2.0 PURPOSE AND NEED

The Purpose and Need Statement in a NEPA document is a formal declaration of the overall goals and objectives of a proposed project. This statement documents the justification for the project and provides the basis for evaluating the effectiveness of the alternatives.

2.1 BACKGROUND

MMU is located fifteen miles northwest of Newark Liberty International Airport, and twenty-five miles west of New York City. MMU is situated in the County of Morris, Hanover Township, and the Borough of Florham Park. MMU is designated as a general aviation reliever airport in the FAA’s National Plan of Integrated Airport Systems (NPIAS). Reliever airports are designated by the FAA to relieve congestion at Commercial Service Airports (such as Newark Liberty International, La Guardia International and J.F.K International) and to provide improved general aviation access to the overall public. In order to be designated as a reliever, the airport must have 100 or more based aircraft or at least 25,000 annual itinerant operations. The FAA report “General Aviation Airports: A National Asset” published in May 2012 classified MMU as one of 84 “National” general aviation airports in the U.S. “National” airports serve national and global markets and have “very high levels of activity with many jets and multiengine propeller aircraft averaging about 200 based aircraft including 30 jets”. Several prominent corporations base their aircraft at MMU because of its proximity to their corporate facilities.

In addition, MMU is utilized by transient aircraft traveling to the NY/NJ Metropolitan area. It is also used for recreation and medevac operations including the transport of human organs for transplants. MMU provides convenient access to the nation’s airspace system for businesses and residents in Morris County and NY/NJ Metropolitan area. According to a 2011 Economic Impact Study, MMU generates $243.6 million in annual economic impact and generates 1,158 jobs.

Based upon the 2013 MPU as well as the Runway 5-23 Rehabilitation Phase I and Phase II Feasibility Reports, dated August 2012 and March 2013, respectively, the Runway Safety Area Determination, dated June 2013, Pavement Condition Index Assessment, dated 2013, and the Preliminary Engineering Report dated June 2014, a number of different project alternatives were developed in order to address the existing deficiencies in the current infrastructure at MMU. The process and progression of the evaluation of the alternatives, and those selected for further study, are detailed in Chapter 3. These selected alternatives comprise what is referred to below as the Proposed Action.

The Proposed Action is in accordance with FAA design criteria and safety standards. FAA criteria from FAA AC 150/5300-13A, Airport Design, establishes airport design criteria for the safe, efficient, and unobstructed movement of aircraft while operating on the ground and in the air. Maintenance of MMU is the responsibility of DM. The future
provision of FAA support through grants is largely dependent on the conformance of MMU with FAA design criteria. Therefore, the future economic viability of MMU is linked to the need to meet FAA requirements for safety.

The Proposed Action is intended to enhance safety and preserve the existing capacity and function of MMU in conformance with current FAA design standards. The project is not intended to enhance airfield capacity for aircraft operations.

### 2.2 PURPOSE

The purpose of the Proposed Action is to meet the following objectives in order to comply with FAA safety standards by addressing existing deficiencies in the current infrastructure. These include:

- Maintain the function and utility of the existing runway by rehabilitating the pavement throughout the entire length of Runway 5-23 and conducting lateral safety area improvements along this runway. Also, replacement of runway and taxiway lighting, and other ancillary lighting as a component of the pavement rehabilitation.
- Improve safety and operational efficiency and reduce maintenance costs by stabilizing the glide slope critical area.
- Improve safety and operational efficiency and reduce maintenance costs by replacing the MALSR at the Runway 5 Departure End.
- Improve safety by enhancing the extended Runway Safety Areas consistent with the findings of the FAA 2013 Runway Safety Area Determination for both Runway 5-23 and Runway 13-31.
- Adhere to recently revised taxiway design standards and remove direct apron-to-runway access through the relocation of Taxiway E.
- Provide improved drainage throughout the airfield.

### 2.3 NEED

The need for the project is described in detail below with each element of the project discussed separately.

#### 2.3.1 Runway 5-23 Pavement Rehabilitation

According to field observations and the verification of pavement core samples conducted as part of the Pavement Condition Index Assessment, Runway 5-23 requires immediate or near-future rehabilitation. The Pavement Condition Index Assessment, completed in December 2013 and enclosed in Appendix A calculated an area weighted Pavement Condition Index (PCI) of 56 for Runway 5-23. The critical PCI, defined as the condition level below which preventative maintenance is no longer cost effective, is 70 for Runway 5-23. Rehabilitation is recommended for pavements with a PCI that is below the critical PCI. The Runway 5-23 centerline has been collapsing slowly over the past few years, causing the crowned portion (center of the runway) to sink. This collapse has subsequently resulted in the pooling of water along the runway centerline,
as well as poor ride quality for incoming and outgoing aircraft. The deterioration of the runway pavement is occurring sooner than anticipated, since the asphalt has not yet reached its 20-year useful life. The failures of the pavement are attributed to poor performance of previous pavement overlays performed in 1983 and 1992 and the settling of soils and sediment below the surface.

The structural integrity of runway pavement is crucial to the safe, efficient, and continued operations at any airport. The rehabilitation project for Runway 5-23 is intended to reinforce the reliability of the pavement performance in an effort to avoid possible structural failure. Failure of the pavement would incur significant economic losses due to a stoppage in runway operations, as well as the costs to repair the damage. In addition, failing pavement can result in Foreign Object Debris (FOD) damage to aircraft. The existing footprint of Runway 5-23 would be maintained and no expansion of the length or width of the runway would occur.

2.3.2 Glide Slope Critical Area Stabilization

A glide slope system uses a ground based antenna to transmit a signal that is reflected off of the ground surface in the Glide Slope Critical Area to an aircraft receiver, which indicates the proper path, or slope, of descent for that aircraft as it approaches to land. Essentially, a glide slope provides vertical guidance to a runway end, which is particularly pertinent at night and during times of low visibility. The operability and reliability of this system is crucial to the safe operations of aircraft. Irregular ground surface, snow cover, saturated ground conditions or flooding can all degrade the glide slope signal, compromising the accuracy of the vertical guidance received by approaching aircraft. The occurrences of degraded system performance are most common during foul weather conditions, when the glide slope is needed most.

The glide slope at MMU is frequently placed out of service because the critical area grading does not provide for adequate drainage, therefore, aircraft approach accuracy is compromised. Modifications to the surrounding terrain are necessary to mitigate these conditions and allow for optimal performance of the glide slope at all times.

2.3.3 MALSR Lighting System Replacement

A MALSR is a ground based lighting system that assists pilots in the transition from instrument to visual flight. It consists of a combination of threshold lamps, steady burning light bars and flashers, providing visual information to pilots on runway alignment, height perception and horizontal references.

The existing MALSR lighting system has exceeded its useful life, and the system contains components of various ages and requires excessive maintenance to remain operational. In addition, there are differing ground elevations throughout the length of the system, and in some instances the height tolerances allowed by the FAA have been exceeded. FAA design criteria for the system states that there must be a minimum of three consecutive light bar stations within a sloping segment prior to a change in slope. Only two of the seven sloping segments contain the minimum three light units. The
The purpose of this project element is to replace the MALSR with a new system that meets current FAA design standards, increases system reliability, and reduces the maintenance requirements. This project element would be done in conjunction with FAA Technical Operations Planning and Requirements Group as a target of opportunity. The Planning and Requirements Group would pay for equipment to be installed though an AIP project.

### 2.3.4 Runway 5-23 Runway Safety Area (RSA) Improvements

The RSA is an area surrounding the runway, intended to reduce the risk of damage to an aircraft in the event of a runway excursion. RSA dimensions are dictated by the approach speed and wing span of the critical aircraft using the runway. The 2013 MPU determined that the critical aircraft is the Gulfstream V [C-III Airport Design Group (ADG)]. A standard RSA for C-III ADG is 500 feet wide centered on the runway and extends 1,000 feet beyond the runway ends. According to the FAA, the RSA must be capable, under dry conditions, of allowing for passage by Aircraft Rescue and Firefighting (ARFF) vehicles, snow removal equipment and occasionally by aircraft without causing structural damage. The RSA must be free of hazardous ruts and depressions, graded to prevent ponding of water, and free of objects greater than three inches high. The existing Runway 5-23 Safety Area does not meet these FAA standards due to the presence of the following impediments:

- Streams
- Wetlands
- Deer Grates
- Drainage Culverts
- Columbia Turnpike (off MMU property)
- Non-frangible Localizer
- Non-frangible MALSR
- Improper Grading (ruts, depressions, humps, etc.)

The FAA has a congressionally mandated national priority to improve RSAs at all airports as a result of several incidents in the 1990s involving aircraft excursions from runways. The FAA also recognized that providing standard RSA’s at all airports may be infeasible for operational, cost, environmental, or other reasons and implemented a process to determine the maximum feasible RSA improvement by issuing RSA Determinations. The process for conducting RSA Determinations is described in FAA Order 5200.8. The Runway 5-23 Safety Area has been studied extensively to identify a cost effective approach to improving the RSA given the extensive physical and environmental constraints present at MMU. This project, consisting of grading and drainage improvements as well as the installation of an Engineered Materials Arresting System (EMAS) at the Runway 23 Departure End, is intended to improve safety by bringing the Runway 5-23 RSA into conformance with the RSA Determination issued by the FAA in June 2013.

### 2.3.5 Taxiway E Relocation

The existing Taxiway E (associated with Runway 5-23) needs to be relocated in order to comply with regulatory changes made to taxiway design standards in the revised FAA
AC 150/5300 – 13A. At issue is the direct path the taxiway facilitates for aircraft traveling between the transient apron, located at the fixed based operator (FBO), and Runway 5-23. The FAA requires that such routing be altered in order to limit the occurrence of runway incursions and increase safety. The existing Taxiway E would be reduced in width to become an access road for ARFF and ground vehicles needing to enter the runway. These modifications would bring Taxiway E into compliance with FAA design standards.

### 2.3.6 Drainage System and Outfall Replacement

There are three drainage systems located within the project area. The FAA recommends that the design capacity of surface drainage systems convey a five-year storm event with no encroachment of runoff on taxiway and runway pavements (including paved shoulders). The current drainage system at MMU does not meet these FAA design criteria based upon a recent hydrologic and hydraulic analyses conducted as part of the Feasibility Studies. The systems evaluated include: the closed drainage system under Taxiway A and Runway 5-23 that runs parallel to Runway 13-31 near Taxiway B; and two culverts, a 54 inch corrugated steel pipe (CSP) located 250 feet from the Runway 23 Threshold, and a 54 inch CSP located 990 feet from the Runway 23 Threshold. Both 54 inch CSPs are within the Runway 23 Safety Area. Essentially, replacement would be conducted to improve the overall condition of the drainage system, increase the size of the culverts to augment capacity, and correct adverse drainage grades to ensure water flows away from the airfield.

### 2.3.7 Connector Taxiway and Fillet Construction

Due to the anticipated runway overlay, the taxiways which connect to Runway 5-23 would need to be reconstructed in order to coincide with the effects of the Runway 5-23 rehabilitation project. In addition, the FAA AC 150/5300-13A, *Airport Design*, revised the standards and recommendations for the geometric layout and engineering design of taxiways at civil airports in 2012. Connector taxiways (those that connect parallel Taxiway A to Runway 5-23) that would be modified as a result of the runway rehabilitation, must be reconfigured to conform to the FAA standards.

### 2.3.8 Runway and Taxiway Lighting Rehabilitation and Replacement

As part of the overall Proposed Action various lighting systems need to be rehabilitated and/or replaced. The following is a summary of the need for these actions:

*Runway Edge Lighting*: The current lighting system for Runway 5-23 was last updated in 1992 and is reaching the end of its useful life. Additionally, there is irregular spacing between the lights which does not comply with FAA standards.

*Runway Threshold Lighting*: Similar to the Runway Edge Lighting, these lights are reaching the end of their useful life and irregular spacing does not comply with FAA standards.
Runway Touchdown and Centerline Lighting: Presently, Runway 5-23 does not have centerline or touchdown zone lighting installed. However, the current fleet mix shows several aircraft with approach speeds nearing the speed threshold. Thus, the installation of this lighting system is needed to provide enhanced operational safety for those aircraft flying in low Instrument Flight Rules (IFR) conditions.

Runway Guard Lights: These lights are currently installed at select connector taxiways to Runway 5-23. Expanding this lighting system to include all taxiway connectors to Runway 5-23, enhances airfield safety and assists in mitigating runway incursions.

Taxiway Edge Lighting: New taxiway edge lighting is needed to meet FAA standards and these lights would be installed as part of the runway rehabilitation.

Precision Approach Path Indicator (PAPI): A PAPI system provides vertical guidance to the aircraft approach path. However, the PAPI system indicates the glide slope via a visual system of lights on the ground adjacent to the runway end, as opposed to inside the aircraft. This is particularly beneficial as it forces pilots, especially student pilots, to focus outside of the cockpit rather than fixating on the aircraft instruments inside. It is also advantageous when flying at night and for pilots without an instrument rating. The pilot sees a series of 4 lights that are either red or white. The lights indicate to the pilot if the aircraft is on course, too high, or too low. For example, two red and two white lights indicate the aircraft is on vertical course. Four white lights indicate the aircraft is too high and four red lights indicate the aircraft is too low.

2.3.9 Runway 13-31 Runway Safety Area (RSA) Improvements

The 2013 MPU found that the critical aircraft for Runway 13-31 is a small business jet such as the Cessna Citation (B-II ADG). A standard RSA for B-II ADG is 150 feet wide centered on the runway and extends 300 feet beyond the runway ends. The extended RSA of the Runway 13 Departure End has wetlands and a stream/drainage way located within, while the Runway 31 Departure End RSA is generally wet, contains a drainage ditch, and the area does not meet grading standards. Additionally, the area does not have sufficient strength to support the weight of an aircraft or emergency equipment. Finally, an underground gas pipeline also traverses the RSA at this end. The purpose of this project, which consists of grading and drainage improvements, is to enhance safety by providing a standard RSA for Runway 13-31, in conformance with the RSA Determination issued by FAA in June 2013.

2.4 SUMMARY

MMU serves as a vital asset to the regional economy and provides the region with critical aviation services. The Proposed Action would ensure that Runway 5-23 and associated infrastructure are rehabilitated so that they continue to operate efficiently, reliably, and with reduced maintenance cost. These proposed improvements would also enhance the overall safety at MMU for the users and surrounding communities.
Table 2-1 FAA Design Criteria details each element of the Proposed Action and provides a description of the FAA design criteria that warrants the action.

<table>
<thead>
<tr>
<th>Proposed Project Elements</th>
<th>Description &amp; FAA Design Criteria</th>
</tr>
</thead>
</table>
| Runway 5-23 Rehabilitation | Rehabilitate pavement in-kind/in-place for entire length of Runway 5-23.  
                        | AC 150-5300-13A, Airport Design AC 150/5320-6E, Airport Pavement Design and Evaluation |
| Glide Slope Stabilization | Grading modifications to enable optimal performance of system.  
                        | AC 150-5300-13A, Airport Design |
| MALSR Lighting System Replacement | Install new MALSR system located at Runway 5 Departure End.  
                        | AC 150-5300-13A, Airport Design |
| Runway 5-23 Runway Safety Area (RSA) Improvements | Improve Runway 5-23 Safety Area with an Engineered Materials Arresting System EMAS and grading throughout.  
                        | AC 150-5300-13A, Airport Design and AC 150/5220-22, Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns, FAA Order 5200.8  
                        | FAA RSA Determination |
| Taxiway E Relocation | Relocate existing taxiway to the south.  
                        | AC 150-5300-13A, Airport Design |
| Drainage System and Outfall Replacement | Install new surface and subsurface drainage system and rehabilitate portions of existing system; replace three undersized culverts.  
                        | AC 150/5320-5D, Airport Drainage Design |
| **Connector Taxiway and Fillet Construction** | Taxiways which connect to Runway 5-23 need to be reconstructed due to overall rehabilitation of Runway 5-23.  
AC 150-5300-13A, *Airport Design* |
| **Runway and Taxiway Lighting Rehabilitation and Replacement** | Install new lighting systems and/or repair existing systems. Install Precision Approach Path Indicators (PAPI) on Runway 5-23.  
AC 150-5300-13A, *Airport Design*  
AC 150/5345-42G, *Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories* |
AC 150-5300-13A, *Airport Design* and  
AC 150/5220-22, *Engineered Materials Arresting Systems (EMAS) for Aircraft Overruns, FAA Order 5200.8*  
FAA RSA Determination |