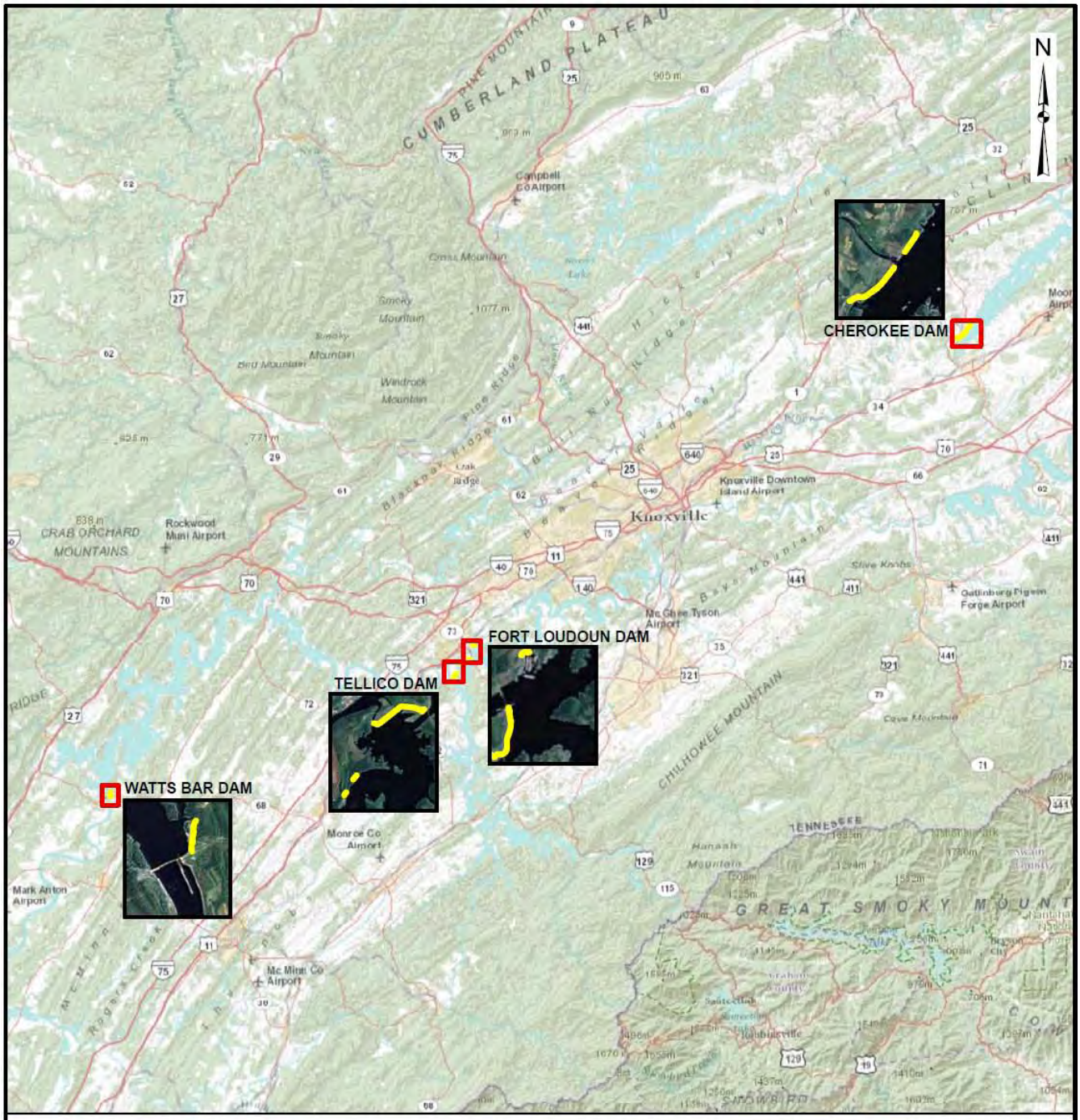
CHAPTER 1 – PURPOSE AND NEED FOR ACTION

The Tennessee Valley Authority (TVA) was established by an act of Congress in 1933. As stated in the TVA Act, TVA is to "improve the navigability and to provide for the flood control of the Tennessee River; to provide for reforestation and the proper use of marginal lands in the Tennessee Valley; to provide for agricultural and industrial development of said valley; [and] to provide for the national defense...." A fundamental part of this mission was the construction and operation of an integrated system of dams and reservoirs. As directed by the TVA Act, TVA uses this system to manage the water resources of the Tennessee River for the purposes of navigation, flood control, power production, and, consistent with these purposes, a wide range of other public benefits.

As the Federal agency responsible for the operation of numerous dams, and consistent with the Federal Guidelines for Dam Safety (Interagency Committee on Dam Safety 2004), TVA prepares for the worst case flooding event in order to protect against dam failure, loss of life, major property damage and impacts to critical facilities. This worst case flooding event is known as the Probable Maximum Flood (PMF), defined as the flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in a particular drainage area. United States (U.S.) Nuclear Regulatory Commission (NRC) nuclear plant operating regulations also require that nuclear plants be protected from the PMF. TVA periodically reviews and revises its calculations of PMF elevations. During the most recent review (completed in 2009), TVA determined that the updated PMF elevations at Cherokee, Fort Loudoun, Tellico, and Watts Bar Dams (Figure 1-1), as well as at TVA's Watts Bar, Sequoyah, and Browns Ferry Nuclear Plants, were higher than previously calculated.

The differences in PMF elevations are sufficient to indicate that a PMF event could cause water to flow over the top of the four dams, even with the floodgates wide open, possibly resulting in dam failure. Failure of one or more of these dams would result in extensive damage to buildings, infrastructure, property, and natural resources, as well as potential personal injury and loss of life.

In 2009, TVA implemented temporary measures at the dams to remain consistent with Federal guidelines and comply with nuclear operating regulations for safe operations of the river and reservoir system, and to minimize the potential effects of the PMF. These temporary measures consisted of raising the heights of the four dams by installing approximately 6,900 interconnected, fabric-lined HESCO Container® units (herein referred to as "HESCO barriers") filled with number (No.) 10 crushed stone on top of the earthen embankments of each dam. The alignments of the temporary modifications at all four dams are shown in Figures 1-2 through 1-5. These HESCO barriers raised the elevation of each dam by 3 to 8 feet and provided additional floodwater storage capacity. The length of HESCO barrier floodwalls totaled approximately 18,000 feet (7,000 feet at Cherokee; 4,500 feet at Fort Loudoun; 6,000 feet at Tellico; and 1,600 feet at Watts Bar). TVA also installed a permanent concrete apron (ArmorFlex concrete mats) on approximately 2 acres of the downstream earthen embankment of Watts Bar Dam, just east of the Lock Operations Building (see Photo 53 in Appendix A). These temporary measures are described and depicted in detail in Section 2.1.1.



Legend

Flood Wall - Centerline

Feet
0 40,000 80,000 160,000

AECOM

Figure 1-1
Site Location Map

Tennessee Valley Authority

Legend

HESCO Barrier Alignment

TVA Owned Land

N

Feet

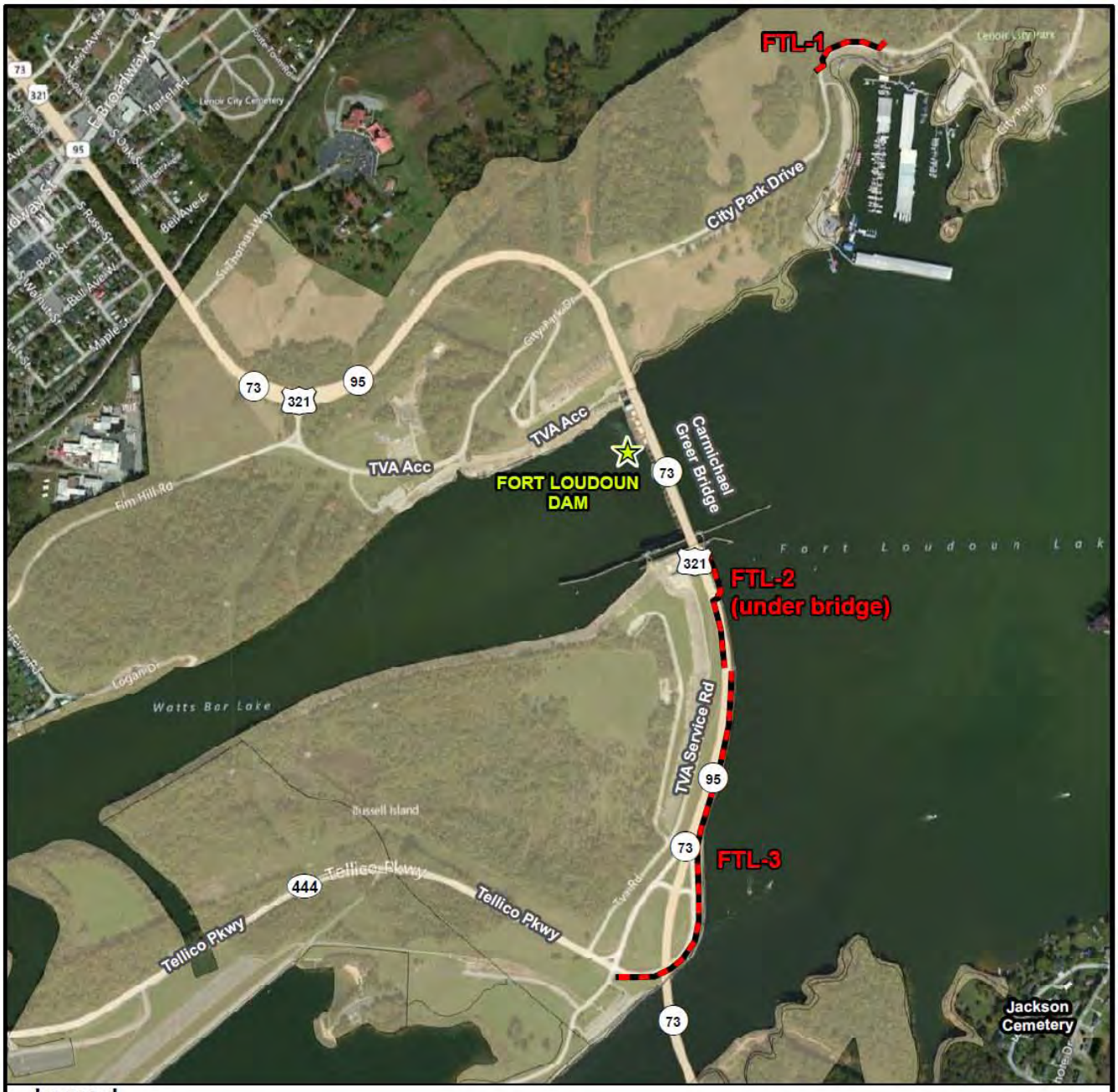
0 500 1,000 2,000

Source: Aerial is provided by ArcMap World Imagery 2012

AECOM

Figure 1-2
Cherokee Dam
HESCO Barrier Alignment

Tennessee Valley Authority



Legend

HESCO Barrier Alignment

TVA Owned Land

N

Feet

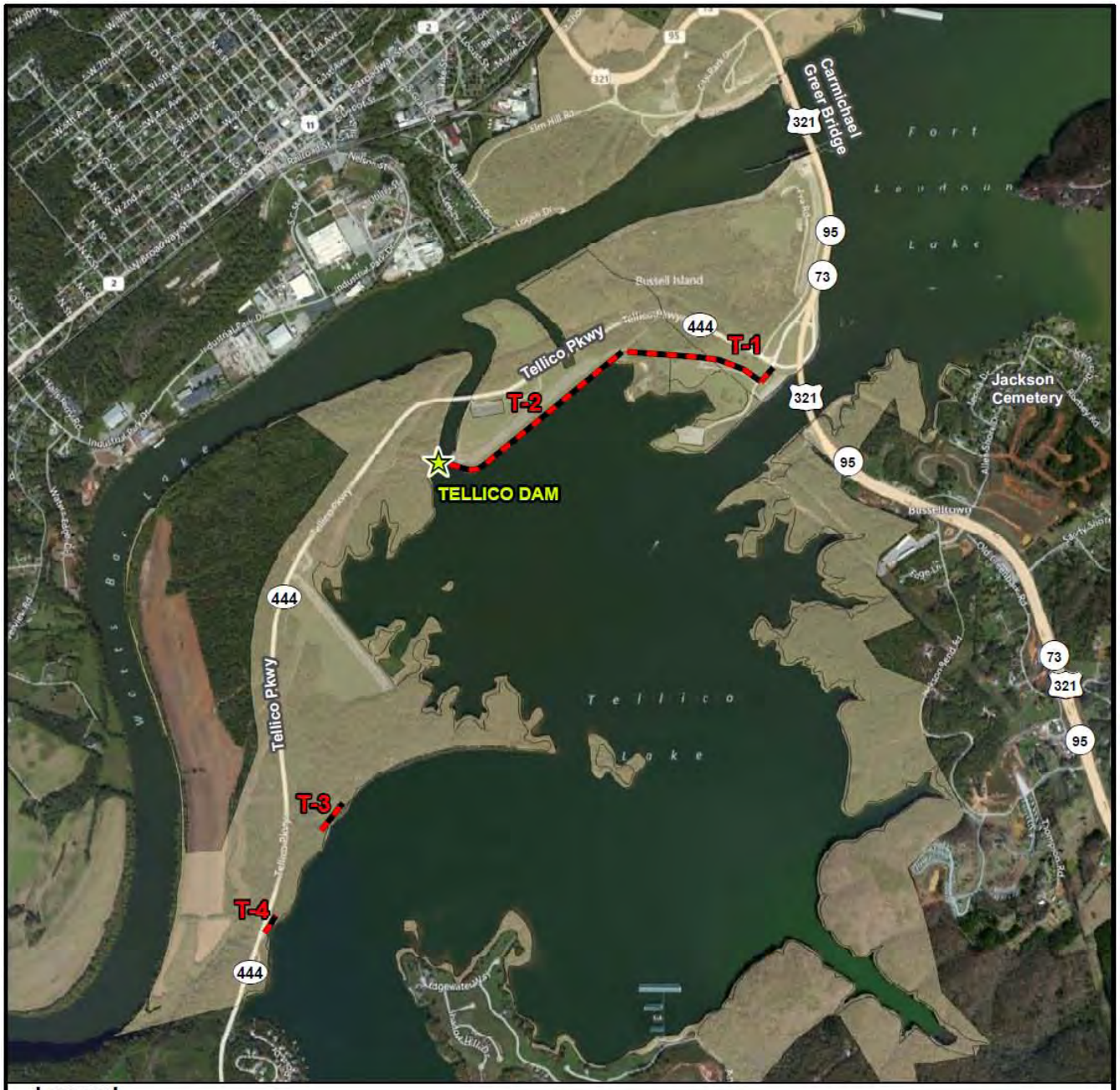
0 500 1,000 2,000

Source: Aerial is provided by ArcMap World Imagery 2012

AECOM

Figure 1-3
Fort Loudoun Dam
HESCO Barrier Alignment

Tennessee Valley Authority



Legend

HESCO Barrier Alignment

TVA Owned Land

N

0 1,000 2,000 4,000 Feet

Source: Aerial is provided by ArcMap World Imagery 2012

AECOM

Figure 1-4
Tellico Dam
HESCO Barrier Alignment

Tennessee Valley Authority

Legend

HESCO Barrier Alignment

TVA Owned Land

N

0 250 500 1,000 Feet

Source: Aerial is provided by ArcMap World Imagery 2012

AECOM

Figure 1-5
Watts Bar Dam
HESCO Barrier Alignment

Tennessee Valley Authority

In a January 25, 2012 letter from NRC to TVA (NRC 2012), NRC outlined the need for replacement of the temporary HESCO barriers:

> *Based on our review of the licensee's documents (ADAMS Accession Nos. ML 110831047, ML 11112A137, ML 11145A163, and ML 111540463), the NRC staff finds that the sand baskets are not capable of resisting debris impact. These documents neither discuss the ability of sand baskets to withstand debris impact, or mention whether the baskets are designed for impact of debris loads. The NRC staff is unable to conclude that these sand baskets were designed to withstand impacts from large debris during a flood. If a design flood were to occur, there is a high likelihood that significant debris would accompany the flood waters which could impact the baskets. There is the potential for this debris to damage the baskets or push the individual baskets apart causing a breach. There would be no time to repair the baskets because the flood would already be in progress. Therefore, sand baskets that are not designed and constructed to withstand impacts from large debris are not acceptable as a long-term solution.*

In response to NRC's request and to better protect the dams, TVA must now develop and implement permanent dam safety modifications to replace the temporary measures at the four dams.

The purpose and need of the Proposed Action is to (1) minimize the potential for the failure of Cherokee, Fort Loudoun, Tellico, and Watts Bar dams during the PMF; and (2) prevent an increase in flooding during the PMF at downstream locations including Watts Bar, Sequoyah, and Browns Ferry Nuclear Plants.

1.1. Background

TVA has long had established design basis flood levels for its dams and nuclear plants based on detailed hydrologic and hydraulic simulations and analyses. Much of this work was completed in the period between the late 1970s and early 1990s. As part of TVA efforts to obtain a construction and operating license for the proposed Bellefonte Nuclear Plant (BLN) in North Alabama, in early 2008 NRC conducted a quality assurance audit of the design basis flood calculations for Bellefonte that had been completed approximately 10 years earlier. The audit produced several findings, most related to TVA's inability to readily produce supporting materials for the NRC review. As a result, TVA decided to reestablish the BLN design basis flood level by performing new hydrologic and hydraulic analyses. Following the completion of the new Bellefonte hydrology study, TVA decided to reestablish design basis flood levels for all of its dams.

TVA has historically used the PMF as the design basis flood event, both for planned and operating nuclear plants and for all dams, which are classified (based on the potential for property damage and loss of life) as high hazard. Estimation of the PMF is based on a deterministic approach, which uses a series of empirical and physically based relationships to predict the response of a watershed to extreme storm rainfall. Model predictions based on a deterministic approach will always provide the same answer as long as the set of model inputs does not change. The PMF is an extremely rare event of unknown probability.

An alternative, probabilistic modeling approach could be used for determining PMF elevations. In recent years, advancements have been made in hydrologic analysis based on a probabilistic approach. In such an approach, many thousands of possible events are simulated; each

simulation is based on estimates of a series of model inputs which are drawn from underlying statistical distributions, and represents a possible outcome of a given hydrologic event. By simulating a very large number of events, some of those events will occur at the extreme ends of possible distributions, and can be used to make inferences about the likelihood or probability of the occurrence of an event of a given magnitude. The primary drawbacks to such an approach include limitations of computational resources and the amount of uncertainty in the underlying statistical distributions for model input parameters, particularly for values well beyond those that have been observed within the historic record.

While the probabilistic approach shows promise, the deterministic approach is currently used for nuclear power plant sites in the U.S. (NRC 2011). The Federal Guidelines for Dam Safety (Interagency Committee on Dam Safety 2004) state that "When flooding could cause significant hazards to life or major property damage, the flood selected for design should have virtually no chance of being exceeded." TVA has historically used the PMF as the design basis for its high hazard dams, and has judged such an approach to be fully consistent with the intent of the Federal Guidelines. For these reasons, TVA has used a deterministic approach to estimate the PMF at the locations of interest in this study.

The updated PMF elevations at Cherokee, Fort Loudoun, Tellico, and Watts Bar dams, as well as at TVA's Watts Bar and Sequoyah Nuclear Plants, were higher than previously calculated. These differences are due to changes in river operating assumptions, higher initial reservoir levels under the current reservoir operating policy (TVA 2004), and revised data from a reanalysis of spillway water flow rates. The previous and revised PMF elevations are as follows:

Table 1-1.
Previous and Revised PMF Elevations

Facility	Previous PMF elevation* (feet)	Revised PMF elevation (feet)	Difference (feet)
Cherokee Dam	1089.4	1093.6	+4.2
Fort Loudoun Dam	833.5	835.6	+2.1
Tellico Dam	828.6	833.3	+4.7
Watts Bar Dam	766.1	768.1	+2.0
Watts Bar Nuclear Plant	734.9	739.2	+4.3
Sequoyah Nuclear Plant	719.6	722.0	+2.4
Browns Ferry Nuclear Plant	572.5	571.7	-0.8

*All elevations are feet above mean sea level, based on the National Geodetic Vertical Datum of 1929.

1.2. Description of the Dams and Reservoirs

Cherokee Dam

Cherokee Dam is on the Holston River at mile 52.3 in Grainger and Jefferson Counties, Tennessee. Construction of Cherokee Dam began in August 1940; it was completed on a greatly accelerated schedule in December 1941 and the first commercial power was generated in April 1942. The hydroelectric plant has four generating units with a total net capacity of 148 megawatts. Cherokee Reservoir extends upstream about 54 miles and has about 400 miles of

shoreline and 28,780 acres of water surface at the normal summer pool elevation. The flood storage capacity is 749,400 acre-feet. The typical summer pool elevation is 1064 to1069 feet and the typical winter pool elevation is 1040 to 1045 feet. Much of the inflow to Cherokee Reservoir is regulated by upstream dams.

The dam is 175 feet high and 6,760 feet long. The dam consists of a 2,150-foot long north earthen embankment, a central 1,697-foot-long concrete portion containing the spillway and penstock intakes, and a 2,913-foot-long south earthen embankment. Three separate earth-fill saddle dams, totaling 1,770 feet in length, are located to the south of the main dam.

TVA previously completed a PMF-related modification of the dam in 1985. This modification consisted of the construction of a 7.5-foot-high concrete wall on portions of the central concrete portion of the dam.

Fort Loudoun Dam

Fort Loudoun Dam is located in Loudon County, Tennessee at Tennessee River mile 602.3. It forms Fort Loudoun Reservoir which extends upstream past Knoxville to a short distance upstream of the junction of the French Broad and Holston Rivers. Fort Loudoun is the uppermost of the nine TVA reservoirs located on the Tennessee River. Construction of Fort Loudoun Dam began in 1940 and was completed in 1943. The hydroelectric plant consists of four generating units with a total net capacity of 162 megawatts. A 60- by 360-foot lock raises and lowers boats about 70 feet between Fort Loudoun and Watts Bar Reservoirs. Fort Loudoun Reservoir has 379 miles of shoreline and 14,600 acres of water surface at normal summer pool elevations. The normal summer pool elevation range is between 812 and 813 feet and the normal minimum winter pool elevation of 807 to 809 feet. The reservoir has a flood storage capacity of 111,000 acre-feet. It is connected by a short canal to Tellico Reservoir and during normal operations water is diverted through the canal to pass through the Fort Loudoun hydroelectric plant. Cherokee Dam and Douglas Dam, on the French Broad River, regulate much of the inflow to Fort Loudoun.

Fort Loudoun Dam is 122 feet high and 4,190 feet long. The 1,550-foot-long concrete portion of the dam, containing the spillway, lock and penstock intakes, is located on the north side against a rock bluff. The remainder of the dam to the south is an earthen embankment faced with rock. A separate earth-fill saddle dam about 550-feet-long spans a low area near Fort Loudon Marina, about 3/4 mile northeast of the main dam. State Route 95/73/U.S. Highway 321 was built on piers across the dam in 1960-1961. The Tennessee Department of Transportation (TDOT) plans to reconstruct the highway on a new alignment with a new bridge crossing the Tennessee River downstream of the dam. As part of this project, the current highway bridge will be removed from the dam.

TVA previously completed PMF-related modifications to the dam in 1989. These modifications included of the construction of a 3.25-foot-tall concrete barrier wall atop the south embankment adjacent to the navigation lock and a 2.67-foot-tall concrete barrier wall atop the saddle dam near Fort Loudoun Marina. Concrete and rock armoring was also added to the south embankment adjacent to the Lock Operations Building.

Tellico Dam

Tellico Dam is located in Loudon County at Little Tennessee River mile 0.35, just upstream from the confluence of the Little Tennessee and Tennessee Rivers. Its operation is closely integrated with the operation of Fort Loudoun Dam and a canal links the two reservoirs. Construction of Tellico Dam began in 1967 and was completed in 1979. The reservoir extends upstream about 33 miles and has 357 miles of shoreline and 15,560 acres of water surface at the normal summer pool elevation. It has a flood storage capacity of 120,000 acre-feet. Normal reservoir pool elevations are the same as for Fort Loudoun, 812-813 feet during the summer and 807-809 feet during the winter. Most of the inflow to Tellico Reservoir is regulated by upstream reservoirs on the Little Tennessee River and its tributaries.

Tellico Dam is 129 feet high and 3,238 feet long. The main concrete portion, approximately 538 feet long and containing the spillway, is located at the west end of the dam. The remainder of the dam is earthen fill faced with rock. Three separate earthen fill saddle dams totaling 2,980 feet in length are located to the south of the main dam.

In 1986, TVA prepared a combined Dam Safety Analysis Report for Fort Loudoun and Tellico dams to evaluate alternatives for new modifications to enable the dams to safely pass the PMF event (TVA 1986a). Due to their close proximity and interconnected drainage area, Fort Loudoun and Tellico were handled as a single, integrated project. Several alternatives were considered in the 1986 analysis: (1) raising the tops of the embankments, (2) increasing the spillway capacity, and (3) a combination of these actions (TVA 1986a). The preferred alternative, selected primarily because of cost differences, was raising the Fort Loudoun embankments and increasing the spillway capacity at Tellico. In 1989, TVA completed the PMF-related modifications of both dams. At Tellico, this consisted of the construction of a 2,000-foot-long, ungated concrete spillway and spillway apron energy dissipater on the downstream side of Tellico Saddle Dam No. 1. The spillway crest was connected to the south abutment by a concrete retaining wall.

Watts Bar Dam

Watts Bar Dam is located at Tennessee River mile 529.0 in Rhea and Meigs Counties, Tennessee. Construction of Watts Bar Dam began in 1939 and was completed in January 1942. The hydroelectric plant contains five generating units with a total net capacity of 182 megawatts. The impounded area extends 72 miles up the Tennessee River to Fort Loudoun Dam and 20 miles up the Clinch River to Melton Hill Dam. These dams, as well as Norris Dam, regulate most of the inflow to Watts Bar Reservoir. The reservoir has a flood storage capacity of 379,000 acre-feet. The typical pool elevations are between 740 and 741 feet during the summer and 735 to 737 feet during the winter. At the normal summer pool level, Watts Bar Reservoir has 722 miles of shoreline and 39,090 acres of water surface. Watts Bar Dam has one 60- by 360-foot lock that lifts and lowers boats as much as 70 feet to Chickamauga Reservoir.

Watts Bar Dam is 112 feet high and 2,960 feet long. The concrete portion of the dam adjoins a rock bluff on the west side of the river. The concrete portion is 1,726 feet long and includes the penstock intakes, spillway, and lock. A 1,234-foot-long earthen embankment faced with stone extends east from the concrete portion of the dam. State Route 68 was built on piers across Watts Bar Dam in the mid-1950s.

TVA previously completed PMF-related modification to Watts Bar Dam in 1998. These included construction of a concrete retaining wall immediately downstream of the bridge bents and spanning from the lock operations building to the bridge abutment, and construction of reinforced concrete slabs on the upstream and downstream slopes adjacent to the lock.

1.3. Description of Temporary Measures

Temporary measures were installed to prevent floodwaters from potentially overtopping the dams and to ensure the integrity of the downstream embankments, thus increasing the public safety of downstream residents and the safety of TVA's critical nuclear facility operations. These modifications, implemented to effectively raise dam embankments 3 to 8 feet and to prevent flood overtopping and potential impacts to the dam downstream embankments and possibly dam failure, are described and depicted below.

Cherokee Dam

Using 2,261 HESCO barriers that contained 8.2 million pounds of No. 10 crushed stone, TVA raised the north embankment, south embankment (Figure 1-6), and the saddle dam of the Cherokee Dam (a total of 6,783 feet in total length) by 3 feet. Additionally, TVA placed 2,500 tons of riprap on the downstream side of the north embankment (see Photo 2 in Appendix A). The areas of Cherokee Dam proposed for permanent modification have been identified by segments: C-1 is the north main embankment; C-2 is the south main embankment; C-3 is a short portion near the roundabout parking area; C-4 runs along the sidewalk on the east side of the TVA Parkway access road; C-5 is located along the sidewalk between the restroom facilities and the covered picnic area; and C-6 is located along the boundary between parking lots near the boat ramp (Figure 1-2).

Figure 1-6. Cherokee Dam – Segment C-2 (South Embankment)

Fort Loudoun Dam

Figure 1-7. Fort Loudoun Marina – Saddle Dam

TVA used a total of 1,907 (1,095 of the 3'x3'x4' barriers and 812 of the 3'x3'x3' barriers) HESCO barriers containing approximately 9.8 million pounds of crushed stone, to raise the earth embankment and one saddle dam of Fort Loudoun Dam. Approximately 3,785 feet was raised by 4 feet and another 570 feet was raised by 3 feet. Additionally, some portions of the Fort Loudoun dam segments (specifically the area under the Fort Loudoun Bridge and the saddle dam near the marina) were raised to a height of 7 to 8 feet using stacked HESCO barriers (Figure 1-7). The modifications being proposed at Fort Loudoun Dam have been broken up into three segments (Figure 1-3): FTL-1 is the saddle dam portion at Fort Loudoun Marina (Figure 1-7); FTL-2 is the portion of stacked barriers located underneath the Carmichael Greer Bridge just south of the dam itself; and FTL-3 is the longest portion located along U. S. Highway 321 (Figure 1-8).

Figure 1-8 Fort Loudoun Dam – Segment FTL-3 (U.S. Highway 321 Portion)

Tellico Dam

At Tellico Dam, TVA raised the portion of the concrete dam, the pedestrian walkway (Figure 1-9), the main earth embankment (Figure 1-10), and two saddle dams. A total of approximately 6,011 feet of embankment was raised by 4 feet utilizing 1,993 HESCO barriers (3'x3'x4') containing approximately 10.8 million pounds of crushed stone. At Saddle Dam No. 2 (Segment T-3 in Figure 1-4), 175 HESCO barriers were used to raise the 525-feet portion of Tellico Dam. At Saddle Dam No. 3 (Segment T-4 in Figure 1-4), 97 HESCO barriers were used to raise the 291-foot portion of Tellico Dam.

Figure 1-9. Tellico Dam Pedestrian Walkway – Segment T-1

Figure 1-10. Tellico Dam Main Embankment – Segment T-2

Watts Bar Dam

At Watts Bar Dam, TVA used 540 3'x3'x3' HESCO barriers containing 1.5 million pounds of crushed stone to raise a 1,600-foot portion of the earth embankment by 3 feet (Figure 1-5). The HESCO barrier tied-in to the existing berm located at the northeast end of the Watts Bar Highway Bridge (Photo 52 in Appendix A and Figure 1-11). Additionally, to ensure Watts Bar main dam integrity, TVA needed to protect the downstream slope below the existing concrete floodwall. Two acres were protected using ArmorFlex® concrete mats (Figure 1-12). A total of 373 concrete mats held by steel cables were placed on the embankment, ranging in weight from 5,000 pounds to 13,000 pounds each.

Figure 1-11. Watts Bar Dam – East Embankment

Figure 1-12. Watts Bar Dam – Downstream Embankment

1.4. Related Environmental Reviews and Consultation Requirements

TVA will be the lead Federal agency in the preparation of the Environmental Impact Statement (EIS); no cooperating agencies are anticipated. Federal, state, and local agencies and governmental entities will be notified when a copy of the draft EIS is available for review. These agencies will include, but are not limited to, the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Tennessee Department of Environment and Conservation (TDEC), and the Tennessee State Historic Preservation Officer (SHPO).

TVA's reservoir land plans and major environmental reviews are briefly described in this section. A comprehensive listing of TVA's recently completed environmental assessments and EISs can be found on TVA's Web site: http://www.tva.gov/environment/reports/index.htm.

River Operations Study Final Programmatic Environmental Impact Statement (TVA 2004)

Published in 2004, this EIS evaluated potential changes in TVA's policy for operating its reservoir system. Specifically, this study evaluated alternative ways to operate the TVA reservoir system in order to produce greater overall public value. The new operating policy, adopted by TVA, established a balance of reservoir system operating objectives to produce a mix of benefits that is more responsive to the values expressed by the public. These changes included enhancing recreational opportunities while avoiding unacceptable effects on flood risk, water quality, and TVA electric power system costs (TVA 2004).

Cherokee Reservoir Land Management Plan Final Environmental Assessment (TVA 2001); Tellico Reservoir Land Management Plan Final Environmental Impact Statement (TVA 2000); and Watts Bar Reservoir Land Management Plan Final Environmental Impact Statement (TVA 2009a)

These land plans and associated EISs and environmental assessment, were completed in 2009 for Watts Bar Reservoir, 2001 for Cherokee Reservoir, and 2000 for Tellico Reservoir. They allocate the TVA-managed land on each of the reservoirs (16,220 acres on Watts Bar, 8.187 acres on Cherokee, and 12,643 acres on Tellico) to one of six land use categories. The lands where the proposed permanent dam modifications would occur were allocated in each plan to Zone 2 - TVA Project Operations. Dam reservation lands are typically given this allocation and are managed for the primary purpose of supporting the operation and maintenance of the dams and associated infrastructure. Secondary uses may include developed and disbursed recreation and visitor centers.

Natural Resource Plan Final Environmental Impact Statement (TVA 2011)

In 2011, TVA completed the Natural Resource Plan and associated programmatic final EIS. This strategic plan addresses TVA's management of biological, cultural, and water resources; recreation; reservoir lands planning, and public engagement (TVA 2011). The EIS evaluates alternative management plans with varying levels of effort and commitment of resources. Under the selected alternative, TVA would continue to operate and maintain the recreation facilities at Cherokee, Fort Loudoun, Tellico, and Watts Bar dams.

1.5. Scoping and Public Involvement

In June 2011, TVA published a Notice of Intent (NOI) in the Federal register for the preparation of either an Environmental Assessment (EA) or EIS for permanent dam safety modifications. Subsequently, following additional analysis of alternatives and field studies, as well as consideration of public comments, TVA determined that an EIS would be required.

TVA completed scoping for the EIS, including a 55-day comment period, open house meetings at Lenoir City, Tennessee in July 2011 and at Louisville, Tennessee in September 2011 to collect public comments, and a request for input from Federal and state agencies, local organizations, and federally recognized Indian tribes. TVA received a total of 248 letters containing 557 individual comments during the scoping period; primary topics included impacts to scenery, land use, and recreation at the dams; the methodology used to calculate the PMF, and alternatives to the permanent dam modifications. Table 1-2 provides a breakdown of the number of comments and issue category. Due to the volume of comments and the similarity of issues raised by commenters, similar comment themes were grouped and summarized; each comment was categorized by major issue(s). Seven predominant themes or issues were identified: Project Scope and Alternatives, Flood Control-Flood Risk Concerns, Visual Aesthetics, Traffic and Safety, Socioeconomic Concerns, Recreation, Public Participation, and National Environmental Policy Act (NEPA) Compliance/Adequacy.

Table 1-2.
Overview of Comments Received During Public Scoping Organized by Issue Categories

Issue Category	Number of Comments
Remove the HESCO Barriers	120
HESCO Barriers Are Not Adequate to Prevent Flood Damage	101
HESCO Barriers Are Affecting Property Values	95
Opposed to the Costs Associated with HESCO Barriers and/or Permanent Barriers	75
Other Viable Alternatives Need to be Developed	47
HESCO Barriers are an Eyesore/Barriers Have Obstructed Views of the Lake	41
TVA Needs to Improve Communication	21
An Environmental Impact Statement Should Be Prepared	18
Remove the HESCO Barriers and Do Not Replace Them	13
Traffic And Safety Have Been Impacted By HESCO Barriers	9
HESCO Barriers Have Negatively Impacted Recreation	7
Visual Impacts Will Hurt The Local Economy	5
Comments In Support of TVA's Efforts	5
Total Individual Concerns/Issues	**557**

The summary below includes the potential environmental issues and themes identified from all the comments received during the public scoping process.

Project Scope and Alternatives

Most comments request the HESCO barriers be removed permanently, and some respondents further indicate they do not want any other types of barriers built to replace the HESCO barriers. Others expressed support for the alternative to remove the HESCO barriers and replace them with permanent structures. Several respondents indicated there was a need to develop other viable alternatives for the proposed project and some commenters provided ideas for other alternatives, such as removing the HESCO barriers and building barriers at TVA's nuclear plant sites.

Flood Control-Flood Risk Concerns

Comments were received related to concerns that the HESCO barriers would not provide adequate flood damage protection in the event of a probable maximum flood rain event. Other respondents expressed uncertainty regarding how and why the probable maximum flood calculations were developed. Some also questioned why TVA used a deterministic modeling approach for calculating PMF elevations instead of a probabilistic modeling approach.

Visual Aesthetics

Comments were received related to the perceived adverse visual impacts the HESCO barriers are having on the area or that the HESCO barriers themselves are unsightly. Other comments indicate the HESCO barriers are blocking the view of the water.

Traffic and Safety

Comments largely pertain to concerns for traffic dangers created by the HESCO barriers. Other comments express general safety concerns associated with the HESCO barriers. Some commented that the safety benefits of the HESCO barriers preventing flood damage are more important than the aesthetic impacts of the flood barriers.

Socioeconomic Concerns

Comments were received related to the perceived adverse impacts the HESCO barriers would have on property values, the local economy, and tourism. Other comments focus on the costs incurred by TVA to construct and/or remove the HESCO barriers or the anticipated future costs associated with the proposed permanent solutions.

Recreation

Comments were received related to the availability and use of hiking/biking/walking trails located in the vicinity of the HESCO barriers. Some respondents indicated that the trails are no longer accessible or that the HESCO barriers negatively impact the recreation experience because they block the views of the water.

Public Participation

Comments were received concerning public involvement during the scoping period for the proposed project. Some comments indicated TVA could have done a better job communicating with the public prior to the HESCO barriers being installed. Others indicated that the public has not been informed properly throughout the scoping process for the proposed actions. Many commenters thanked TVA for their efforts to reach out and involve the public.

NEPA Compliance/Adequacy

Comments were received related to many aspects of NEPA compliance, including the level of environmental review TVA should consider for the proposed action. Most respondents indicated that an EIS should be prepared.

1.6. Decision to be Made

The Senior Vice President of River Operations and Renewables will consider TVA staff recommendations, the Final Environmental Impact Statement (FEIS), public comments, and other factors, and make a decision following the Notice of Availability of this FEIS and after public comments on the FEIS are considered. The final decision will be documented in a Record of Decision (ROD) and made available to the public. Decisions made by other Federal agencies would be appropriately documented by the respective agency.

1.7. Necessary Permits or Licenses

TVA thoroughly examined the project components and determined that construction stormwater permits are the only permits and/or licenses potentially necessary to complete the permanent dam modifications. Stormwater-related permits would be site-specific and their need is dictated by the total area of temporary and permanent disturbance at each dam (i.e., area of excavation at each dam). This information is not available at this time; it will be determined once final engineering designs have been approved.

No Section 404(b), state aquatic resource alteration permits, State 401 certification, Endangered Species Act (ESA) Section 7 incidental take permits, or any other similar, resource-specific permits would be required for the Proposed Action.

1.8. Environmental Impact Statement Overview

This Draft EIS consists of seven chapters as outlined below. In addition, this document includes four appendices, which generally contain more detail on technical analyses and supporting data.

- **Chapter 1:** Describes the purpose and need for the Dam Safety Modification EIS, scope of the EIS, decision to be made, related environmental reviews and consultation requirements, necessary permits or licenses, and EIS overview.

- **Chapter 2:** Describes the Action and No Action Alternatives, alternatives eliminated from further consideration, provides a comparison of alternatives, identifies mitigation measures, and discusses the Preferred Alternative.

- **Chapter 3:** Discusses both the Affected Environment and Environmental Consequences of each alternative on various resources including: Geology and Soils, Water Resources, Flooding and Floodplains, Wetlands, Aquatic Ecology, Terrestrial Ecology, Threatened and Endangered Species, Land Use, Socioeconomics and Environmental Justice, Cultural and Historic Resources, Air Quality and Greenhouse Gas Emissions, Noise, Transportation, Visual Resources, Recreation, Solid and Hazardous Waste, and Public Safety. Direct and indirect impacts are evaluated for each resource in this chapter.

- **Chapter 4:** Addresses the Cumulative Impacts of the alternatives identified in the EIS, in consideration of other major actions in the region of influence.

- **Chapters 5-7:** Contains the list of preparers, EIS distribution list, and a list of literature cited.

- **Appendix A:** Contains a Photo Log of the project areas at each of the four dams.

- **Appendix B:** Contains Consultation Correspondence.