Moseley

Town of Black Mountain

Public Safety Building Professional Expected Damages Certification

July 8, 2026

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Executive Summary / Engineering Opinion

Project Scope

The Town of Black Mountain tasked Moseley with performing a facility condition assessment (FCA) of the Black Mountain Public Safety Building. The FCA was a visual evaluation of the current condition of the building systems and an estimation of the remaining useful life of these systems. The FCA team consisted of engineers and architects from Moseley. In December of 2025, the FCA team assessed exterior envelope, architectural interiors, structural systems, mechanical/electrical/plumbing/fire protection systems, and life safety. During this assessment we were assisted by Town of Black Mountain staff to provide both access to restricted parts of the building and institutional knowledge of the building system operations and problems.

Based on the assessment, the building has major structural and subsurface deficiencies that need to be addressed. Substantial system replacements and/or renovations are needed to improve the facility's condition. Additional testing was required to determine the full scope of structural repairs that are necessary. On March 16, 2026 a geotechnical test was performed by ESP inc. which conducted 8 test borings. 4 borings were under the existing slabs and 4 outside of the building. ESP again visited the site to obtain water levels on April 21 and 29, 2026.

Building Summary

Building:

The Building is a 1 story building with a basement that is exposed on the east side built in 1959 with the apparatus bays being added around1990. The building is approximately 13,500/sf with an additional 9,500/sf for the fire apparatus bay.

Electrical

The utility service is routed into the building from the utility pole through a building mounted weather head. It is then routed in the conduit through the basement ceiling space over the generator room and serves a main disconnect that feeds the building main distribution panel (MDP) in the basement. The basement area has indications of previous flooding.

Emergency Power

The building is served by an emergency standby gas generator located in the basement of the building. The generator is a Kohler 30kW, 208/120V, 3-phase, 4-wire generator. From visual inspection it appears that flood waters have been in the emergency generator room. It is recommended that emergency generators be located outside potential flood waters.

The emergency power system has a newly installed connection to a portable generator per NEC 700.3 that serves as a back up to the existing emergency standby generator in the case of maintenance or generator failure.

A public safety building should be able to remain operational in the event of a loss of utility power. The existing emergency power system is not sufficient for this. The generator does not have the capacity to support additional loads. It is recommended to update the emergency power system to be able to provide an adequate capacity in the event of utility power loss.

Structural Observations

Basement Level

Many of the perimeter basement walls within the basement footprint were covered up with storage materials making a thorough inspection of all of them difficult. However, at visible areas, primarily along the east wall, vertical and step cracks were visible. Additionally, evidence of the east wall moving away from the building was observed.

Main Floor Level

Along the north side of the building, the building is single-story with a slab on grade. Within the veneer of the north wall, at floor level, there is a 1/4 inch tall horizontal crack running nearly the length of the building. Additionally, the slab along this entire side of the building has experienced large cracks and differential settlements of up to one inch. Cracking in some of the gypsum covered walls is visible, and walls with brittle finishes, such as the tiled walls in the men's bathroom, are showing many cracks throughout the walls and floor areas. Evidence of the slab settlement is apparent where gaps between the top of the slab and bottom of the cove base is more than 1/2 of an inch. At one location, it appears that the wall ties that are attached to the slab are dragging the slab towards the exterior wall as the veneer moves. Distress due to settlement and reported roof leaks during Hurricane Helene are visible in the ceilings as well.

The quarter circle windows at the dispatch office and fire chief office have both cracked, indicating excessive amounts of wall movement. The stone veneer around the door that leads to the apparatus bay has also cracked.

The floor slab in the apparatus bay appears to be in mostly good condition, with an increase in visible slab cracks as you approach the main building. These slab cracks may be due to normal shrinkage of the concrete slab. It is unusual, however, that the instance of cracking increases with the proximity to the main building with known settlement issues. It should be expected that some amount of soil stability issues may be a contributor to these cracks as well. Additionally, a video provided by Deputy Chief James Bingham shows the slab at the door threshold deflecting as the wheels of one of the fire trucks is driven over it, indicating a loss of bearing under the slab at this location.

The concrete apron in front of the apparatus bay appears to be in good condition with minimal cracking.

Conclusions

It is readily apparent that the second-floor slabs and the building foundations have been compromised. The cracks, settlements, and wall movements are consistent with those caused by loss of bearing under the wall footings and slabs. Any rainfall events, groundwater movement, and the cracked drainage pipe are likely contributors. Water movement is known to cause erosion, and broken drain lines can wash soil away, both creating hollow and soft spots under the facility.

Moseley has reviewed the Report of Exploratory Hand Auger Borings prepared by ESP, dated May 12, 2026 in regard to the Facility Condition Assessment that we completed. We would suggest stabilizing the building, removing the groundwater, and providing appropriate site and wall drainage systems. As the soils under the building dry out, they will shrink, requiring additional remediation to compact and fill the resulting voids left behind. In addition to these measures, the existing storm water pipe under the building should be repaired and relocated outside of the building footprint as best as possible.

As stated in the Exploratory report, it is our opinion that the presence of groundwater around and under the building will continue to cause settlement and degradation of the facility, creating and unsafe environment for the user and public, until repairs and remediation are made.

Current Building Status

The building has been unoccupied since March 2026. In that time, additional water damage has occurred, including damage to ceilings resulting in deterioration and failure. In its current condition, the building is nonfunctional, and not repairable in place without significant site remediation.

Building Replacement Value (BRV)

To provide a new facility that meets current code requirements, the Town of Black Mountain would need to spend approximately $19,998,000. This number is based on a $550/sf base construction cost, as well as additional soft costs that include design fees, permitting, and furniture, fixtures, and equipment costs.

To demolish and replace the facility on the same site, the Town of Black Mountain would need to spend approximately $22,512,000. This number is based on a $50/sf demolition cost, a $600/sf base construction cost to include geotechnical remedies, as well as additional soft costs that include design fees, permitting, and furniture, fixtures, and equipment costs.

The costs are based on similar project costs as experienced by Moseley in the state of North Carolina, and RSMeans data.

Site Suitability

In our professional opinion, the Public Safety Facility located at 106 Montreat Road is subject to persistent hydrologic and geotechnical conditions that adversely affect the long-term structural performance and resiliency of improvements constructed at this location. This opinion is based on review of the Facility Condition Assessment and Amendment 01, available geotechnical investigations, prior subsurface evaluations, drainage investigations, watershed analyses, field observations, coordination with the structural evaluation performed by Moseley, review of publicly available datasets including USGS StreamStats, North Carolina Emergency Management Advisory Flood Mapping, and AccelAdapt, together with direct involvement in evaluating existing site conditions.

The available engineering information indicates that the site is influenced by a documented subsurface drainage feature, chronic groundwater movement, concentrated watershed runoff, and reduced bearing capacity of the underlying soils. Active groundwater movement has been observed beneath the building, and CCTV inspection identified a deteriorated storm drainage pipe with multiple cracks that likely contributes to continued subsurface saturation and migration of supporting soils. These conditions are consistent with the differential settlement, structural cracking, pavement distress, wall movement, and foundation-related damage documented throughout the facility.

Unlike facilities where flood risk is primarily associated with surface inundation, the observed structural distress at this site is driven principally by subsurface processes. Repeated groundwater recharge and soil saturation reduce the bearing capacity of the underlying soils, promote migration of fine-grained soils, and contribute to progressive differential settlement and loss of foundation support. Based on structure observations documented by Town staff and the engineering information reviewed during this assessment, Hurricane Helene may have increased groundwater saturation within an already vulnerable subsurface environment, thereby contributing to or accelerating the observed deterioration. While the precise contribution of any individual storm event cannot be quantified, the documented hydrologic and geotechnical conditions represent persistent site characteristics that would continue to influence future improvements constructed at this location.

The current condition of the facility is consistent with an active and ongoing deterioration mechanism resulting from the interaction of watershed hydrology, groundwater movement, and reduced bearing capacity of the underlying soils over time. Reconstruction of a facility of similar size and function at this location would therefore require comprehensive groundwater management, stormwater improvements, subsurface stabilization, and foundation design measures to mitigate these conditions. Without mitigation of these underlying site characteristics, a replacement facility would reasonably be expected to experience continued structural deterioration throughout its service life.

Hazard Characterization

As described above, the current site is subject to persistent hydrologic and geotechnical conditions that adversely affect the long-term structural performance and resiliency of improvements constructed at this location. The available engineering information indicates that the site is influenced by a documented subsurface drainage feature, chronic groundwater movement, concentrated watershed runoff, and reduced bearing capacity of the underlying soils.

The Public Safety Facility receives runoff from an approximately 19-acre contributing drainage basin, approximately 41 percent of which is impervious, resulting in rapid runoff response during storm events. USGS StreamStats confirms increasing peak runoff with increasing storm frequency, while existing site grading directs runoff toward the facility. Although the deteriorated storm drainage pipe beneath the building could be relocated as part of a reconstruction effort, the contributing watershed cannot reasonably be rerouted without substantial impacts to existing upstream infrastructure and developed properties. Consequently, relocation of the on-site storm conveyance system would not eliminate the site's underlying hydrologic conditions or the associated groundwater recharge affecting the building foundation.

Independent flood risk screening further supports these observations. AccelAdapt identifies the property as an exposed government-owned critical facility with high vulnerability and elevated overall flood risk based on its location relative to the North Carolina Emergency Management Advisory Flood dataset and the facility's essential public safety function.

Traditional FEMA flood depth-damage methodologies do not fully characterize the expected risk associated with this site because the principal damage mechanism is not solely related to the depth of surface inundation. Rather, the damage results from the cumulative effects of groundwater movement, long-term geotechnical degradation, and progressive loss of foundation support. Based on the available engineering information and our evaluation of the documented site conditions, it is our professional opinion that the Professional Expected Damages (PED) methodology provides the most appropriate engineering basis for estimating future expected damages associated with reconstruction of a critical public safety facility at this location.

Damage Certifications Using a Multi-Hazard Model

Hazard 1: Annual Chronic Deterioration Recurrence: 1 year (continuous)

The Current Public Safety Facility located at 106 Montreat Road would need immediate remediation and continuous monitoring to ensure that the foundations and retaining walls are not settling, subsiding or moving due to the subsurface conditions. The initial geotechnical reports indicated water levels at 9-10 feet below the ground surface. The most recent geotechnical reports listed at 1-1.5 feet indicating a rise in water levels. These levels could be the result of seasonal changes but indicate that the water levels have been present over time.

An initial impact cost would have to be absorbed, and ongoing annual monitoring would have to be performed at an annual rate of $15,000.00 by a licensed geotechnical engineer. Dependent on those results more repairs and mitigations may be necessary, and it is estimated that ongoing structural injections could range from $20,000 to $80,000 per year. Additionally, monitoring of the retaining walls and sealing any cracking and repairing any waterproofing would have to be performed. This monitoring could be done by on site personal, and repairs could range in the $5,000 to $10,000 for a licensed professional to repair.

Proposed estimated average annual damage $75,000.

Hazard 2: Flood-Accelerated Deterioration

Any periodic flooding may worsen the structural capacity of the bearing soils. AccelAdapt identifies the property as an exposed government-owned critical facility with high vulnerability and elevated overall flood risk based on its location relative to the North Carolina Emergency Management Advisory Flood dataset and the facility's essential public safety function. USGS StreamStats confirms increasing peak runoff with increasing storm frequency, while existing site grading directs runoff toward the facility.

The electrical and backup generator are located in the basement which has routinely flooded over the years. Any flooding event could render the facility powerless. Any damage to the main electrical distribution and generators could have an immediate cost impact. Loss of power would also effect the building HVAC and the Town of Black Mountain’s main data servers. Any loss of

power or damage to the servers would result in a loss of communications throughout the town. Estimated 25 year occurrence for HVAC, Generator and loss of service at $25,000.

Hazard 3: Catastrophic Geologic Failure

This facility was constructed in 1959 and the building evacuated in March of 2026 resulting in a 67 year life span. Helene would have represented a 100 year storm for this area and could have contributed to the damages observed. The last known comparable storm to Helene for Western NC would have been in 1916. That is a 108 year span between these two events.

Any catastrophic event such as wind, flood, or seismic could have a complete failure of the structural system. Any such damage would most likely be beyond repair, especially given the current damages at the site. A full replacement would be required. To design, procure and construct a new facility would take approximately 3 years (1,095 days).

A full building replacement value at today's rates would be estimated at 17,325,000 for construction costs, 3,186,875 for soft costs.

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Residual Risk at Proposed New Site

The proposed relocation site at the corner of North Fork Road and Lions Way is not identified as being subject to flood risk according to the North Carolina Emergency Management Advisory Flood Mapping service. Based on the available mapping and site information reviewed to date, the proposed site does not appear to contain the same documented subsurface drainage feature, chronic groundwater condition, or storm conveyance conflict present at the existing Public Safety Facility site.

A geotechnical investigation has not yet been completed for the proposed relocation site; therefore, final foundation design and any required subsurface recommendations will be determined during subsequent design phases. However, based on the information currently available, the proposed relocation site is expected to substantially reduce the combined flood, storm conveyance, and geotechnical hazards affecting the existing facility. As a result, no comparable chronic site-related service disruption is currently anticipated for a new essential facility constructed at this location, provided that final design incorporates standard geotechnical, stormwater, and site drainage recommendations.

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