

DESIGN REPORT

FOR

**RUNWAY 9-27 EDGE LIGHTING & SIGNAGE REPLACEMENT
AIP 3-24-0019-071-2023 (DESIGN/CONSTRUCTION)
BID NO. PUR-1635**

PREPARED FOR THE

HAGERSTOWN REGIONAL AIRPORT

HAGERSTOWN, MARYLAND



PREPARED BY



**AIRPORT DESIGN CONSULTANTS, INC.
ELLCOTT CITY, MARYLAND**

BID DOCUMENTS

September 2023

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**DESIGN REPORT
FOR
RUNWAY 9-27 EDGE LIGHTING
AND SIGNAGE REPLACEMENT
HAGERSTOWN REGIONAL AIRPORT
HAGERSTOWN, MARYLAND**

1 Airport Data and Site Information

Hagerstown Regional Airport (HGR) is a non-hub air carrier Airport located in Hagerstown, Washington County, Maryland. The Airport is situated approximately 80 miles west of Baltimore, Maryland and can be easily accessed from Maryland Veterans Memorial Highway (Interstate 81). The Maryland/Pennsylvania state line is approximately 3 miles north of the airport (See **Exhibit 1** in Appendix A for Vicinity Map). HGR was originally built in 1928 by the Kreider-Reisner Aircraft Company, Inc. and is currently owned and operated by Washington County. A graphical depiction of the Airport is shown on the General Project Layout included on Sheet G202 in Appendix A. The Airport is comprised of the following major features:

- HGR has two (2) runways, Runway 9-27 (Primary air carrier runway) and Runway 2-20, and an extensive taxiway system to connect various parts of the airfield with the runways.
- Primary Air Carrier Runway 9-27 is 7,000 (published length) feet long by 150 feet wide. Runway 27 is a precision instrument runway with a 1,400-foot Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR). Runway 9 is a precision instrument runway. Visual aids include 4-box Precision Approach Path Indicators (PAPI) and Navigational Aids (NAVAIDS) include Glideslope and Localizer for both approaches.
- Runway 2-20 is 3,165 feet long by 100 feet wide and is a visual runway.
- Partial length parallel Taxiway F on the south side of Runway 9-27
- Full length parallel Taxiway A on the north side of Runway 9-27.

- Full length parallel Taxiway C on the west side of Runway 2-20.
- Taxiway G (access to conventional hangars on northwest side), Taxiway H (access to Royal and SNC hangars), Taxiway D (terminal apron across Runway 9-27 to Taxiway A), Taxiway M (Runway 20 access to east apron), Taxiway B (east apron to Runway 9-27), Taxiway N and Q (access to SNC hangars).
- Passenger Terminal on the south side of the airfield and the Air Traffic Control Tower on the north side of the airfield.

The Airport serves all aviation markets including general aviation, business, military and commercial service. Scheduled passenger service is offered at HGR by Allegiant Air. The Airport Reference Code is shown as C-III on the current Airport Layout Plan (ALP) and the Design Aircraft is the A321-200. Therefore, Airplane Design Group (ADG) III and Taxiway Design Group (TDG) 3 standards will be utilized following the requirements of Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5300-13B, criteria established in March 2022.

2 Project Description and Background

Runway 9-27 is the Primary Air Carrier Runway at HGR and it is 7000' long by 150' wide, comprised of flexible asphalt pavement. The pavement condition of Runway 9-27 at Hagerstown Regional Airport is excellent (rehabilitated in 2019), this project focuses on replacing the edge lighting and guidance sign systems associated with the runway. The intent is to remove and replace the L-824 cabling within the conduit infrastructure supporting these systems and to install new LED L-861 elevated edge lights and L-858 guidance signs in existing locations. Select signs require updated legends per FAA PART 139 requirements. Correspondence with the FAA and approved Signage and Marking Plan are included in Appendix B. Home run cabling for the affected circuit(s) will travel back to the airfield lighting vault. The new cabling will utilize existing conduit and duct banks, and a new constant current regulator will be installed in the airfield lighting vault. Refer to Section 5 of this report for more information on the scope of work for the project.

3 Data Collection

Airport Design Consultants, Incorporated (ADCI) possesses all available archived as-built drawings for the various construction projects at HGR; therefore, no additional field survey was

conducted as part of this Project. The design team completed an initial field investigation on April 14, 2023 to verify existing conditions.

4 Environmental Considerations

The scope of this project involves pulling cable and installing cable in existing conduit and duct banks and installing runway edge lights on existing bases. A Documented Categorical Exclusion (CATEX) Form was submitted and approved by the FAA Washington Airport District Office (WADO) on March 21, 2023. It was determined by the FAA that the project does not have the characteristics that require a formal NEPA environmental assessment nor does it contain the potential for causing an environmental impact.

5 Electrical Design

5.1 Runway Edge Lighting

The Runway 9-27 lighting system is comprised of incandescent high intensity runway edge and threshold/end lights. The edge light fixtures are FAA Standard L-862 high intensity runway lights (HIRL) with a 30-inch height installed at ten feet away from the defined edge of pavement, except for five instances of L-850C in-pavement runway edge lights at taxiway intersections. The edge lights from Taxiway B to the Runway 27 End were installed during the Runway Extension project in 2006/2007 and are over 16 years old, while the edge lights on the remainder of the runway are over 25 years old. The runway threshold/end lights are L-862E fixtures featuring red/green lights positioned at the runway thresholds. All current light fixtures are quartz incandescent, requiring periodic lamp replacement. Fixtures in grass areas are mounted on L-867 light bases encased in 24" concrete and in-pavement fixtures are affixed to L-868 light bases. All bases are interconnected with 2" PVC conduit that runs back to the airfield lighting vault. The existing layout was evaluated in accordance with the requirements set forth in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5340-30J, Design and Installation Details for Airport Visual Aids, and it was confirmed that the light spacing is within criteria. These lights, as well as certain L-858 airfield guidance signs, are served by a 30 kW Constant Current Regulator (CCR) located within the airfield lighting vault, also over 25 years old. The images below are examples of these fixtures.



Figure 5.1 – Existing Light Fixtures

This project will replace these fixtures with LED equivalent L-862(L), L-862E(L), and L-850C(L) equipment, installed on existing light base infrastructure, including new bolts and seals. In June of 2019 the Federal Aviation Administration (FAA) approved the use of LED fixtures for High Intensity Runway Lights (HIRL) in PGL 19-02. Site investigation shows that these light bases are in fair condition, undamaged by maintenance equipment, and bolts appear to be operated regularly. The existing light base and conduit infrastructure will remain and will be reused. In addition to replacing the fixtures, the L-824 cable, L-823 connectors, L-830 isolation transformers and the L-829 constant current regulator are also being replaced. Electrically, the circuit will be entirely new, achieving insulation resistnace greater than 100 MegaOhms, and will utilize the existing conduit and ductbank infrastructure.

5.2 Airfield Guidance Signs

Existing L-858 airfield guidance signs are a combination of signs manufactured by Lumacurve, ADB and AGM, with the majority being incandescent signs by Lumacurve. Installation dates range from 1999 to 2020. The direction and mandatory signs are Size 1, and the Runway Distance Remaining (RDR) signs are Size 4, and all are on concrete bases. Examples of existing signs and corresponding foundations are below. These signs are installed on concrete foundations with an intergral L-867 light base. Due to varying vintages of installation, there are differences in grounding and tethering options, as well as the legibility of the retrorefelcted sign panels. Examples of existing signs are below.

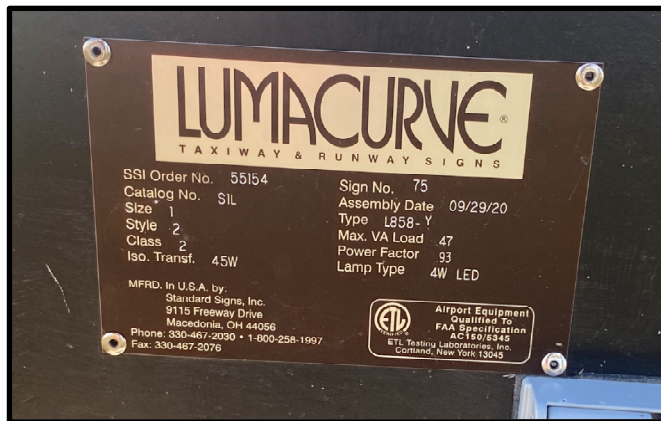




Figure 5.2 – Existing Airfield Signs and Foundations

The recent Part 139 inspection at HGR outlined a recommendation to adhere to FAA advisory circular 150/5340-1 requirements to revise connector taxiway nomenclature to alphanumeric designations. Below is a graphic indicating the re-named taxiways as well as a graphic highlighting the signs impacted by the alphanumeric change

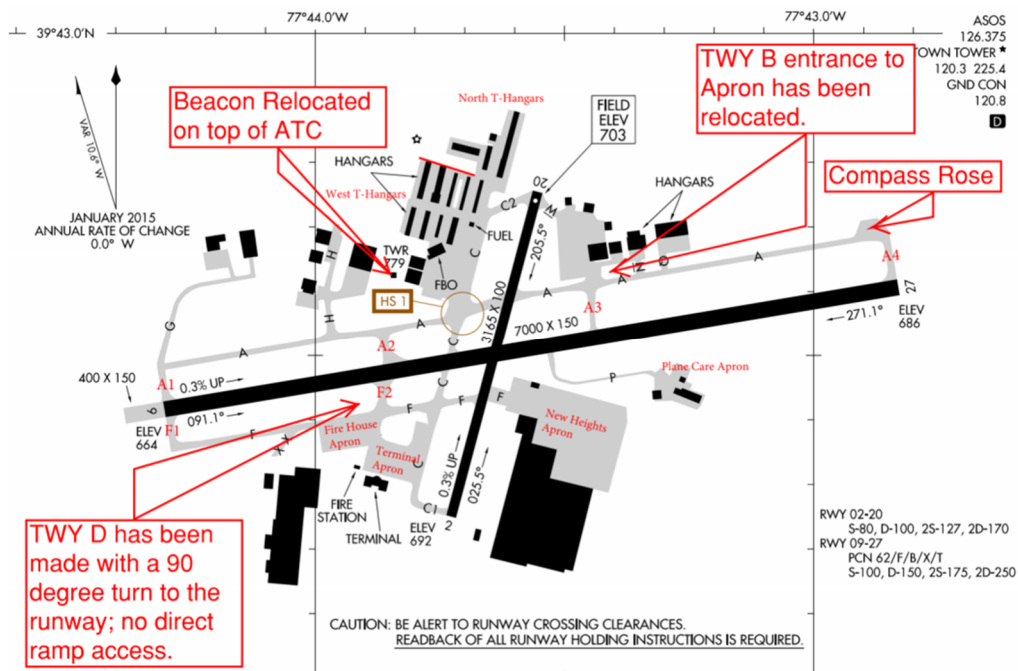


Figure 5.3 – Airfield Updates with New Taxiway Names



Figure 5.4 –Signs Impacted from Taxiway Name Changes

This project will be replacing the airfield guidance signs associated with Runway 9-27, as well as select adjacent signs that require new sign messages. Most of these signs are past their design life, but newer signs will be targeted for reuse or relocation. The highlighted signs above are identified to be addressed in terms of alphanumeric identification. Those within the Taxiway F footprint (plan south parallel taxiway) have already been addressed on a previous project.

Additionally, the remaining taxiway connector or runway connector signs to Runway 9-27, from hold position inward, are also identified for replacement due to their age and condition. In total, the Runway 9-27 Signage Replacement identifies 46 signs impacted as part of this Project.

The signs installed in 2020 are still under manufacturer’s warranty, so they will receive a new message panel while all other signs will be replaced entirely. Where sign panels must be lengthened to accommodate the new alphanumeric message, the foundation will be expanded via a 12-inch diameter concrete pier, to support the new sign frangible coupling and support leg. Where grounding of the sign does not currently exist, ground rods and grounding bushings will be installed. Similar to the edge light system, the L-824 cable, L-823 connectors and L-830 isolation transformers will all be replaced. All signs that are associated with Runway 9-27 are currently served by the runway edge light circuit and will therefore be served by a new constant current regulator. Adjacent signs being replaced will feature new circuitry to the nearest hand hole or demarcation point.

5.3 Initial Site Investigation

Representatives from ADCI completed a field investigation on April 14th, 2023. Record drawings were reviewed in the field and compared against current conditions. This project does not anticipate any underground conduit installation, or any pavement repair, so the purpose of the

investigation was to verify existing conditions and confirm the extent of replacement.



Figure 5.5 – Runway Distance Remaining Sign & Airfield Directional Sign

5.4 Applicable Standards and Records

This project is designed in accordance with applicable FAA standards, sound engineering judgement, and generally accepted codes, standards, and practices. The FAA standards used for this particular project are found in the table below.

Table 5.1 – Standard Numbers, Descriptions, and Dates

STANDARD NUMBER	DESCRIPTION	DATE
AC 150/5300-13B	<i>Airport Design</i>	03/30/2022
AC 150/5340-18G	<i>Standards for Airport Sign Systems</i>	05/09/2019
AC 150/5370-10H	<i>Standard Specifications for Construction of Airports</i>	12/20/2018
AC 150/5340-30J	<i>Design and Installation Details for Airport Visual Aids</i>	02/11/2018
AC 150/5370-2G	<i>Operational Safety on Airports During Construction</i>	12/12/2017
AC 150/5345-42J	<i>Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories</i>	09/11/2019

AC 150/5345-53D	<i>Airport Lighting Equipment Certification Program</i>	09/25/2012
FAA-E-2013E	<i>Cable, Electrical Power, Exterior 600V Volts</i>	11/2012
FAA-C-1217H	<i>Electrical Work, Premises Wiring</i>	11/5/2018
FAA-C-1391E	<i>Installation, Termination, Splicing, and Transient/ Surge Protection of Underground Electrical Distribution System Power Cables</i>	5/2019
FAA-STD-019F	<i>Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Electronic Equipment</i>	7/14/2020
FAA – EB 67	<i>Light Sources other than Incandescent and Xenon</i>	

ADCI reviewed as-built documents of the following projects. These drawings, in addition to topographic and subsurface site survey, provided baseline data for existing conditions.

- Runway 9-27 Rehabilitation Package 4
- Runway 2-20 Rehabilitation
- Taxiway C Rehabilitation

5.5 FAA Navigational Aids (NAVAID)

Runway 9-27 is supported by instrument landing systems (ILS) on both runway ends and both approaches feature precision approach path indicators (PAPIs). Runway 27 also utilizes a medium intensity approach light system (MALSR). ADCI held a meeting to discuss the construction durations and activities with the Martinsburg SSC to determine protocols for construction on July 5th. The following was agreed upon at the meeting:

- Runway Closures – anticipated that the runway closure will occur Monday through Friday from 9pm to 6am for 11 nights.
- Project Timeline – anticipate a grant this year with contract award in the September/October 2023 timeframe. Due to long lead items, a Construction Notice To Proceed (NTP) is not anticipated until the Spring/Summer of 2024.
- ADCI will complete the Strategic Event Form for the Project. We are awaiting feedback from the FAA ADO on the Construction Safety and Phasing Plans (CSPP) that has been submitted for their review.
- ADCI inquired if a Reimbursable Agreement (RA) would be required for this Project given the limited closures. FAA advised that under their current Fatigue MOA, they are required to have 9 hours off between each shift and the shifts are limited to 14 hours with 12 hours preferred. FAA advised that as long as we can provide them with two months

advance notice, they can adjust their schedules accordingly to avoid overtime and the requirements for an RA.

- ADCI advised that they would coordinate with the successful contractor and get a construction schedule that identifies the runway closure dates and would pass that on to them at a minimum two months prior to the closures to avoid the need for an RA.

5.6 Electrical and Communication

The Runway 9-27 airfield ground lighting circuit serves the edge light and taxi guidance sign systems associated with the runway. The L-823 cables extend from the constant current regulators in the airfield lighting vault to the edge light infrastructure at Runway 9-27. During construction, portions of the cabling system will be removed and replaced during each work shift, which will occur during nightly closures. Since there is no pavement scope within this project, it is possible to energize the lighting and sign systems each day and daytime air operations will be unimpeded. As lighting and sign replacements are installed along the runway, there will be a combination of new and existing equipment in operation. The final condition will feature new light fixtures, signs, isolation transformers, connectors and cable, and CCR, utilizing existing conduit, light bases, structures, and sign foundations.

5.7 Airport Approach Procedures and Flight Checks

All instrument approach procedures, threshold locations, threshold crossing heights and glide angles will remain the same as part of this project. No coordination with the FAA Flight Procedures and Airspace Group will be required.

6 Phasing

The project is currently divided into three (3) work areas and two (2) sub-work areas. Work Area 1 will involve work starting at the Runway 9 End and continue to the RSA of Runway 2-20. Work Area 1 includes a more restrictive Work Area 1A comprised of work within the Runway 9-27 RSA. Work Area 2 will consist of work within the Runway 2-20 RSA, and Work Area 3 will begin at the RSA of Runway 2-20 and continue to the Runway 27 End. Similar to Work Area 1, Work Area 3 includes a more restrictive Work Area 3A comprised of work within the Runway 9-27 RSA. See the General Project Layout Sheet G202, included in Appendix A, for graphical depiction of the Phasing Limits.

The contractor will access the site via Gate No. 130 located west of the terminal and utilize the staging/stockpile area as shown on the Construction Safety and Phasing Plans for both Work Areas

1 and 2. The contractor will access Work Area 3 via Gate No. 460 located off Jarkey Drive and utilize a staging/stockpile area adjacent to the gate as shown on the plans. The proposed AOA access gates and staging/stockpile areas are to be confirmed by the Airport.

Work within the RSA will be constructed as night work and work hours are anticipated to be 9:00PM to 6:00AM. Work outside the RSA will be constructed as day work and on a pull-back basis for any work in a TSA. The work hours may be changed at the Airport's discretion to accommodate commercial flight service. For Work Areas 1A, 2, and 3A, Runway 9-27 will be closed nightly and reopened each day at the end of the working shift. The nightly closures of Runway 9-27 will be restricted to a total of ten (10) nights. Work Area 2 will close both Runway 9-27 and Runway 2-20 for one (1) night.

The construction duration is located in Section 10 of this report.

7 Design/Bid Schedule

Design Schedule:

Preliminary Design (30%) Submittal (Includes Plans, Specifications, Design Report and Cost Estimate)	May 2023
Pre-Final Design (90%) Submittal (Includes Plans, Specifications, Design Report and Cost Estimate)	June 2023
Construction Safety and Phasing Plan (CSPP)/7460	June 2023
Final Design/Bid Documents Complete	July 2023
Bid Advertisement	September 2023
Bids Due	September 2023
Contract Start (ANTP) (Order Materials)	November 2023
Construction Start (CNTTP)	April 2024

8 Construction Costs

The engineer's construction cost estimate has been developed based on engineering judgment and costs from recent FAA construction projects. The current engineer's cost estimate is included in Appendix C. The construction cost is currently estimated at **\$787,775** and the program cost is estimated at \$1.04M.

9 AIP Eligible Costs

All proposed work in this project meets AIP eligibility requirements.

10 Construction Duration and Liquidated Damages

The construction duration for this project is anticipated to be 60 consecutive calendar days from the Construction Notice to Proceed (CNTN). The contract will begin at the Administrative Notice to Proceed (ANTN) to provide the contractor time to order and receive materials.

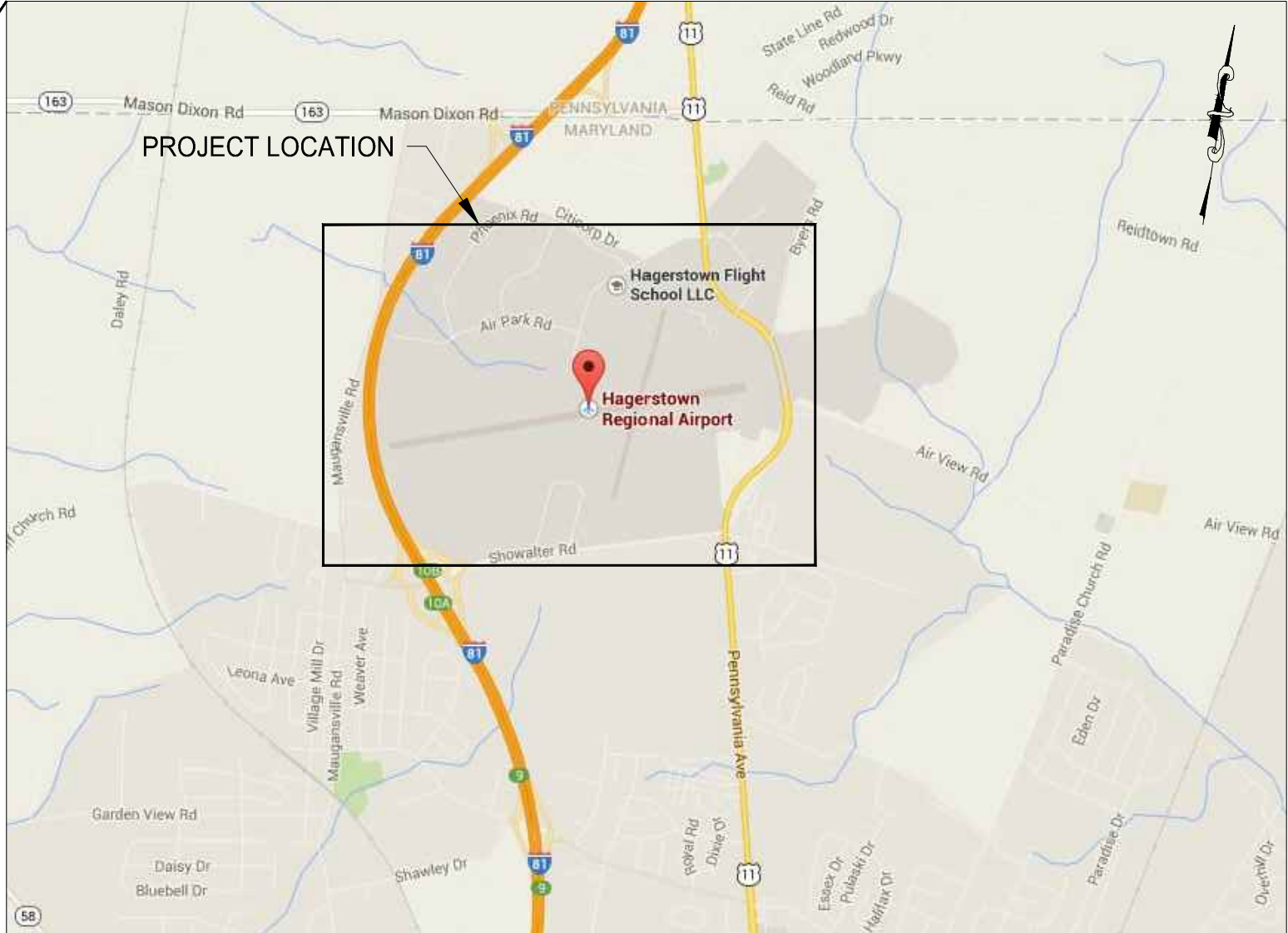
Liquidated Damages for the overall completion of the project will be \$2,500 per day/part of day. Liquidated Damages for the Runway Opening will be \$2,500 per 15 minutes/part of 15 minutes.

APPENDIX A
EXHIBITS

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VICINITY MAP
N.T.S



LOCATION MAP
N.T.S



DESIGNED: G.F.R.
DRAWN: N.B. / S.S.
CHECKED: B.C. / K.M.F.
APPROVED: M.S.K.

REVISION No.	REVISION DATE	DESCRIPTION



PROJECT TITLE: RUNWAY 9-27 EDGE LIGHTING AND SIGNAGE REPLACEMENT		FAA AIP No.:
SHEET TITLE: VICINITY MAP		SHEET No.:
SCALE: AS SHOWN	DATE: SEPTEMBER 2023	EX-1

APPENDIX B
FAA CORRESPONDENCE AND
APPROVED SIGNAGE AND MARKING PLAN

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U.S. Department
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**Federal Aviation
Administration**

Eastern Region, Airports Division

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August 21, 2023

Mr. Neil R. Doran
Airport Director
Hagerstown Regional Airport
18434 Showalter Road Hagerstown,
Maryland 21742

(240) 313-2764

**HGR - Hagerstown Regional Airport
Hagerstown, Maryland**

Airport Certification Manual – Signage and Marking Plan

Dear Mr. Doran:

The enclosed revised signage and marking plan for Hagerstown Regional Airport was approved on 08/21/2023. Please discard the superseded signage and marking plan drawings, previously approved on 08/16/2022.

If there are any questions regarding the drawings, please call me at (718) 553-3091.

Sincerely,

Ward Hoekstra
Airport Certification Safety Inspector
Safety & Standards Branch
Airports Division

cc: WASADO
File

APPENDIX C
ENGINEER'S ESTIMATE

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RUNWAY 9-27 EDGE LIGHTING AND SIGNAGE REPLACEMENT
Hagerstown Regional Airport (HGR)
Program Cost Estimate - Bid Documents
AIP 3-36-0046-071-2023 (DESIGN/CONSTRUCTION)

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL	
L-100-5.1	SITE LOCATING AND DUCT TRACING	ALLOW	1	\$ 20,000.00	\$ 20,000.00	
L-108-5.1	1-1/C NO. 8 AWG, 5KV, L-824C CABLE IN CONDUIT, INSTALLED COMPLETE IN PLACE	LF	28,500	\$ 4.00	\$ 114,000.00	
L-108-5.2	DEMOLITON OF CABLE IN CONDUIT, CONDUIT TO REMAIN, PER CONDUIT LENGTH	LF	28,500	\$ 1.50	\$ 42,750.00	
L-109-7.1	REMOVE 30KW CONSTANT CURRENT REGULATOR AND ASSOCIATED EQUIPMENT AND INSTALL 20KW, 5-STEP, 240V, L-829 CONSTANT CURRENT REGULATOR AND ALL ASSOCIATED INCOMING POWER AND COMMUNICATION APPURTENANCES	EA	1	\$ 25,000.00	\$ 25,000.00	
L-125-5.1	L-862(L) RUNWAY ELEVATED EDGE LIGHT FIXTURE ON EXISTING LIGHT BASE, WITH TRANSFORMER AND ACCESSORIES, INSTALLED COMPLETE IN PLACE	EA	64	\$ 2,000.00	\$ 128,000.00	
L-125-5.2	L-862E(L) RUNWAY THRESHOLD/END LIGHT ON EXISTING LIGHT BASE, WITH TRANSFORMER AND ACCESSORIES, INSTALLED COMPLETE IN PLACE	EA	16	\$ 2,000.00	\$ 32,000.00	
L-125-5.3	L-850C(L) RUNWAY IN-PAVEMENT EDGE LIGHT FIXTURE ON EXISTING LIGHT BASE , WITH TRANSFORMER AND ACCESSORIES, INSTALLED COMPLETE IN PLACE	EA	5	\$ 2,500.00	\$ 12,500.00	
L-125-5.4	1 MODULE - SIZE 1, STYLE 3, CLASS 1, MODE 2, L-858(L) AIRFIELD GUIDANCE SIGN ON EXISTING FOUNDATION, WITH TRANSFORMER AND ACCESSORIES, INSTALLED, COMPLETE IN PLACE	EA	10	\$ 4,000.00	\$ 40,000.00	
L-125-5.5	2 MODULE - SIZE 1, STYLE 3, CLASS 1, MODE 2, L-858(L) AIRFIELD GUIDANCE SIGN ON EXISTING FOUNDATION, WITH TRANSFORMER AND ACCESSORIES, INSTALLED, COMPLETE IN PLACE	EA	15	\$ 5,000.00	\$ 75,000.00	
L-125-5.6	3 MODULE - SIZE 1, STYLE 3, CLASS 1, MODE 2, L-858(L) AIRFIELD GUIDANCE SIGN ON EXISTING FOUNDATION, WITH TRANSFORMER AND ACCESSORIES, INSTALLED, COMPLETE IN PLACE	EA	11	\$ 6,100.00	\$ 67,100.00	
L-125-5.7	4 MODULE - SIZE 1, STYLE 3, CLASS 1, MODE 2, L-858(L) AIRFIELD GUIDANCE SIGN ON EXISTING FOUNDATION, WITH TRANSFORMER AND ACCESSORIES, INSTALLED, COMPLETE IN PLACE	EA	2	\$ 7,200.00	\$ 14,400.00	
L-125-5.8	1 MODULE - SIZE 4, STYLE 3, CLASS 1, MODE 2, L-858(L) AIRFIELD GUIDANCE SIGN ON EXISTING FOUNDATION, WITH TRANSFORMER AND ACCESSORIES, INSTALLED, COMPLETE IN PLACE	EA	6	\$ 6,500.00	\$ 39,000.00	
L-125-5.9	RELOCATE 2 MODULE L-858(L) AIRFIELD GUIDANCE SIGN ON EXISTING FOUNDATION, FURNISH AND INSTALL TRANSFORMER AND ACCESSORIES, INSTALLED, COMPLETE IN PLACE	EA	2	\$ 900.00	\$ 1,800.00	
L-125-5.10	REMOVE AND REPLACE ALL EXISTING SIGN PANELS WITHIN EXISTING SIGN HOUSING	EA	4	\$ 850.00	\$ 3,400.00	
L-125-5.11	INSTALL 12" DIAMETER 36" DEEP REINFORCED CONCRETE PIER FOR SIGN FOUNDATION EXTENSION AND 6" DEEP WASHED STONE MAINTENANCE PAD, COMPLETE IN PLACE	EA	10	\$ 1,350.00	\$ 13,500.00	
L-125-5.12	REMOVE AIRFIELD GUIDANCE SIGN, DEMOLISH TRANSFORMER AND ACCESSORIES, FOUNDATION TO REMAIN	EA	46	\$ 1,000.00	\$ 46,000.00	
L-125-5.13	REMOVE LIGHT FIXTURE, DEMOLISH TRANSFORMER AND ACCESSORIES	EA	85	\$ 225.00	\$ 19,125.00	
L-125-5.14	TEMPORARY AIRFIELD LIGHTING DURING CONSTRUCTION	ALLOW	1	\$ 7,000.00	\$ 7,000.00	
					\$700,575.00	
				Design Contingency	0%	\$0.00
Subtotal B =					\$700,575.00	
				Maintenance and Protection of Traffic and CSPP (M-100-4.1)	5%	\$35,000.00
Subtotal C =					\$735,575.00	
				Project Survey and Stakeout (M-150-5.1)	2%	\$14,700.00
Subtotal D =					\$750,275.00	
				Mobilization (C-105-6.1)	5%	\$37,500.00
Subtotal E (TOTAL CONSTRUCTION COST) =					\$787,775.00	
					Design Phase	\$107,180.00
					CA Phase	\$131,720.00
					IFE Cost	\$2,250.00
					Admin Costs	\$10,000.00
PROGRAM COST TOTAL =					\$1,038,925.00	
					SAY =	\$1,039,000.00
				FAA	90%	\$935,100.00
				MD State	5%	\$51,950.00
				Local	5%	\$51,950.00