementary schools, two middle schools, one high school, and one preschool. In 2010, approximately 4800 students were enrolled in the city public school system. (Reference 2.5.2-184) These schools and students are included in the county statistics above. In the 2009-2010 academic year, Oak Ridge spent \$11,681 per pupil (Reference 2.5.2-183).

Knox County

In 2010 Knox County, Tennessee, had approximately 58,000 students enrolled in the public school system (Table 2.5.2-20) and approximately 9400 students enrolled in private schools (Reference 2.5.2-185; Reference 2.5.2-186). There are 86 public schools and 36 private schools in Knox County. Of the public schools, 44 are elementary schools, 16 are middle schools, 13 are high schools, and 13 are specialized education centers. (Reference 2.5.2-186) Of the private schools, nine enroll pre-kindergarten or kindergarten through 12th grade students, 22 enroll pre-kindergarten or kindergarten through elementary or middle school students, and five enroll middle to high school students (Reference 2.5.2-185). In the 2009-2010 academic year, Knox County spent \$8504 per pupil, including federal, state, and local funding (Reference 2.5.2-187; Reference 2.5.2-188).

Loudon County

In 2010, Loudon County, Tennessee, had approximately 7500 students enrolled in the public school system (Table 2.5.2-20) and approximately 109 students enrolled in private schools (Reference 2.5.2-189; Reference 2.5.2-190). There are 12 public schools and one private school in Loudon County. Of the public schools, six are elementary schools, three are middle schools, two are high schools, and one enrolls pre-kindergarten through eighth grade students (Reference 2.5.2-189). The private school enrolls pre-kindergarten through 12th grade students (Reference 2.5.2-190). Lenoir City has its own public school district that enrolls approximately 2300 students in one elementary, one middle, and one high school. These students and schools are included in the county statistics above. (Reference 2.5.2-191) In the 2009-2010 academic year, Loudon County spent \$8416 per pupil, and Lenoir City spent a total of \$8929 per student (Reference 2.5.2-192). Revenue sources for this per-pupil expenditure included federal, state, and local funding (Reference 2.5.2-193).

Roane County

In 2010 in Roane County, Tennessee, approximately 7400 students were enrolled in the public school system (Table 2.5.2-20), and approximately 250 students were enrolled in private schools (Reference 2.5.2-194). The county contains 18 public schools and five private schools. Of the public schools, eight are elementary, four are middle, and five are high schools, and one enrolls pre-kindergarten through 12th grade students. Of the private schools, two enroll pre-kindergarten or kindergarten through 12th grade students and three are special education schools. (Reference 2.5.2-195) In the 2009-2010 academic year, Roane County spent \$8699 per pupil, including federal, state, and local funding (Reference 2.5.2-196).

Higher Education Institutions

Within the 50 mi region, there are sixteen institutions of higher education in Tennessee, including fourteen 4-yr colleges and two 2-yr colleges (Table 2.5.2-21). The University of Tennessee in Knoxville is the largest institution in the University of Tennessee system and is

within the 50 mi region (Reference 2.5.2-197). No colleges or universities were identified within the 50 mi region in Kentucky or North Carolina.

Thirteen colleges and universities are located within the geographic area of interest. Eleven of them are located in Knox County with a total enrollment exceeding 43,000 students. The University of Tennessee in Knoxville had the highest enrollment with approximately 27,000 students. Pellissippi State Community College was the other major institution of higher learning in Knox County with an enrollment of over 11,000 students. One college, Roane State Community College, is located in Roane County and has an enrollment of over 6500 students. (Reference 2.5.2-198; Reference 2.5.2-199; Reference 2.5.2-200; Reference 2.5.2-201; Reference 2.5.2-202; Reference 2.5.2-203; Reference 2.5.2-204; Reference 2.5.2-197; Reference 2.5.2-205; Reference 2.5.2-206; Reference 2.5.2-207; Reference 2.5.2-208)

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**Table 2.5.2-1
Employment By Industry (2001 to 2011)**

County	Anderson, TN			Knox, TN			Loudon, TN			Roane, TN			Total		
Year	2001	2011	Percent Change 2001-2011 (%)	2001	2011	Percent Change 2001-2011 (%)	2001	2011	Percent Change 2001-2011 (%)	2001	2011	Percent Change 2001-2011 (%)	2001	2011	Percent Change 2001-2011 (%)
Total Employment	50,589	53,943	6.6	270,325	298,779	10.5	15,832	18,954	19.7	20,909	22,087	5.6	357,655	393,763	10.1
Wage and Salary Employment	39,989	41,823	4.6	225,512	239,331	6.1	11,732	14,481	23.4	18,623	19,811	6.4	295,856	315,446	6.6
Proprietors Employment	10,600	12,120	14.3	44,813	59,448	32.7	4100	4473	9.1	2286	2276	-0.4	61,799	78,317	26.7
Farm	633	490	-22.6	1660	1195	-28.0	1530	1155	-24.5	779	541	-30.6	4602	3381	-26.5
Agricultural Services, Forestry, Fishing, and Other	(D) ¹	82	NA	219	259	18.3	(D) ¹	(D) ¹	NA	(D) ¹	(D) ¹	NA	219	341	NA
Mining	(D) ¹	307	NA	512	323	-36.9	(D) ¹	(D) ¹	NA	(D) ¹	(D) ¹	NA	512	630	NA
Construction	2,983	4178	40.1	16,479	16,108	-2.3	(D) ¹	1,238	NA	(D) ¹	(D) ¹	NA	19,462	21,524	NA
Manufacturing	10,039	10,153	1.1	20,416	12,085	-40.8	3020	2,985	-1.2	2260	1204	-46.7	35,735	26,427	-26.0
Transportation and Utilities	(D) ¹	(D) ¹	NA	9802	10,355	5.6	679	895	31.8	394	(D) ¹	NA	10,875	11,250	NA
Wholesale Trade	1061	979	-7.7	13,228	13,399	1.3	(D) ¹	482	NA	(D) ¹	(D) ¹	NA	14,289	14,860	NA
Retail Trade	5001	4497	-10.1	35,327	35,102	-0.6	1796	2188	21.8	2,250	2155	-4.2	44,374	43,942	-1.0
Finance, Insurance, and Real Estate	2572	3589	39.5	19,338	26,417	36.6	912	1227	34.5	648	642	-0.9	23,470	31,875	35.8
Services	10,692	23,414	119.0	115,534	145,429	25.9	3649	6445	76.6	6737	9668	43.5	136,612	184,956	35.4
Government	5362	5348	-0.3	37,810	38,107	0.8	2022	2167	7.2	4371	3908	-10.6	49,565	49,530	-0.1

¹ (D) indicates the information is not disclosed, although the estimates for these items are included in the Total Employment. Ten-year growth rates for these rows are labeled NA. Note: Data are estimates of total full-time and part-time employment by place of work (number of jobs), based on the 2012 North American Industry Classification System. The information is provided by U.S. Bureau of Economic Analysis through its Regional Economic Information System.

Sources: (Reference 2.5.2-1; Reference 2.5.2-2; Reference 2.5.2-4; Reference 2.5.2-3)

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**Table 2.5.2-2
Employment Trends (2001 to 2011)**

	2001	2011	Avg. Annual Change (%)
Anderson, TN			
Labor Force	34,442	36,739	0.7
Employed	32,805	33,620	0.2
Unemployed	1637	3119	9.1
Unemployment Rate	4.8%	8.5%	
Knox, TN			
Labor Force	205,871	235,250	1.4
Employed	198,949	218,576	1.0
Unemployed	6922	16,674	14.1
Unemployment Rate	3.4%	7.1%	
Loudon, TN			
Labor Force	20,188	25,132	2.4
Employed	19,326	23,177	2.0
Unemployed	862	1955	12.7
Unemployment Rate	4.3%	7.8%	
Roane, TN			
Labor Force	24,987	28,046	1.2
Employed	23,798	25,791	0.8
Unemployed	1189	2255	9.0
Unemployment Rate	4.8%	8.0%	
Regional Total			
Labor Force	285,488	325,167	1.4
Employed	274,878	301,164	1.0
Unemployed	10,610	24,003	12.6
Unemployment Rate	3.7%	7.4%	
Tennessee			
Labor Force	2,863,521	3,116,935	0.9
Employed	2,728,528	2,828,616	0.4
Unemployed	134,993	288,319	11.4
Unemployment Rate	4.7%	9.3%	

Note: Data are from the Local Area Unemployment Statistics program and represent labor force by place of residence. They are estimates of key indicators of local economic conditions.

Sources: (Reference 2.5.2-5; Reference 2.5.2-6)

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Table 2.5.2-3 (Sheet 1 of 2)
Top Employers Located in Anderson, Knox, Loudon, and Roane Counties, Tennessee

Company	Total Employees	Description
Anderson County		
Y-12 National Security Complex	7000	Refurbishing nuclear weapon components and storage and recycling of nuclear material.
Anderson County Schools	1050	Local public education system
Oak Ridge Associated Universities	933	University consortium that creates collaborative partnerships between scientific research, government & industry
SL Tennessee	750	Manufacture gear shift assemblies, park brake levers, head & rear lights
Sitel	725	Global customer interaction solutions provider with over 450 world-class clients
Eagle Bend Manufacturing	671	Manufactures auto body parts
Oak Ridge City Schools	668	Local public education system
Energy Solutions	625	Nuclear engineering services
Aisin Automotive Casting Tennessee Inc.	580	Manufacture, casting, machining & assembly of timing chain covers, pistons, pumps, VVT's
Science Applications International Corp. (SAIC)	550	Science & engineering consulting, energy, national security
Knox County		
Covenant Health ¹	10,458	Local health care system
Knox County Schools	6804	Local public education system
The University of Tennessee - Knoxville	6660	State university
University of Tennessee Medical Center	4224	Local health care system
Tennova Healthcare ¹	4067	Local health care system
State of Tennessee - Regional Offices	3226	State administrative offices
Knox County Government	3014	County government
City of Knoxville	2828	Municipal government
East Tennessee Children's Hospital	1900	Area children's hospital
Team Health, Inc.	1640	Local health care providers
TVA	1600	Regional power authority and development agency providing improvement for river navigation, flood damage reduction, agricultural & industrial development, & electric power in a 7-state region

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Table 2.5.2-3 (Sheet 2 of 2)
Top Employers Located in Anderson, Knox, Loudon, and Roane Counties, Tennessee

Company	Total Employees	Description
Loudon County		
Kimberly Clark Corporation ²	654	Paper towels and bath tissue
Loudon County Schools	600	Local public education system
Monterey Mushrooms, Inc.	585	Mushrooms
Roane County		
Oak Ridge National Lab	4374	Dept. of energy facility that conducts research & development.
Roane County Schools	1150	Public education system
UCOR	565	Engineering, environmental management & clean-up

¹ Includes employees at regional facilities.

² Includes employees in Knox County.

Source: (Reference 2.5.2-7)

Table 2.5.2-4
Household Income Distribution in Communities Closest to Clinch River Site

	Kingston, TN		Lenoir City, TN		Oak Ridge, TN	
Income	Number	Percent (%)	Number	Percent (%)	Number	Percent (%)
Less than \$10,000	165	6.0	418	11.7	949	7.6
\$10,000 to \$14,999	198	7.2	283	7.9	788	6.3
\$15,000 to \$24,999	437	15.9	815	22.7	1287	10.3
\$25,000 to \$34,999	339	12.3	278	7.8	1105	8.9
\$35,000 to \$49,999	323	11.7	389	10.8	1637	13.2
\$50,000 to \$74,999	548	19.9	702	19.6	2240	18.0
\$75,000 to \$99,999	399	14.5	373	10.4	1542	12.4
\$100,000 to \$149,999	188	6.8	146	4.1	1730	13.9
\$150,000 to \$199,999	47	1.7	26	0.7	677	5.4
\$200,000 or more	107	3.9	156	4.4	490	3.9

Source: (Reference 2.5.2-8)

Table 2.5.2-5
Per Capita Personal Income (2001 to 2011)

Per Capita Personal Income (Dollars)			
	2001	2011	Avg. Annual Growth (%)
Anderson County, TN	26,758	36,289	3.6
Knox County, TN	30,102	38,894	2.9
Loudon County, TN	25,974	37,698	4.5
Roane County, TN	22,805	35,142	5.4
Tennessee	27,551	36,567	3.3

Source: (Reference 2.5.2-9)

Table 2.5.2-6
Level of Service (LOS) Index

LOS	Traffic Flow Conditions	Delay (seconds) Signalized Intersections	Delay (seconds) Unsignalized Intersections
A	Progression is extremely favorable and most vehicles do not stop at all	0-10	0-10
B	Good progression, some delay	10-20	10-15
C	Fair progression, higher delay	20-35	15-25
D	Unfavorable progression, congestion becomes apparent	35-55	25-35
E	Poor progression, significant delay	55-80	35-50
F	Poor progression, extreme delay	>80	>50

Source: (Reference 2.5.2-23)

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Table 2.5.2-7
Total Revenues for Anderson, Knox, Loudon, and Roane Counties FY 2010 through FY 2014

Fiscal Year	Anderson County	Knox County	Loudon County	Roane County
2009-2010	\$95.4	\$740.9	\$64.7	\$94.0
2010-2011	\$98.0	\$785.3	\$65.4	\$102.2
2011-2012	\$110.8	\$808.7	\$72.2	\$110.5
2012-2013	\$99.3	\$822.9	\$111.1	\$94.4
2013-2014	\$109.6	\$846.9	\$67.3	\$91.3

Note: \$ in millions.

Source: (Reference 2.5.2-209)

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Table 2.5.2-8
Anderson, Knox, Loudon, and Roane County Tax Collections by Category

Category of Tax	July 2012 - June 2013	July 2011 - June 2012	July 2010 - June 2011	July 2009 - June 2010
Income				
Anderson County	\$1,968,515	\$1,575,868	\$1,530,346	\$1,438,650
Knox County	\$45,989,199	\$20,652,793	\$29,123,768	\$34,794,117
Loudon County	\$2,887,761	\$2,330,636	\$2,458,379	\$2,237,490
Roane County	\$803,924	\$732,038	\$680,892	\$676,312
Inheritance, Gift and Estate				
Anderson County	\$725,715	\$758,465	\$1,271,837	\$594,469
Knox County	\$7,804,953	\$7,596,948	\$8,100,884	\$5,862,597
Loudon County	\$664,080	\$690,794	\$586,436	\$555,044
Roane County	\$431,847	\$327,606	\$132,777	\$675,603
Motor Vehicle				
Anderson County	\$2,666,171	\$2,696,968	\$2,618,413	\$2,661,736
Knox County	\$12,609,990	\$12,732,014	\$12,425,272	\$12,096,208
Loudon County	\$1,645,092	\$1,632,452	\$1,658,036	\$1,659,640
Roane County	\$1,485,565	\$1,531,098	\$1,503,164	\$1,531,883
Realty Transfer and Mortgage				
Anderson County	\$1,146,950	\$892,777	\$1,014,343	\$1,059,985
Knox County	\$11,394,844	\$10,971,507	\$9,005,730	\$9,843,116
Loudon County	\$1,459,830	\$1,083,551	\$1,169,124	\$1,297,700
Roane County	\$790,205	\$628,981	\$727,255	\$732,347
State Sales				
Anderson County	\$65,604,268	\$67,687,676	\$66,012,268	\$65,302,009
Knox County	\$559,083,177	\$566,834,256	\$514,295,050	\$490,452,261
Loudon County	\$37,606,209	\$38,115,626	\$34,604,248	\$32,190,322
Roane County	\$44,442,643	\$49,878,618	\$46,743,505	\$43,470,677
Local Sales				
Anderson County	\$21,020,530	\$21,579,178	\$21,450,182	\$21,127,175
Knox County	\$155,950,973	\$158,422,676	\$143,702,808	\$139,648,687
Loudon County	\$8,335,130	\$8,551,488	\$7,806,899	\$7,333,465
Roane County	\$13,811,128	\$13,930,618	\$14,172,830	\$13,878,046

Sources: (Reference 2.5.2-210; Reference 2.5.2-211; Reference 2.5.2-212; Reference 2.5.2-213)

Table 2.5.2-9
Tennessee Property Tax Classes

Description	Assessment Percent (%)
Residential Property	25
Farm Property	25
Commercial and Industrial Property	40
Public Utility Property	55
Business Personal Property	30

Source: (Reference 2.5.2-214)

Table 2.5.2-10
Appropriation of Tennessee State Funds for Fiscal Year 2012-2013

Tax Appropriation Category	Percentage (%)
Education	42
Health and Social Services	28
Law, Safety, and Correction	10
Cities and Counties	7
Transportation	6
Resources and Regulation	3
General Government	3
Business and Economic Development	1
Total	100

Source: (Reference 2.5.2-215)

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Table 2.5.2-11
TVA Tax Equivalent Payments to State of Tennessee and Counties FY 2011 through FY 2015

Fiscal Year	Total Distribution to State	Total Distribution to Counties	Anderson County	Knox County	Loudon County	Roane County
2010-2011	\$319.3	\$93.3	\$1.1	\$3.3	\$1.0	\$1.5
2011-2012	\$351.0	\$99.9	\$1.1	\$3.5	\$1.1	\$1.6
2012-2013	\$334.3	\$98.8	\$1.1	\$3.5	\$1.1	\$1.6
2013-2014	\$331.6	\$96.1	\$1.1	\$3.4	\$1.1	\$1.6
2014-2015	\$350.6	\$100.8	\$1.2	\$3.6	\$1.1	\$1.6

Note: \$ in millions.

Table 2.5.2-12
Housing in Anderson, Knox, Loudon and Roane Counties, Tennessee

County/Community	Total Housing Units	Number Owner-Occupied	Number Renter-Occupied	Number Vacant	Number for Rent	Number for Sale
Anderson County	34,717	21,876	9377	3464	1087	523
Oak Ridge ¹	14,494	8230	4542	1722	762	303
Knox County	194,949	117,412	59,837	17,700	6777	3747
Farragut	7982	6724	942	316	52	136
Loudon County	21,725	15,535	4291	1899	360	431
Lenoir City	3703	1987	1382	334	103	66
Roane County	25,716	16,829	5547	3340	760	419
Kingston	2814	1763	793	258	79	61
Harriman	3185	1484	1172	529	201	66

¹ City of Oak Ridge is located in Anderson and Roane Counties, Tennessee.

Sources: (Reference 2.5.2-100; Reference 2.5.2-94; Reference 2.5.2-96; Reference 2.5.2-98; Reference 2.5.2-97; Reference 2.5.2-102; Reference 2.5.2-101; Reference 2.5.2-99; Reference 2.5.2-95)

Table 2.5.2-13
Percent of Houses Built by Decade

Date of Construction	Farragut (%)	Harriman (%)	Kingston (%)	Lenoir City (%)	Oak Ridge (%)
Before 1940	1.1	21.1	0.9	24.3	2.6
1940 to 1949	0.9	12.9	5.5	6.7	31.7
1950 to 1959	1.4	19.9	27.1	14.8	17.1
1960 to 1969	8.1	18.3	9.7	2.8	12.5
1970 to 1979	18.5	13.8	20.1	10.9	11.7
1980 to 1989	23.8	9.3	9.8	10.6	9.9
1990 to 1999	28.9	2.8	12.6	13.9	6.6
2000 to 2004	11.8	1.2	6.0	10.1	3.1
2005 or Later	5.5	0.6	8.3	6.0	4.7

Sources: (Reference 2.5.2-216; Reference 2.5.2-217; Reference 2.5.2-218; Reference 2.5.2-219; Reference 2.5.2-220)

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Table 2.5.2-14
Temporary Housing at Recreational Sites

County	Total Campgrounds	Name	RV Sites	Cabins	Tent Sites/ Boat Slips	County Total
Anderson	7	Anderson County Park Commission	50	0	22	419
		Clinton / Knoxville North KOA	77	2	6	
		Half Moon	NA	NA	NA	
		Indian Creek RV Resort	20	NA	NA	
		Norris Dam State Park	75	29	10	
		Sportsman's Campground and RV Park	33	3	50	
		Windrock Park	39	14	75	
Roane	5	Caney Creek	170	0	230	631
		Riley Creek	45	0	- ¹	
		Crosseyed Cricket	47	0	- ¹	
		Four Seasons	34	0	- ¹	
		Soaring Eagle	105	0	- ¹	
Loudon	5	Yarberry Peninsula	45	0	- ¹	111
		Lazy Acres	66	0	- ¹	
		Sweetwater Valley KOA	59	6	10	
		Lotterdale Cove	90	0	28	
		Melton Hill Dam	56	0	- ¹	
Knox (near Knoxville)	3	Raccoon Valley	78	0	- ¹	275
		Southlake	90	0	27	
		Volunteer Park	100	0	- ¹	

¹ Tent sites not listed individually; however, RV sites could be utilized as tent sites.

Notes:

NA = Not Available

Sources: (Reference 2.5.2-221; Reference 2.5.2-222; Reference 2.5.2-223; Reference 2.5.2-224; Reference 2.5.2-225; Reference 2.5.2-226; Reference 2.5.2-114; Reference 2.5.2-227; Reference 2.5.2-228; Reference 2.5.2-229; Reference 2.5.2-230; Reference 2.5.2-231; Reference 2.5.2-232; Reference 2.5.2-233; Reference 2.5.2-234)

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Table 2.5.2-15
Public Water Supply Systems and Capacities in Anderson, Knox, Loudon, and Roane
Counties, Tennessee

Water System	Water Source Type	Maximum Daily Capacity (mgd)	Average Daily Consumption (mgd)
Anderson County			
Anderson County Water Authority	Surface Water	2	1.21
Clinton Utilities Board	Surface Water	3.2	1.86
Rocky Top Water Department	Purchased Surface Water	0 ³	14
Norris Water Commission	Groundwater under Influence of Surface Water	0.53	0.2
Oak Ridge Department of Public Works	Surface Water	9.9	7.7
Knox County			
First Utility District of Knox County	Surface Water	34	11
Hallsdale Powell Utility District	Surface Water	12	6.8
Johnson University	Groundwater	-	0.01
Knox-Chapman Utility District ¹	Surface Water	6.4	3.65
Knoxville Utilities Board	Surface Water	61.2	32.7
Northeast Knox Utility District	Surface Water	6.91	2.0
West Knox Utility District	Surface Water	18	5.5
Loudon County			
Creekside Mobile Home Subdivision	Groundwater	Not metered	NA
Lenoir City Utility Board ²	Surface Water	3.9	2.4
Loudon Utilities Board	Surface Water	14	9.7
Martel Utility District	Purchased Surface Water	0 ³	NA
Tellico Village Property Owners Association	Purchased Surface Water	0 ³	1.2
Roane County			
Cumberland Utility District	Surface Water	2.3	1.2 - 1.5
Harriman Utility Board	Surface Water	3.2	1.3 - 1.7
Kingston Water System	Surface Water	2.8	0.74
Oliver Springs Water Board	Purchased Surface Water	0.86	Unknown
Roane Central Utility District	Purchased Surface Water	0.7	0.35 - 0.4
Rockwood Water System	Surface Water	6	2.5
Watts Bar East Utility District	Purchased Surface Water	0 ³	NA

¹ A new water treatment plant with a maximum daily capacity of 10 mgd was placed online in 2014.

² Water is also purchased from First Utility District, in varying unknown amounts.

³ Purchased

Notes:

mgd = million gallons per day; NA = not available

Sources: (Reference 2.5.2-235; Reference 2.5.2-236)

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Table 2.5.2-16
Public Wastewater Treatment Facilities in Anderson, Knox, Loudon, and Roane Counties,
Tennessee

Treatment Facility	Maximum Daily Capacity (mgd)	Utilization (mgd)
Anderson County		
Oak Ridge	30	5 - 7
City of Oak Ridge - Rarity Ridge	0.63	0.09 - 0.1
Clinton STP #1	3	1.5 - 1.9
Norris	0.2	Wet Season 0.5 Dry Season 0.06
Rocky Top	0.95	0.3 - 0.4
Knox County		
First Utility District of Knox County - Turkey Creek	18	7
Johnson University	0.14	0.07
Hallsdale Powell Utility District	16	9
Knoxville Utilities Board - Eastbridge	1.3	0.57
Knoxville Utilities Board - Fourth Creek	10.8	7.3
Knoxville Utilities Board - Kuwahee	44	35.1
Knoxville Utilities Board - Loves Creek	10.3	3.3
West Knox Utility District - Karns Beaver Creek	4	3.6
Loudon County		
Lenoir City Utilities Board	3	1.5
Loudon Utility Board	14	8.09
Tellico Village Property Owners Association	Treated by Loudon Utilities	0.1
Roane County		
Kingston	2.0	0.45
Harriman Utility Board	5	0.9 - 1.0
Oliver Springs	0.74	0.4
Roane County Wastewater	1	Not available
Rockwood	1.65	1.3
Watts Bar Utility District	Decentralized/Purchased	Not applicable

Notes:

mgd - million gallons per day

Table 2.5.2-17
Police Services

	Number of Sworn Law Enforcement Officers	Officer to Resident Ratio
Anderson County	60	1:1250
Clinton	27	1:350
Oak Ridge	61	1:500
Knox County	458	1:1000
Knoxville	393	1:500
Loudon County	49	1:1000
Lenoir City	24	1:350
Roane County	33	1:1600
Harriman	18	1:350
Kingston	12	1:500

Sources: (Reference 2.5.2-162; Reference 2.5.2-161; Reference 2.5.2-165)

Table 2.5.2-18
Area Hospitals and Medical Centers

Hospital/Medical Center	County	Location	Number of Beds	Number of Physicians	Number of Employees
Methodist Medical Center of Oak Ridge	Anderson	Oak Ridge	255	180	1000
Ridgeview Psychiatric Hospital and Center	Anderson	Oak Ridge	20	NA	52
Turkey Creek Medical Center	Knox	Knoxville	101	811 ¹	441
East Tennessee Children's Hospital	Knox	Knoxville	152	100 ²	1283
Fort Sanders Regional Medical Center	Knox	Knoxville	402	350 ²	1611
Parkwest Medical Center	Knox	Knoxville	297	400 ²	1462
Physicians Regional Medical Center	Knox	Knoxville	243	811 ¹	1364
North Knoxville Medical Center	Knox	Knoxville	108	811 ¹	478
University of Tennessee Medical Center	Knox	Knoxville	536	800 ²	3212
Fort Loudoun Medical Center	Loudon	Lenoir City	40	200 ²	235
Roane Medical Center	Roane	Harriman	36	NA	283

¹ Physician total, 811, includes the three Hospitals: Turkey Creek Medical Center, Physicians Regional Medical Center, and North Knoxville Medical Center.

² Number of physicians provided in the reference is expressed as "greater than" the number shown on the table. An exact number is not provided.

Notes: NA – Not Available

Sources: (Reference 2.5.2-237; Reference 2.5.2-169; Reference 2.5.2-170; Reference 2.5.2-238; Reference 2.5.2-239; Reference 2.5.2-240; Reference 2.5.2-241; Reference 2.5.2-242; Reference 2.5.2-243; Reference 2.5.2-244)

Table 2.5.2-19
Nursing Homes in Anderson, Knox, Loudon, and Roane Counties, Tennessee

Nursing Home	Location	Number of Beds
Anderson County		
Briarcliff Health Care Center	Oak Ridge	120
Golden LivingCenter - Windwood	Clinton	120
NHC HealthCare	Oak Ridge	128
Norris Health and Rehabilitation Center	Andersonville	103
Summit View of Rocky Top	Rocky Top	125
Knox County		
Beverly Park Place Health and Rehab	Knoxville	271
Brakebill Nursing Home Inc.	Knoxville	222
Fort Sanders TCU	Knoxville	24
Holston Health & Rehabilitation Center	Knoxville	109
Island Home Park Health and Rehab	Knoxville	95
Kindred Health and Rehabilitation - Northhaven	Knoxville	96
NHC HealthCare, Farragut	Knoxville	100
NHC HealthCare, Ft.Sanders	Knoxville	166
NHC HealthCare, Knoxville	Knoxville	99
Senator Ben Atchley State Veterans' Home	Knoxville	140
Serene Manor Medical Center	Knoxville	79
Shannondale Health Care Center	Knoxville	200
Summit View of Farragut, LLC	Knoxville	113
Tennova Health Care - Tennova TCU	Knoxville	25
West Hills Health and Rehab	Knoxville	194
Loudon County		
Baptist Health Care Center	Lenoir City	104
Kindred Nursing and Rehabilitation - Loudon	Loudon	182
Roane County		
The Bridge at Rockwood	Rockwood	157
Harriman Care & Rehab Center	Harriman	180
Renaissance Center	Harriman	130

Source: (Reference 2.5.2-171)

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Table 2.5.2-20
Public Schools in Anderson, Knox, Loudon, and Roane Counties, Tennessee

County	Total Public Schools	Schools	Number of Schools	Student Total	Amount spent per pupil in 2009-2010 academic year
Anderson	28	Elementary	16	12,800	\$9,617
		Middle	6		
		High School	3		
		Preschool	2		
		Vocational	1		
City of Oak Ridge ¹	8	Elementary	4	4800	\$11,681
		Middle	2		
		High School	1		
		Preschool	1		
Knox	86	Elementary	44	58,000	\$8,504
		Middle	16		
		High School	13		
		Specialized Education Center	13		
Loudon	12	Elementary	6	7500	\$8,416
		Middle	3		
		High School	2		
		Pre-kindergarten through eighth grade	1		
Lenoir City ²	3	Elementary	1	2300	\$8,929
		Middle	1		
		High School	1		
Roane	18	Elementary	8	7400	\$8,699
		Middle	4		
		High School	5		
		Pre-kindergarten through 12 th grade	1		

¹ Included within data for Anderson County

² Included within data for Loudon County

Sources: (Reference 2.5.2-194; Reference 2.5.2-196; Reference 2.5.2-181; Reference 2.5.2-183; Reference 2.5.2-184; Reference 2.5.2-186; Reference 2.5.2-188; Reference 2.5.2-189; Reference 2.5.2-191; Reference 2.5.2-192)

Table 2.5.2-21
Colleges and Universities within 50 Miles of the CRN Site

Institutions	Location	County	Institution Type (2 or 4 year)	Approximate Enrollment
Maryville College	Maryville, TN	Blount	4	1093
Carson-Newman College	Jefferson City, TN	Jefferson	4	1967
Fountainhead College of Technology	Knoxville, TN	Knox	4	180
ITT Technical Institute	Knoxville, TN	Knox	4	400
Johnson University	Knoxville, TN	Knox	4	954
Lincoln Memorial University – Duncan School of Law	Knoxville, TN	Knox	4	104
Pellissippi State Community College	Knoxville, TN	Knox	2	11,259
South College	Knoxville, TN	Knox	4	1116
Strayer University	Knoxville, TN	Knox	4	509
The Crown College of the Bible	Powell, TN	Knox	4	700
Tusculum College – Graduate and Professional Studies	Knoxville, TN	Knox	4	2055
University of Tennessee	Knoxville, TN	Knox	4	27,000
Virginia College – Knoxville	Knoxville, TN	Knox	4	602
Tennessee Wesleyan College	Athens, TN	McMinn	4	1084
Bryan College	Dayton, TN	Rhea	4	1704
Roane State Community College	Harriman, TN	Roane ¹	2	6508

¹ Campuses are also located in eight other counties (Reference 2.5.2-245)

Sources: (Reference 2.5.2-204; Reference 2.5.2-205; Reference 2.5.2-197; Reference 2.5.2-246; Reference 2.5.2-247; Reference 2.5.2-248; Reference 2.5.2-203; Reference 2.5.2-202; Reference 2.5.2-201; Reference 2.5.2-200; Reference 2.5.2-199; Reference 2.5.2-249; Reference 2.5.2-206; Reference 2.5.2-207; Reference 2.5.2-198; Reference 2.5.2-208; Reference 2.5.2-250)

Table 2.5.2-22
Traffic Incident Rates in the Vicinity of the Clinch River Site
(February 2008 to November 2012)

Roadway	2011 Average Daily Traffic (ADT)	Length (miles)	# of Crashes (2008- 2012)	# of Injuries (2008- 2012)	# of Fatalities (2008- 2012)	Crashes per Year (100 MVM)	Injuries per Year (100MVM)	Fatalities per Year (100MVM)
TN 58 (L.M. 17.60 to L.M. 20.18)	10,500	2.58	28	9	0	59.62	19.16	0.00
TN 95 (L.M. 0.00 to L.M. 3.00)	6600	3.00	32	10	3	90.30	29.13	8.74
TN 327 (L.M. 0.00 to L.M. 2.20)	3000	2.20	9	4	0	78.65	34.96	0.00

Notes:

MVM = million vehicle miles

L.M. = log mile

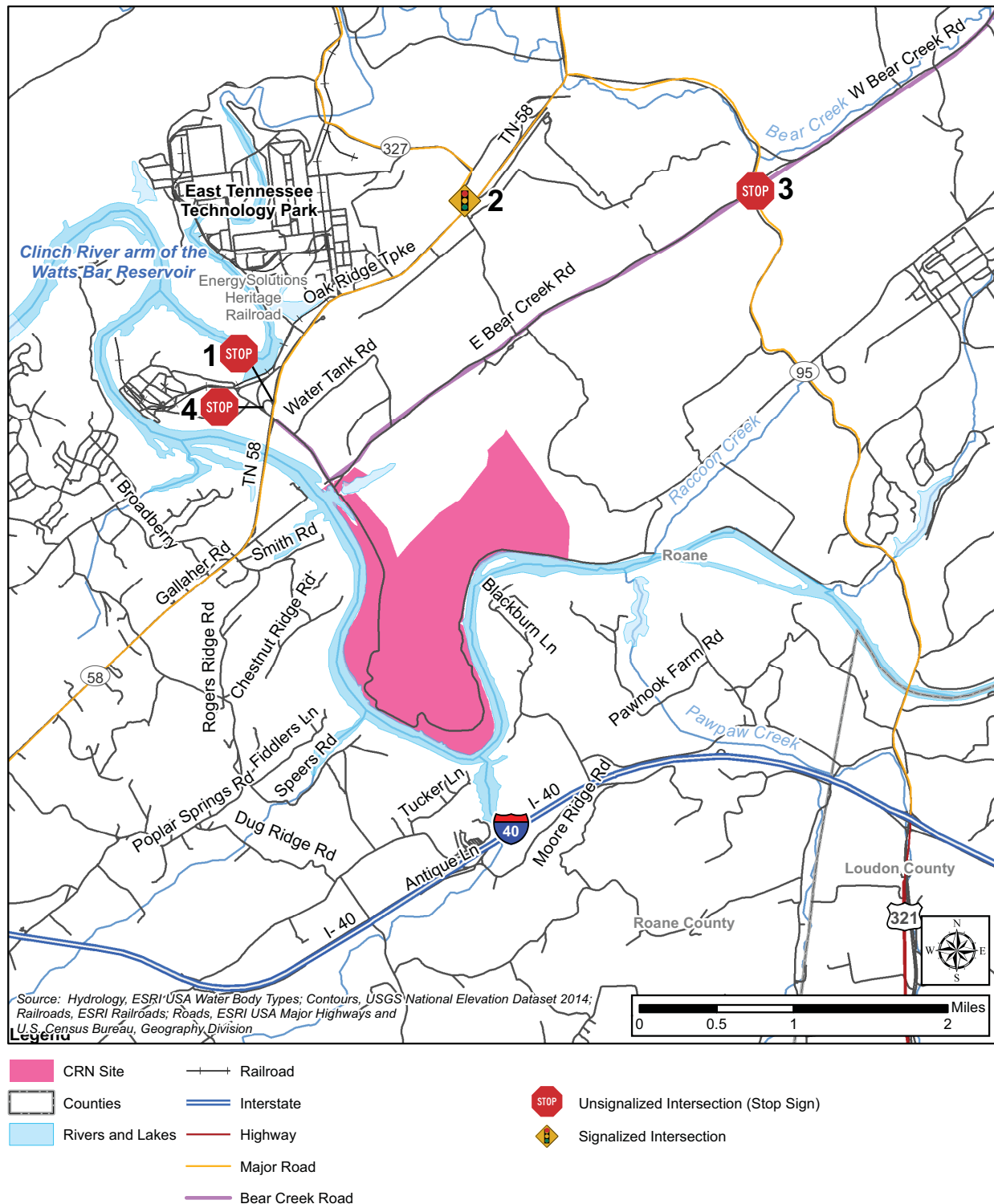


Figure 2.5.2-1. Traffic Study Intersections Potentially Impacted by the Proposed Project