

ADDENDUM NO. 01

to

CONTRACT DOCUMENTS

SYRACUSE HANCOCK INTERNATIONAL AIRPORT

SYRACUSE, NEW YORK

RECONFIGURE TAXIWAYS C, F, B, E, AND G

**FAA AIP NO. 3-36-0114-144-2016 (D)
FAA AIP NO. 3-36-0114-XXX-2018 (C)**

M-J PROJECT NO.: 18180.04

June 6, 2018

SYRACUSE HANCOCK INTERNATIONAL AIRPORT
RECONFIGURE TAXIWAYS C, F, B, E, AND G

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**ADDENDUM NO. 01
June 6, 2018**

1. INSTRUCTIONS TO ALL HOLDERS OF CONTRACT DOCUMENTS

Your attention is directed to the following interpretations of changes in and additions to the Contract Documents for the construction of the RECONFIGURE TAXIWAYS C, F, B, E, AND G project at the Syracuse Hancock International Airport.

Please indicate receipt of this addendum (including date) on page 300-5 of the Form of Proposal documents.

**Syracuse Hancock International Airport
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2. MINUTES OF PRE-BID CONFERENCE

Pre-Bid Meeting Minutes and Sign-In Sheet have been attached to this Addendum.

**Syracuse Hancock International Airport
Reconfigure Taxiways C, F, B, E, and G
Addendum No. 01**

3. REVISIONS/CLARIFICATIONS TO CONTRACT SPECIFICATIONS

SPECIFICATIONS

Note: Changes to the Contract Specifications are identified with red underlined text.

1. SECTION 10 ADVERTISEMENT AND NOTICE TO CONTRACTORS – Replace with attached.
 - a. Revised Bid Opening to Wednesday June 13, 2018.
2. SECTION 100 INSTRUCTIONS TO BIDDERS – Replace with attached.
 - a. 100-01 BID DATE – Revised Bid Opening to Wednesday June 13, 2018.
 - b. 100-01 (A) DISADVANTAGED BUSINESS ENTERPRISE (DBE) STATEMENT – Revised DBE contract goal to 6.7 percent.
3. SECTION 900 ADDITIONAL FEDERAL REQUIREMENTS – Replace with attached.
 - a. 900-10 (H) Failure to Complete on Time – Revised liquidated damage clause. Phase 1 and Phase 3 shall have liquidated damages in the amount of \$10,000 per calendar day or portion thereof in which work remains incomplete. Phase 2 shall have liquidated damages in the amount of \$2,500 per calendar day or portion thereof in which work remains incomplete.
 - b. 900-15 SPECIFIC AIRPORT OPERATION REQUIREMENTS (B) Work Areas – Clarified that the removal of the temporary markings, the retroreflective edge markers, and restoration of the runway markings at the end of Phase 1 shall take place in a 12-hour period prior to re-opening Runway 10-28.
4. P-152 EXCAVATION AND EMBANKMENT – Replace with attached.
 - a. 152-2.2 (e) Compaction Requirements – Clarified compaction requirements for subgrade.
 - b. 152-2.6 FORMATION OF EMBANKMENTS – Clarified compaction requirements for embankment.
5. P-401 HOT MIX ASPHALT (HMA) PAVEMENTS – Replace with attached.
 - a. 401-8.2 PAYMENT (a) – Corrected reference to Table 401-8 PRICE ADJUSTMENT SCHEDULE.
6. L-109 INSTALLATION OF AIRPORT ELECTRICAL BUILDING EQUIPMENT – Replace with attached.
 - a. 109-5.1 BASIS OF PAYMENT – Corrected Item L-109-1 to 20kW CCR. Corrected Item L-109-2 to 15kW CCR.

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7. L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS
– Replace with attached.
 - a. 110-2.6 CONCRETE – Revised minimum 28-day compressive strength to 3,500 psi.

8. L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS – Replace with attached.
 - a. 125-2.11 CONCRETE – Revised concrete requirements to reference P-610 Structural Portland Cement Concrete.

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4. REVISIONS/CLARIFICATIONS TO CONTRACT DRAWINGS

1. Replace the following revised sheets with attached:
 - a. IN-01 SHEET INDEX AND QUANTITY TABLES
 - i. Revised Base Bid Quantity Table.
 - b. CS-01 CONSTRUCTION SAFETY & PHASING PLAN (SHEET 1 OF 4)
 - i. Added note to clarify location of milling stockpile. Stockpile is located outside of the airport security fence and will require a gate guard during hauling operations.
 - c. CS-02 CONSTRUCTION SAFETY & PHASING PLAN (SHEET 2 OF 4)
 - i. Added note to clarify location of milling stockpile. Stockpile is located outside of the airport security fence and will require a gate guard during hauling operations.
 - d. CS-03 CONSTRUCTION SAFETY & PHASING PLAN (SHEET 3 OF 4)
 - i. Added note to clarify location of milling stockpile. Stockpile is located outside of the airport security fence and will require a gate guard during hauling operations.
 - e. TS-02 TYPICAL SECTIONS – 2
 - i. Added detail for Undercut Excavation and Backfill.
 - f. GR-01 GRADING & DRAINAGE PLAN (SHEET 1 OF 4)
 - i. Added existing contour labels.
 - g. GR-02 GRADING & DRAINAGE PLAN (SHEET 2 OF 4)
 - i. Added existing contour labels.
 - h. GR-03 GRADING & DRAINAGE PLAN (SHEET 3 OF 4)
 - i. Added existing contour labels.
 - i. GR-04 GRADING & DRAINAGE PLAN (SHEET 4 OF 4)
 - i. Added existing contour labels.
 - j. EC-01 EROSION & SEDIMENT CONTROL PLAN (SHEET 1 OF 4)
 - i. Added existing contour labels.
 - k. EC-02 EROSION & SEDIMENT CONTROL PLAN (SHEET 2 OF 4)

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- i. Added existing contour labels.
 - l. EC-03 EROSION & SEDIMENT CONTROL PLAN (SHEET 3 OF 4)
 - i. Added existing contour labels.
 - m. EC-04 EROSION & SEDIMENT CONTROL PLAN (SHEET 4 OF 4)
 - i. Added existing contour labels.
- 2. Add the following sheets (Attached):
 - a. CS-04 CONSTRUCTION SAFETY & PHASING PLAN (SHEET 4 OF 4)
 - i. Added new 12-hr duration work area to install/remove temporary markings, interim retroreflective markers, low-profile barricades, lighted X's, and make modifications to airfield lighting circuits for the Phase 1 Runway 10-28 closure.

**Syracuse Hancock International Airport
Reconfigure Taxiways C, F, B, E, and G
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5. ATTACHMENTS

1. Pre-Bid Meeting Minutes and Sign In Sheet
2. Page 10-1 Advertisement and Notice to Contractors
3. Page 100-1 Instructions to Bidders
4. Page 900-48 Additional Federal Requirements
5. Pages 900-78 to 900-79 Additional Federal Requirements
6. Specification Item P-152 Excavation and Embankment
7. Specification Item P-401 Hot Mix Asphalt (HMA) Pavements
8. Specification L-109 Installation of Airport Electrical Building Equipment
9. Specification L-110 Airport Underground Electrical Duct Banks and Conduit
10. Specification L-125 Installation of Airport Lighting Systems
11. Drawing IN-01 Sheet Index and Quantity Table
12. Drawing CS-01 Construction Safety & Phasing Plan (Sheet 1 of 4)
13. Drawing CS-02 Construction Safety & Phasing Plan (Sheet 2 of 4)
14. Drawing CS-03 Construction Safety & Phasing Plan (Sheet 3 of 4)
15. Drawing CS-04 Construction Safety & Phasing Plan (Sheet 4 of 4)
16. TS-02 Typical Sections – 2
17. GR-01 Grading & Drainage Plan (Sheet 1 of 4)
18. GR-02 Grading & Drainage Plan (Sheet 2 of 4)
19. GR-03 Grading & Drainage Plan (Sheet 3 of 4)
20. GR-04 Grading & Drainage Plan (Sheet 4 of 4)
21. EC-01 Erosion & Sediment Control Plan (Sheet 1 of 4)
22. EC-02 Erosion & Sediment Control Plan (Sheet 2 of 4)
23. EC-03 Erosion & Sediment Control Plan (Sheet 3 of 4)
24. EC-04 Erosion & Sediment Control Plan (Sheet 4 of 4)

**Syracuse Hancock International Airport
Reconfigure Taxiways C, F, B, E, and G
Project Pre-Bid Meeting Minutes – May 30, 2018 (10:00 A.M.)**

I. Sign-in Sheet:

See attached meeting sign-in sheet.

II. Project Description:

The project has been divided into a Base Bid and Add Alt I to maximize use of available funding. A general description of the major work associated with each bid alternative is as follows:

- Base Bid:
 - Demolish existing connecting Taxiways C, F, B, and E
 - Construct new connecting Taxiways W and U – approximately 350 feet each
 - Demolish existing South GA Apron access Taxiway G
 - Construct new South GA Apron access Taxiways H2 and H3 – approximately 60 feet each
 - Re-designate existing Taxiway G (north) to Taxiway Z
 - Excavation
 - Embankment
 - Drainage pipe and underdrain installation
 - Install geotextile fabric
 - Construct 23-inches of P-209 Crushed Aggregate Base Course
 - Construct 8-inches of P-401 Binder Course
 - Construct 5-inches of P-401 Surface Course
 - Installing new elevated taxiway edge lights, elevated/in-pavement runway edge lights, and elevated runway guard lights
 - Installing new light conduit and cable
 - Install new in-pavement temperature sensor including associated cabling
 - Installing new electrical manholes
 - Installing new electric duct banks
 - Installing new airfield guidance signs
 - Upgrade and replace existing constant current regulators (CCRs) for noted circuits
 - Permanent pavement markings including preformed thermoplastic surface painted hold signs
 - Permanent topsoil and seed

- Add Alt 1:
 - Mill existing Taxiway M – 3” depth
 - Perform pavement repairs on milled surface
 - Construct 3-inches of P-401 Surface Course
 - Permanent pavement markings



III. Relationships

- A. **The Owner:** Syracuse Regional Airport Authority
B. **Grant Agencies:** Federal Aviation Administration
New York State Department of Transportation
C. **Engineer:** McFarland-Johnson, Inc.
D. **Contractor:** to be awarded as a single contract with Syracuse Regional Airport Authority

IV. Items included in the Bid

The contract bid items include in general:

A. **Maintenance and Protection of Traffic:**

1. In order to enhance safety during construction and minimize impacts on Airport operations caused by construction, the project has been divided into three (3) phases:
 - a. Phase 1 (Base Bid) – Demolish Taxiways C, F, B, and E/Construct Taxiways W and U
 - Work Area ‘A’ – 45 Calendar Days (Runway 10/28 Closure)
 - Entrance through Gate 108 (cargo) with construction access crossing only closed pavements
 - Access route must be delineated utilizing colored traffic cones
 - South half of Runway 10-28 will be utilized by taxiing aircraft
 - b. Phase 2 (Base Bid) – Construct Taxiways H2 and H3 / Demolish Taxiway G (Access to South GA Apron)
 - Work Area ‘B’ – 25 Calendar Days
 - Work Area ‘C’ – 5 Calendar Days
 - Access will be through Gate 125 off Malden Road
 - Apron will remain active during the entire work period
 - c. Phase 3 (Add Alt 1) – Taxiway ‘M’ Rehabilitation
 - Work Area ‘E’ – Friday 6:00pm-Saturday 6:00pm (Mill/Pavement Repairs/Pave), Sunday 8:00am-Sunday 6:00pm (Painting) : 5 Calendar Days provided in the contract
 - Access via Taxiway A through Gate 108 (cargo)
2. Liquidated damage clauses have been included for work beyond the completion times of individual phases and are as follows:
 - Phase 1 \$10,000 per Calendar Day or portion thereof



for incomplete work items beyond 45 Calendar Days

- Phase 2 \$2,500 per Calendar Day or portion thereof for incomplete work items beyond 30 Calendar days.
- Phase 3 \$10,000 per Calendar Day or portion thereof for incomplete work items beyond closure hours indicated.

3. All vehicles operating on the airport shall be appropriately marked including a 3' x 3' orange and white checkered flag during the day, and amber rotating beacons at night. All vehicles shall be staged / stored in the designated work area or staging area.

B. Pavements:

- The airfield bituminous pavements items are FAA P-401 mix. Bituminous pavement acceptance criteria includes plant testing and compaction after placement with an quality based payment factor. Any bonus tons earned may be applied against days where payment is less than 100%, but in no case shall the aggregate payment exceed 100% of the tonnage placed.
- The pavement base course is an FAA P-209 crushed aggregate base course. The base course testing requirement include hydrometer testing.
- There are no asphalt or fuel cost escalation clauses included in the contract, per federal requirements.

C. Project Survey and Stakeout:

- All work must be performed under the direction of a New York State licensed surveyor.
- Contractor should review Item M-150 in the specifications to become familiar with acceptable survey methods.

D. Excavation and Embankment:

- The contractor should familiarize themselves with the compaction requirements within Item P-152 and P-209.
- Unclassified excavation includes stripping of topsoil.

E. Lighting and Signage Improvements:

- This project includes installation of the following electrical items:
 - Elevated taxiway edge lights, elevated and inset runway edge lights, and outboard, elevated runway guard lights
 - Size 1 and Size 3 Airfield guidance signs
 - In-pavement surface temperature sensor and associated cable
 - Constant current regulators in the electrical vault building

F. Pavement Markings:

- Includes the following items:
 - Temporary runway and taxiway markings for Phase 1 work
 - Permanent runway and taxiway markings
 - Preformed thermoplastic holding position sign markings

G. Contractor's Schedule:

- The project is scheduled such that construction will start in the Spring of 2019. It is anticipated that Phase I will begin in mid-May. Phase II and Phase III (if awarded) will follow the completion of Phase I, and will run consecutively.
- As per Section 100-04 of the Contract Specifications, Contractor shall provide a construction schedule for all work activities. This schedule shall be submitted to the Engineer for review during the Pre-Construction meeting. The schedule shall be maintained throughout the project to the satisfaction of the Engineer.

H. General Requirements:

- Cleanup of airfield pavements and haul routes is critical on an active airfield and should receive appropriate attention in the bidding process.
- It is anticipated that groundwater control will be required for the placement of deeper items such as piping, duct banks, and manhole/catch basing structures. The contractor shall include groundwater control considerations in their bids.
- Stored materials will be reimbursed by the Owner, however the contractor shall meet the requirements for the stored material payment including paid receipts for the item, it needs to be stored on site in a secured location and protected.
- There are a considerable number of airfield lighting circuits within the Phase I and II work areas. Cables servicing active circuits shall be required to remain in service to the greatest extent practicable. This includes the requirement that these services be returned to service during all hours of darkness or poor visibility. Splicing of new circuits into existing circuits will be coordinated through the engineer and airport operations.

V. Additional Considerations/Topics –

A. Airport Access

- Gates: The contractor shall coordinate all ingress and egress locations and/or access with Airport Operations and the Resident Engineer
- Badging: Employees and Subcontractors working within the AOA will be issued a security badge by the Authority. Lost badges will result in a fine of \$1000 per badge if they are not returned to the airport. The contractor shall

also be required to provide a list of vehicles that will require access to the construction site. All vehicles are subject to search.

- Haul Routes: During hauling operations, the contractor shall be restricted to the haul routes shown on plans. The current phasing program does not require the contractor to cross any active airfield pavements with the exception of the initial closure of Runway 10-28, the modification of the signage on Taxiway G north, and the stockpiling of millings. The initial closure of Runway 10-28, the reopening of Runway 10-28, and the redesignation of Taxiway G north will require an escort from Airport Operations. The hauling of millings will require flaggers at the crossing points of the active airfield pavements.
- Millings: Pavement millings are the property of the airport and will be deposited at the location shown on the plans.
- Spoils: Excess spoil material from earthwork operations shall be hauled off site.

B. General Requirements for review

- Bonding and Insurance – the Contractor is directed to review the requirements for insurance and bonding.
- Prevailing Wages – both State and Federal wage rate schedules are included in the contract documents as both Federal and State funding has been included in the project. The contractor shall be required to pay the higher of the two schedules.
- DBE Goal – 6.7% (to be modified to this number in addendum No. 01). Linda Ryan from the Airport Authority reviewed the required paperwork included in the contract for DBE participation and reporting. The paperwork is included in Section 200, Appendix C of the Contract Documents.
- Prime bidders are required to submit a list for the prime and all subcontractor's that lists the firm's name, address, whether or not the firm is a certified DBE firm, age of firm, and annual gross receipts with bids.
- William Verfuss, wverfuss@mjinc.com (MJ) – Design Interpretations
- Quality Control Plans: the contractor should note that they are required to submit a project quality control plan per Section 100 of the specifications. In general, the Contractor is to provide quality control testing during construction in order to control their operations, and the Engineer shall provide quality assurance testing for acceptance purposes.
- Proposal Submission: All bidders shall submit an original and one (1) copy of all required documents. Copied documents shall be clearly marked "COPY" and bound as a complete set.

C. Addendum Items

- Pre-bid meeting minutes will be submitted as an addendum
- DBE Goal modified to 6.7%
- Bid Opening will be delayed one day to Wednesday June 13th, 2018 at 1:00 pm.



VI. Open Discussion

1. Contractor Question: Is there water available on the site and is the contractor required to pay for the water?
Answer: There are several hydrants available for use adjacent to the project site. The contractor shall coordinate with the Onondaga County Water Authority regarding their desired use. This will require installation of a backflow preventer, and a meter. The contractor will be required to pay for the water used.
2. What is the Engineer's estimate for the project?
Answer: The engineer's estimate for the project is \$6-7M, including the bid alternate.
3. Can you confirm the badging requirements and costs for badging for the project?
Answer: We will conform the badging requirements for the project and include them in the published prebid meeting minutes which will be published in Addendum No. 01.

Clarification: There is no charge to the contractor for the initial badging requirements and issued badges. There is a fine of \$1000 per lost or unreturned badge.

There is a requirement of no more than 5 unbadged individuals for every 1 badged person on the site. The badged person must be in direct control of the unbadged personnel at all times during the construction, meaning that they must be within direct visual range of the badged person, as well as be able to receive direct verbal instruction from the badged individual. This requirement applies to all subcontractor's as well.

Vehicles operating on the airport will be issued a vehicle placard, and vehicle operators must be badged. Material delivery vehicles will be subject to search at the gates, and must be listed on the daily delivery list. Escorts must be provided for delivery vehicles that are unfamiliar with the designated haul routes, and all haul routes must be clearly delineated per the plans.





SYRACUSE
REGIONAL
AIRPORT
AUTHORITY

Syracuse Hancock International Airport
Project Pre-Bid Meeting 5/30/18
Reconfigure Taxiways C, F, B, E, and G



McFarland Johnson

Name, Title, and Company	Mailing Address	Phone / Fax / Email
William Verfuss, PE Aviation Operations Manager McFarland-Johnson, Inc.	2525 SR 332 Box 6, Suite 101 Canandaigua, NY 14424	Phone: 607-723-9421 Fax: 607-723-4979 Email: wverfuss@mjincc.com
JOSH LEVIKER PROJECT MANAGER BARNETT PAULING MATHEWS Scott Lewis VP	4530 WETZEL ROAD LIVERPOOL, N.Y. 13090 PO Box 527 Johnstown NY 12095	Phone: 315-391-5405 Fax: 315-652-4590 Email: JLeviker@BARNETTPAULINGM.COM Phone: 607 743 8702 Fax:
The Wesson Group KATE REYNGOUDT SUPER	PO Box 527 JOHNSTOWN	Email: slewng@twg.us.com Phone: 607 226 0031 Fax:
THE WESSON GROUP MATT SCHULLER PM	PO Box 527 JOHNSTOWN NY 12095	Email: KATE@TWG.US.COM Phone: 315-525-7184 Fax:
THE WESSON GROUP Dan Squire PM O'Connell Electric	700' Performance Dr N Syr 12012	Email: MSCHULLER@TWG.US.COM Phone: Dan. Squire R Fax: O'Connell electric . com Email:
Tim Dalrymple Vice President Seneca Stone Corp. AL Lytle CCI Companies	2747 Canoga Road Seneca Falls, NY 13148 PO Box 186 Canastota NY 13032	Phone: 607-738-1076 Fax: 315-549-7156 Email: Estimating@Senecastone.com Phone: 315-697-2547 Fax: 315-697-8436 Email: alytle@ccicompanies.com



Syracuse Hancock International Airport
 Project Pre-Bid Meeting 5/30/18
 Reconfigure Taxiways C, F, B, E, and G



Name, Title, and Company	Mailing Address	Phone / Fax / Email
Doug Fusillo	Po Box 186 Canastota NY	Phone: Fax: 315-697-8436
CCI Companies	Fusillo Companies, Inc 315-697-2547	Email: dfusillo@ccicompanies.com
Russell Huta	5835 Rt 5	Phone: Fax: 315-724-4062
Marcy Excavation Services LLC	Herkimer, NY 13350	Email: RHUTA@MARCYEXCAVATION.COM
Samuel Obermayer	701 Peppermere Drive	Phone: 315-268-6052
O'Connell electric	Syracuse NY 13212	Fax: Email: Sam.Obermayer@occonnelectrical.com
Jake Belcher		Phone: 315-836-7306
Hi-Lite Airfield Services		Fax: Email: Jake, Belcher @ Hi-Lite.com
Tim Huntibus		Phone: 315-583-611 ext 241
Hi-Lite Airfield Services		Fax: Email: Tim.Huntibus@hi-lite.com
Jim BAKER	7901 GEE ROAD	Phone: 315-697-7114
JBS Dint Inc	Canastota NY 13032	Fax: 315-697-8619
Tina Dorrance	111 Liberty Lane	Email: JBSDINT@AOL.COM
Baseline Airport Lighting	Barneveld NY 13304	Phone: 315-896-6106
Antonio Pasarella		Fax: 315-896-8584
Ops		Email: baselinekingcorp@gmail.com
		Phone: 315-455-3666
		Fax: Email: APasarella@Syrainport.org



Syracuse Hancock International Airport
 Project Pre-Bid Meeting 5/30/18
 Reconfigure Taxiways C, F, B, E, and G



Name, Title, and Company	Mailing Address	Phone / Fax / Email
Linda Ryan Aviation Contracting Officer	Syracuse Regional Airport Authority 1060 Col. Eileen Collins Blvd Syracuse NY 13215	Phone: (315) 454-3263 Fax: Email: ryan.l@syraairport.org
SRAA	SAME AS ABOVE	Phone: 315-3744407 Fax: Email: SMOROL.JE.SYRAIRPORT.ORG
JOHN SMOROL AIRFIELD SUPERVISOR CITY OF SYR - DEPT OF AVIATION		Phone: Fax: Email:
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SECTION 10 – ADVERTISEMENT AND NOTICE TO CONTRACTORS

FOR THE RECONFIGURE TAXIWAYS C, F, B, E, AND G AT THE SYRACUSE HANCOCK INTERNATIONAL AIRPORT SYRACUSE, NEW YORK

Sealed proposals for the Syracuse Hancock International Airport Reconfiguration of Taxiways C, F, B, E, and G will be received at the Office of the Executive Director of the Syracuse Regional Airport Authority located at 1000 Col. Eileen Collins Boulevard, Syracuse, New York, 13212, **until 1:00 p.m. local time, on Wednesday June 13th, 2018**, and there at said office, at said time, publicly opened and read aloud.

The project consists of the removal of all or portions of five existing asphalt pavement taxiways (C, F, B, E and G) and the construction of four new asphalt pavement taxiways (U, W, H2 and H3). Project also includes drainage improvements, airfield lighting and signage improvements, and pavement markings.

PDF Sets of plans and specifications for work under this Contract will be available beginning **Thursday May 17, 2018**. Contractors may sign up for plans and download them directly from the internet at no cost by accessing McFarland Johnson's bid portal by visiting <http://bidportal.mjinc.com> under the project name **"Syracuse Hancock Int'l Airport – Reconfigure Taxiways C, F, B, E and G"**. The Bidders are responsible for checking the above website for all project updates including all Addenda.

Copies of the above described bid documents may be examined at the Syracuse Builders Exchange, 6563 Ridings Road, Syracuse, New York, 13206.

Each bid must be accompanied by a certified check or bid bond, in the amount of five percent (5%) of the total maximum price bid (combination of the base bid price or add/alternate items) for the Contract in the form and subject to the conditions provided in the Information for Bidders.

A pre-bid conference has been scheduled for the benefit of all prospective bidders. All prospective bidders are encouraged to attend. The **pre-bid conference is scheduled for Wednesday May 30th at 10:00 a.m.** in the Veronica Room (South Terminal Conference Room) of the Syracuse Hancock International Airport Terminal Building.

Any questions regarding bidding of this project shall be directed, in writing only, to William Verfuss, PE, of McFarland Johnson, Inc., email: wverfuss@mjinc.com. Any necessary addendum to this project will be posted to bid portal provided above. Bidders should check the website frequently for any updates.

Bids must be submitted in a sealed envelope clearly marked:

"Syracuse Hancock International Airport Reconfigure Taxiways C, F, B, E, and G"

The Authority reserves the right to waive any informalities in the bids and to reject any and all bids.

SYRACUSE REGIONAL AIRPORT AUTHORITY

END OF ADVERTISEMENT

SECTION 100 – INSTRUCTIONS TO BIDDERS

100-01 BID DATE. Sealed proposals will be received by the Office of the Executive Director, Syracuse Regional Airport Authority, 1000 Col. Eileen Collins Boulevard, Syracuse, New York, 13212 until 1:00 p.m. on **Wednesday June 13th, 2018** for:

Syracuse Hancock International Airport
Reconfigure Taxiways C, F, B, E, and G

at the Syracuse Regional Airport Authority, in accordance with the Plans and Specifications on file in the office of the Executive Director, Syracuse Regional Airport Authority, where they may be examined.

Plans and specifications may be examined at the following offices:

Syracuse Hancock International Airport
Syracuse Regional Airport Authority
1000 Col. Eileen Collins Boulevard
Syracuse, NY 13212

Syracuse Builders Exchange
6563 Ridings Road
Syracuse, New York 13206

A. DISADVANTAGED BUSINESS ENTERPRISE (DBE) STATEMENT.

The requirements of 49 CFR Part 26, Regulations of the U.S. Department of Transportation, apply to this contract. It is the policy of the Sponsor to practice nondiscrimination based on race, color, sex, or national origin in the award or performance of this contract. All firms qualifying under this solicitation are encouraged to submit proposals. Award of this contract will be conditioned upon satisfying the DBE requirements of this contract. These requirements apply to all bidders, including those who qualify as a DBE. A DBE contract goal of **6.7 percent** has been established for this contract. The bidder shall make good faith efforts, as defined in Appendix A, 49 CFR Part 26, to meet the contract goal for DBE participation in the performance of this contract.

Within 15 days after the opening of bids and before award of the contract, all bidders wishing to remain in competition for award of this contract shall submit the Contractor's DBE Plan to the Owner. The website for the Unified Certification Program directory in the State of New York is: <http://www.nysucp.net/>.

B. M/WBE AND SDVOB STATEMENT – NOT APPLICABLE TO THIS CONTRACT

C. BUY AMERICAN - STEEL AND MANUFACTURED PRODUCTS FOR CONSTRUCTION CONTRACTS (JAN 1991).

1. The Aviation Safety and Capacity Expansion Act of 1990 provides that preference be given to steel and manufactured products produced in the United States when funds are expended pursuant to a grant issued under the Airport Improvement Program. The following terms apply:
 - a. Steel and Manufactured Products. As used in this clause, steel and manufactured products include (1) steel produced in the United States or (2) a manufactured product produced in the United States, if the cost of its components mined, produced or manufactured in the United States exceeds 60 percent of the cost of all its components

SECTION 900 - ADDITIONAL FEDERAL REQUIREMENTS

H. Failure to Complete on Time. For each working day, as specified in the Contract, that any part of the work in Phase 2 remains uncompleted after the Contract Time (including all extensions and adjustments as provided in the subsection titled, Determination and Extension of Contract Time of this section), the sum of two thousand five-hundred dollars (\$2,500.00) per day or portion thereof will be deducted from any money due or to become due, the Contractor or his Surety or both. For each working day, as specified in the Contract, that any part of the work in Phase 1 or Phase 3 remains uncompleted after the Contract Time (including all extensions and adjustments as provided in the subsection titled, Determination and Extension of Contract Time of this section), the sum of ten-thousand dollars (\$10,000.00) per day or portion thereof will be deducted from any money due or to become due, the Contractor or his Surety or both. Additional withholdings associated with each phase of the work shall be as indicated in section 900-15 Specific Airport Operating Requirements. Such deducted sums shall not be deducted as a penalty but shall be considered as liquidation of a reasonable portion of damages that will be incurred by the Owner as a result of not having beneficial occupancy and for the loss to the Owner on account of the expense due to the employment of Engineers and their assistants and to any other expenses incurred by the Owner should the contractor fail to complete the work in the time specified in the Contract.

Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Owner of any of its rights under the Contract.

I. Default and Termination of Contract. Refer to Section L of the Agreement.

J. Termination for National Emergencies. The Owner shall terminate the Contract or portion thereof by written notice when the Contractor is prevented from proceeding with the Construction Contract as a direct result of an Executive Order of the President with respect to the prosecution of war or in the interest of national defense.

When the Contract, or any portion thereof, is terminated before completion of all items of work in the contract, payment will be made for the actual number of units or items of work completed at the Contract price or as mutually agreed for items of work partially completed or not started. No claims or loss of anticipated profits shall be considered.

Reimbursement for organization of the work, and other overhead expenses, (when not otherwise included in the Contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the work and that are not incorporated in the work shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Engineer.

Termination of the Contract or a portion thereof shall neither relieve the Contractor of his responsibilities for the completed work nor shall it relieve his Surety of its obligation for and concerning any just claim arising out of the work performed.

K. Night Work. Work after sunset will not be permitted except as provided by the special requirements of Section 900-15 SPECIFIC AIRPORT OPERATING REQUIREMENTS. Where work on this

SECTION 900 - ADDITIONAL FEDERAL REQUIREMENTS

PHASE 1: BASE BID – 45 Calendar Days

Work Area ‘A’ – Demolish Existing Taxiways C, F, B, E/Construct New Taxiways U and W

Work Area: Taxiways C, F, B, and E from edge of Runway 10-28 to parallel Taxiway A

Runway 10-28 will be closed; Taxiway A from Taxiway G to Taxiway M will be closed; Taxiways C and F will be closed; Taxiways B and E will be closed south of Taxiway T; and a portion of the South Apron will be closed.

Runway 15-33 will remain open during this work area

Duration: Forty-Five (45) Consecutive Calendar Days

Primary work to be performed in this Phase:

- Establish work area phasing and closure areas
- Demolish existing taxiways, lighting/signage, and drainage
- Installation of new drainage structures and pipes
- Installation of new lighting and signage
- Installation of new pavement section for Taxiways U and W
- Installation of new pavement markings
- Grade, topsoil, and seed work area
- Work area cleanup and reopening

Narrative Description – Work Area A:

- Runway 10-28 will be closed for the duration of the work within Work Area A to the landing and takeoff of aircraft. The south half of the runway will be available to taxiing aircraft from Taxiway G to Taxiway M.
- The initial set up of the runway closure markers, the temporary markings on Runway 10-28, the barricades and the layout of the retroreflective edge markers on Runway 10-28 will take place in a 12-hour period at the beginning of the project. Taxiway A will remain open during this initial period, with barricades required to prohibit aircraft traffic from entering the runway from Taxiways G, C, F, B, E, M, N, and J.
- Upon the completion of the modifications to Runway 10-28, Taxiway A will be closed from Taxiway G to Taxiway M, and the final location of the barricades placed for the remaining duration of Work Area A.
- The contractor's personnel and equipment shall remain north of the candle stick barricades that are to be placed 93' north of the temporary taxiway centerline stripe on the southern portion of the runway pavements. This will provide for the proper wing tip clearance to be maintained for any aircraft taxiing on RW 10-28.
- The contractor is advised to carefully review the airfield lighting circuits that exist within Work Area A. All circuits that service active airfield pavements shall be maintained throughout the duration of work in this area. Any interruption in services to these areas shall be scheduled through the Resident Engineer and shall occur during daylight hours, returning the edge lights to full service at the end of each day. During periods of poor visibility, these outages may be postponed by airport operations.
- There are airfield guidance sign modifications (Taxiway G re-designation as Taxiway Z) that are outside of the enclosed work area. These modifications shall be made in a maximum 4 hour period, under the escort of airport operations personnel.
- Upon the completion of all work items in Work Area A, Taxiway A will be opened full length, and barricades shall be placed that will prohibit the access to closed Runway 10-28 from Taxiways G, Z, W, U, M, N, and J. Removal of temporary markings, the retroreflective edge markers, and the

SECTION 900 - ADDITIONAL FEDERAL REQUIREMENTS

restoration of the runway markings shall take place in a 12-hour period. Upon the completion of this work, Runway 10-28 will be opened and the work within Phase I shall be considered to be complete.

- **Should the closure of Runway 10-28 go beyond the designated 45 calendar day period for Phase I, the contractor shall be subject to liquidated damages in the amount of \$10,000 per calendar day, or any portion thereof that the runway remains closed.**

PHASE 2: BASE BID – 30 Calendar Days

Work Area ‘B’ – Construct New GA Apron Access Taxiways H2 and H3 and removal of the Pavement on the East end of the GA Apron

Work Area: South GA Apron adjacent to Taxiway H

Taxiway H between Taxiway G and N will be closed; Taxiway H between Taxiway G west for approximately 800 feet will be closed; the East and West ends of the GA Apron will be closed

Runway 10-28, Runway 15-33 will remain open during this work area

Duration: Twenty-Five (25) Calendar Days

Primary work to be performed in this Phase:

- Excavate and construct new pavement section
- Installation of new lighting and signage
- Installation of new pavement markings
- Removal of the undesignated pavement section east of the GA Apron
- Work area cleanup and reopening
- Grade, topsoil, and seed work area

Narrative Description – Work Area B:

- The east and west portions of the GA Apron will remain closed throughout the duration of Work Area B.
- The contractor shall maintain access to the Hangars located on the GA Apron, and shall cooperate with airport staff and the FBO operating these hangars regarding the movement of men and equipment required to accommodate the movement of aircraft on the apron. The contractor shall be advised that the movement of aircraft on an apron is less controlled than on other airfield surfaces and shall remain vigilant regarding the movement of aircraft. Equipment when not in use shall be located in the designated staging areas.
- **Should Taxiways H2 and H3 not be opened in the designated 25 calendar day time period, the contractor shall be subject to liquidated damages in the amount of \$2,500 per calendar day, or any portion thereof that the taxiways remains closed.**

Work Area ‘C’ – Remove Taxiway G between the GA Apron and Taxiway H

Work Area: Taxiway G at GA Apron

Taxiway G between the GA Apron and Runway 10-28 will be closed. The center portion of the GA Apron will be closed.

Runway 10-28, Runway 15-33 will remain open during this work area

Duration: Five (5) Calendar Days

Primary work to be performed in this Phase:

- Demolish existing taxiway markings, lighting/signage, and drainage

ITEM P-152 EXCAVATION, SUBGRADE, AND EMBANKMENT

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 CLASSIFICATION. All material excavated shall be classified as defined below:

- a. Unclassified excavation.** Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature, which is not otherwise classified and paid for under the following items.
- b. Undercut Excavation and Backfill.** Undercut excavation and backfill shall consist of the removal and disposal of deposits of mixtures of soil and organic matter not suitable for foundation material and the backfill of the excavated area with P-209 Crushed Aggregate Base Course. The backfilling shall include all grading and compaction work required to produce a suitable pavement section foundation.
- c. Borrow Embankment.** Borrow excavation shall consist of approved material required for the construction of embankment or for other portions of the work in excess of the quantity of usable material available from required excavations. Borrow material shall be obtained from approved off-site locations. Borrow material shall meet the material requirements of PennDOT Specifications Section 206–Embankment.

152-1.3 UNSUITABLE EXCAVATION. Any material containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material, suitable for topsoil may be used on the embankment slope when approved by the Engineer.

CONSTRUCTION METHODS

152-2.1 GENERAL. The suitability of material to be placed in embankments shall be subject to approval by the Engineer. All unsuitable material shall be disposed of in waste areas shown on the plans. All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. The surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the plans or approved by the Engineer.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the Engineer notified per subsection 70-20. At the direction of the Engineer, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Those areas outside of the limits of the pavement areas where the top layer of soil material has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer, who shall arrange for their removal if necessary. The Contractor, at his or her expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

152-2.2 EXCAVATION. No excavation shall be started until the work has been staked out by the Contractor and the Engineer has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the Engineer. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be used to grade the areas of ultimate development or disposed as directed by the Engineer. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work.

- a. **Selective grading.** When selective grading is indicated on the plans, the more suitable material designated by the Engineer shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas so that it can be measured for payment as specified in paragraph 152-3.3.
- b. **Undercutting.** Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the Engineer. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be disposed off the airport. The cost is incidental to this item. This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for Undercut Excavation and Backfill. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans.
- c. **Overbreak.** Overbreak, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the Engineer. All overbreak shall be graded or removed by the Contractor and disposed of as directed by the Engineer. The Engineer shall determine if the displacement of such material was unavoidable and his or her decision shall be final. Payment will not be made for the removal and disposal of overbreak that the Engineer determines as avoidable. Unavoidable overbreak will be classified as "Unclassified Excavation."
- d. **Removal of utilities.** The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished by someone other than the Contractor; for example, the utility unless otherwise shown on the plans. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the

material disposed of as directed by the Engineer. All foundations thus excavated shall be backfilled with suitable material and compacted as specified.

- e. **Compaction requirements.** The subgrade under areas to be paved shall be compacted to a depth of 25-inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557. The material to be compacted shall be within $\pm 2\%$ of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils).

The in-place field density shall be determined in accordance with ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade. The finished grading operations, conforming to the typical cross-section, shall be completed and maintained at least 1,000 feet (300 m) ahead of the paving operations or as directed by the Engineer.

All loose or protruding rocks on the back slopes of cuts shall be pried loose or otherwise removed to the slope finished grade line. All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the Engineer.

Blasting shall not be allowed.

- f. **Proof rolling.** After compaction is completed, the subgrade area shall be proof rolled with a 20 ton (18.1 metric ton) Tandem axle Dual Wheel Dump Truck loaded to the legal limit with tires inflated to 100 psi (0.689 MPa) in the presence of the Engineer. Apply a minimum of 80% coverage, or as specified by the Engineer, to all paved areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications.

152-2.3 BORROW EXCAVATION. Borrow areas within the airport property are indicated on the plans. Borrow excavation shall be made only at these designated locations and within the horizontal and vertical limits as staked or as directed by the Engineer.

When borrow sources are outside the boundaries of the airport property, it shall be the Contractor's responsibility to locate and obtain the borrow sources, subject to the approval of the Engineer. The Contractor shall notify the Engineer at least 15 days prior to beginning the excavation so necessary measurements and tests can be made. All borrow pits shall be opened up to expose the various strata of acceptable material to allow obtaining a uniform product. All unsuitable material shall be disposed of by the Contractor. Borrow pits shall be excavated to regular lines to permit accurate measurements, and they shall be drained and left in a neat, presentable condition with all slopes dressed uniformly.

152-2.4 DRAINAGE EXCAVATION. Drainage excavation shall consist of excavating for drainage ditches such as intercepting; inlet or outlet ditches; for temporary levee construction; or for any other type as designed or as shown on the plans. The work shall be performed in sequence with the other construction. Intercepting ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the Engineer. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 PREPARATION OF EMBANKMENT AREA. Where an embankment is to be constructed to a height of 4 feet (1.2 m) or less, all sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted as indicated in paragraph 152-2.6. When the height of fill is greater than 4 feet (1.2 m), sod not required to be removed shall be thoroughly disked and recompact to the density of the surrounding ground before construction of embankment.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

For embankments over 4 feet (1.2m) the Contractor shall install settlement plates to monitor the consolidation of the embankment. The data shall be furnished to the Engineer. Further construction of the pavement section shall not continue until the Engineer has reviewed the data from the settlement plates.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing, the quantity of excavation removed, and installation of settlement plates will be paid for under the respective items of work.

152-2.6 FORMATION OF EMBANKMENTS. Embankments shall be formed in successive horizontal layers of not more than 8 inches (200 mm) in loose depth for the full width of the cross-section, unless otherwise approved by the Engineer.

The layers shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the Engineer. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each layer shall be within $\pm 2\%$ of optimum moisture content before rolling to obtain the prescribed compaction. To achieve a uniform moisture content throughout the layer, the material shall be moistened or aerated as necessary. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken for each Based on these tests, the Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

Rolling operations shall be continued until the embankment is compacted to not less than 95% of maximum density for noncohesive soils, and 90% of maximum density for cohesive soils as determined by ASTM D1557. Under all areas to be paved, the embankments shall be compacted to a depth of 25-inches and to a density of not less than 95 percent of the maximum density as determined by ASTM D1557.

On all areas outside of the pavement areas, no compaction will be required on the top 4 inches (100 mm).

The in-place field density shall be determined in accordance with ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938. The Engineer shall perform all density tests.

Compaction areas shall be kept separate, and no layer shall be covered by another layer until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each layer is placed. Layer placement shall begin in the deepest portion of the embankment fill. As placement progresses, the layers shall be constructed approximately parallel to the finished pavement grade line.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated under the future paved areas. Stones or fragmentary rock larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 6 inches (150 mm) of the subgrade. Rockfill shall be brought up in layers as specified or as directed by the Engineer and the finer material shall be used to fill the voids with forming a dense, compact mass. Rock or boulders shall not be disposed of outside the excavation or embankment areas, except at places and in the manner designated on the plans or by the Engineer.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in layers not exceeding 2 feet (60 cm) in thickness. Each layer shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The layer shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in layers, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.

152-2.7 FINISHING AND PROTECTION OF SUBGRADE. After the subgrade is substantially complete, the Contractor shall remove any soft or other unstable material over the full width of the subgrade that will not compact properly. All low areas, holes or depressions in the subgrade shall be brought to grade with suitable select material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans.

Grading of the subgrade shall be performed so that it will drain readily. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes. All ruts or rough places that develop in the completed subgrade shall be graded and recompacted.

No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been approved by the Engineer.

152-2.8 HAUL. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

152-2.9 TOLERANCES. In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 12-foot (3.7-m) straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2 inch (12 mm), or shall not be more than 0.05 feet (15 mm) from true grade as established by grade hubs. Any deviation in excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompacting.

On safety areas, intermediate and other designated areas, the surface shall be of such smoothness that it will not vary more than 0.10 feet (3 mm) from true grade as established by grade hubs. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.10 TOPSOIL. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall not be placed within 213 feet of runway pavement or 48 feet of taxiway pavement and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the Engineer, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further rehandling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as directed, or as required in Item T-905.

No direct payment will be made for topsoil under Item P-152. The quantity removed and placed directly or stockpiled shall be paid for at the contract unit price per cubic yard (cubic meter) for “Unclassified Excavation.”

When stockpiling of topsoil and later rehandling of such material is directed by the Engineer, the material so rehandled shall be paid for at the contract unit price per cubic yard (cubic meter) for “topsoiling,” as provided in Item T-905.

METHOD OF MEASUREMENT

152-3.1 The quantity of excavation to be paid for shall be the number of cubic yards (cubic meters) measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed.

152-3.3 For payment specified by the cubic yard (cubic meter), measurement for all excavation and embankment shall be computed by the average end area method. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by excavation and embankment cross-sections shown on the plans, subject to verification by the Engineer. After completion of all excavation and embankment operations and prior to the placing of base or subbase material, the final excavation and embankment shall be verified by the Engineer by means of field cross-sections taken randomly at intervals not exceeding 500 linear feet (150 m).

BASIS OF PAYMENT

152-4.1 “Unclassified excavation” payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Pay Unit</u>
P-152-1	Unclassified Excavation and Disposal	Cubic Yard
P-152-2	Undercut Excavation and Backfill	Cubic Yard
P-152-3	Embankment In Place	Cubic Yard

TESTING REQUIREMENTS

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

END OF ITEM P-152

ITEM P-401 HOT MIX ASPHALT (HMA) PAVEMENTS

DESCRIPTION

401-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt cement binder (asphalt binder) mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

MATERIALS

401-2.1 AGGREGATE. Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screenings, natural sand and mineral filler, as required. The aggregates should be free of ferrous sulfides, such as pyrite, that would cause “rust” staining that can bleed through pavement markings. The portion retained on the No. 4 (4.75 mm) sieve is coarse aggregate. The portion passing the No. 4 (4.75 mm) sieve and retained on the No. 200 (0.075 mm) sieve is fine aggregate, and the portion passing the No. 200 (0.075 mm) sieve is mineral filler.

- a. **Coarse aggregate.** Coarse aggregate shall consist of sound, tough, durable particles, free from films of matter that would prevent thorough coating and bonding with the bituminous material and free from organic matter and other deleterious substances. The percentage of wear shall not be greater than 40% when tested in accordance with ASTM C131. The sodium sulfate soundness loss shall not exceed 12%, or the magnesium sulfate soundness loss shall not exceed 18%, after five cycles, when tested in accordance with ASTM C88. Clay lumps and friable particles shall not exceed 1.0% when tested in accordance with ASTM C142.

Aggregate shall contain at least 75 percent by weight of individual pieces having two or more fractured faces and 85 percent by weight having at least one fractured face. The area of each face shall be equal to at least 75% of the smallest midsectional area of the piece. When two fractured faces are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces. Fractured faces shall be achieved by crushing.

The aggregate shall not contain more than a total of 8%, by weight, of flat particles, elongated particles, and flat and elongated particles, when tested in accordance with ASTM D4791 with a value of 5:1.

Slag shall be air-cooled, blast furnace slag, and shall have a compacted weight of not less than 70 pounds per cubic foot (1.12 mg/cubic meter) when tested in accordance with ASTM C29.

- b. **Fine aggregate.** Fine aggregate shall consist of clean, sound, tough, durable, angular shaped particles produced by crushing stone, slag, or gravel that meets the requirements for wear and soundness specified for coarse aggregate. The aggregate particles shall be free from coatings of clay, silt, or other objectionable matter.

The fine aggregate, including any blended material for the fine aggregate, shall have a plasticity index of not more than six (6) and a liquid limit of not more than 25 when tested in accordance with ASTM D4318.

The soundness loss shall not exceed 10% when sodium sulfate is used or 15% when magnesium sulfate is used, after five cycles, when tested per ASTM C88.

Clay lumps and friable particles shall not exceed 1.0%, by weight, when tested in accordance with ASTM C142.

Natural (non-manufactured) sand may be used to obtain the gradation of the aggregate blend or to improve the workability of the mix. The amount of sand to be added will be adjusted to produce mixtures conforming to requirements of this specification. The fine aggregate shall not contain more than 15% natural sand by weight of total aggregates. If used, the natural sand shall meet the requirements of ASTM D1073 and shall have a plasticity index of not more than six (6) and a liquid limit of not more than 25 when tested in accordance with ASTM D4318.

The aggregate shall have sand equivalent values of 45 or greater when tested in accordance with ASTM D2419.

- c. **Sampling.** ASTM D75 shall be used in sampling coarse and fine aggregate, and ASTM C183 shall be used in sampling mineral filler.

401-2.2 MINERAL FILLER. If filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D242.

401-2.3 ASPHALT CEMENT BINDER. Asphalt cement binder shall conform to ASTM D6373 Performance Grade (PG) 64-22. A certificate of compliance from the manufacturer shall be included with the mix design submittal.

The supplier's certified test report with test data indicating grade certification for the asphalt binder shall be provided to the Engineer for each load at the time of delivery to the mix plant. A certified test report with test data indicating grade certification for the asphalt binder shall also be provided to the Engineer for any modification of the asphalt binder after delivery to the mix plant and before use in the HMA.

401-2.4 PRELIMINARY MATERIAL ACCEPTANCE. Prior to delivery of materials to the job site, the Contractor shall submit certified test reports to the Engineer for the following materials:

- a. **Coarse aggregate:**
 - (1) Percent of wear
 - (2) Soundness
 - (3) Clay lumps and friable particles
 - (4) Percent fractured faces
 - (5) Flat and elongated particles
- b. **Fine aggregate:**
 - (1) Liquid limit and Plasticity index
 - (2) Soundness
 - (3) Clay lumps and friable particles
 - (4) Percent natural sand
 - (5) Sand equivalent
- c. **Mineral filler.**

- d. Asphalt binder.** Test results for asphalt binder shall include temperature/viscosity charts for mixing and compaction temperatures.

The certifications shall show the appropriate ASTM tests for each material, the test results, and a statement that the material meets the specification requirement.

The Engineer may request samples for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

401-2.5 ANTI-STRIPPING AGENT. Any anti-stripping agent or additive if required shall be heat stable, shall not change the asphalt cement viscosity beyond specifications, shall contain no harmful ingredients, shall be added in recommended proportion by approved method, and shall be a material approved by the Department of Transportation of the State in which the project is located.

COMPOSITION

401-3.1 COMPOSITION OF MIXTURE. The HMA mix shall be composed of a mixture of well-graded aggregate, filler and anti-strip agent if required, and asphalt binder. The several aggregate fractions shall be sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of the job mix formula (JMF).

401-3.2 JOB MIX FORMULA (JMF). No hot-mixed asphalt (HMA) for payment shall be produced until a JMF has been approved in writing by the Engineer. The asphalt mix-design and JMF shall be prepared by an accredited laboratory that meets the requirements of paragraph 401-3.4. The HMA shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. Samples shall be prepared at various asphalt contents and compacted using the gyratory compactor in accordance with ASTM D6925.

Tensile strength ratio (TSR) of the composite mixture, as determined by ASTM D4867, shall not be less than 75 when tested at a saturation of 70-80% or an anti-stripping agent shall be added to the HMA, as necessary, to produce a TSR of not less than 75 when tested at a saturation of 70-80%. If an anti-strip agent is required, it shall be provided by the Contractor at no additional cost to the Owner.

The JMF shall be submitted in writing by the Contractor at least 30 days prior to the start of paving operations. The JMF shall be developed within the same construction season using aggregates currently being produced.

The submitted JMF shall be stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

- a. Percent passing each sieve size for total combined gradation, individual gradation of all aggregate stockpiles and percent by weight of each stockpile used in the job mix formula.
- b. Percent of asphalt cement.
- c. Asphalt performance grade and type of modifier if used.
- d. Number of gyrations.
- e. Laboratory mixing temperature.
- f. Laboratory compaction temperature.
- g. Temperature-viscosity relationship of the PG asphalt cement binder showing acceptable range of mixing and compaction temperatures; and for modified binders include supplier recommended mixing and compaction temperatures.

- h. Plot of the combined gradation on a 0.45 power gradation curve.
- i. Graphical plots of air voids, voids in the mineral aggregate, and unit weight versus asphalt content.
- j. Specific Gravity and absorption of each aggregate.
- k. Percent natural sand.
- l. Percent fractured faces.
- m. Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
- n. Tensile Strength Ratio (TSR).
- o. Anti-strip agent (if required).
- p. Date the JMF was developed. Mix designs that are not dated or which are from a prior construction season shall not be accepted.
- q. Percentage and properties (asphalt content, binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP) in accordance with paragraph "Reclaimed Hot-Mix Asphalt," if RAP is used.

The Contractor shall submit to the Engineer the results of verification testing of three (3) asphalt samples prepared at the optimum asphalt content. The average of the results of this testing shall indicate conformance with the JMF requirements specified in Tables 1 and 3.

When the project requires asphalt mixtures of differing aggregate gradations, a separate JMF and the results of JMF verification testing shall be submitted for each mix.

The JMF for each mixture shall be in effect until a modification is approved in writing by the Engineer. Should a change in sources of materials be made, a new JMF must be submitted within 15 days and approved by the Engineer in writing before the new material is used. After the initial production JMF has been approved by the Engineer and a new or modified JMF is required for whatever reason, the subsequent cost of the Engineer's approval of the new or modified JMF, including a new test strip when required by the engineer, will be borne by the Contractor. There will be no time extension given or considerations for extra costs associated with the stoppage of production paving or restart of production paving due to the time needed for the Engineer to approve the initial, new or modified JMF.

TABLE 401-1 GYRATORY DESIGN CRITERIA	
Test Property	Pavements Designed for Aircraft Gross Weights of 60,000 Lbs (27216 kg) or More or Tire Pressures of 100 psi or More
Number of compactor gyrations	75
Target Air Voids (percent)	3.5
Percent Voids in Mineral Aggregate (minimum)	See Table 2

TABLE 401-2 MINIMUM PERCENT VOIDS IN MINERAL AGGREGATE (VMA)	
Aggregate (See Table 3)	Minimum VMA
Gradation 1	14%
Gradation 2	15%

The mineral aggregate shall be of such size that the percentage composition by weight, as determined by laboratory sieves, will conform to the gradation or gradations specified in Table 3 when tested in accordance with ASTM C136 and ASTM C117.

The gradations in Table 3 represent the limits that shall determine the suitability of aggregate for use from the sources of supply; be well graded from coarse to fine and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve, or vice versa.

TABLE 401-3 AGGREGATE – HMA PAVEMENTS		
Sieve Size	Percentage by Weight Passing Sieves	
	Gradation 1	Gradation 2
1 inch (25 mm)	100	--
3/4 inch (19 mm)	76-98	100
1/2 inch (12 mm)	66-86	79-99
3/8 inch (9 mm)	57-77	68-88
No. 4 (4.75 mm)	40-60	48-68
No. 8 (2.36 mm)	26-46	33-53
No. 16 (1.18 mm)	17-37	20-40
No. 30 (0.60 mm)	11-27	14-30
No. 50 (0.30 mm)	7-19	9-21
No. 100 (0.15 mm)	6-16	6-16
No. 200 (0.075 mm)	3-6	3-6
Asphalt Percent:		
Stone or gravel	4.5-7.0	5.0-7.5
Slag	5.0-7.5	6.5-9.5

The aggregate gradations shown are based on aggregates of uniform specific gravity. The percentages passing the various sieves shall be corrected when aggregates of varying specific gravities are used, as indicated in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition.

401-3.3 RECLAIMED ASPHALT PAVEMENT (RAP). Reclaimed HMA shall consist of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt cement. Recycled asphalt shingles (RAS) shall not be allowed. The RAP shall be of a consistent gradation and asphalt content and properties. When RAP is fed into the plant, the maximum RAP chunk size shall not exceed 1-1/2 inches (38 mm). The reclaimed asphalt pavement mix shall be designed using procedures contained in the Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The percentage of asphalt in the RAP shall be established for the mixture design according to ASTM D2172 using the appropriate dust correction procedure. The JMF shall meet the requirements of paragraph 401-3.2. RAP shall only be used for

shoulder surface course mixes and for any intermediate courses. The use of RAP containing Coal Tar shall not be allowed. Coal Tar surface treatments must be removed prior to recycling underlying asphalt material. The amount of RAP shall be limited to 10 percent. In addition to the requirements of paragraph 401-3.2, the JMF shall indicate the percent of reclaimed asphalt pavement and the percent and grade of new asphalt binder. For the PG graded asphalt binder selected in 401-2.3, adjust as follows:

- a. For 0-20% RAP, there is no change in virgin binder content.
- b. For >20 to 30% RAP, select binder one grade softer, i.e., PG 64-22 would soften to PG 58-28.

401-3.4 JOB MIX FORMULA (JMF) LABORATORY. The Contractor's laboratory used to develop the JMF shall be accredited in accordance with ASTM D3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the JMF must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction.

401-3.5 TEST SECTION. Prior to full production, the Contractor shall prepare and place a quantity of HMA according to the JMF. The amount of HMA shall be sufficient to construct a test section 300 feet long and 35 feet wide, placed in two lanes, with a longitudinal cold joint, and shall be of the same depth specified for the construction of the course which it represents. A cold joint for this test section is an exposed construction joint at least four (4) hours old or whose mat has cooled to less than 160°F (71°C). The cold joint must be cut back using the same procedure that will be used during production in accordance with 401-4.13. The underlying grade or pavement structure upon which the test section is to be constructed shall be the same as the remainder of the course represented by the test section. The equipment used in construction of the test section shall be the same type and weight to be used on the remainder of the course represented by the test section.

The test section shall be evaluated for acceptance as a single lot in accordance with the acceptance criteria in paragraph 401-5.1 and 401-5.2. The test section shall be divided into equal sublots. As a minimum the test section shall consist of three (3) sublots.

The test section shall be considered acceptable if (1) mat density, air voids, and joint density are 90% or more within limits, (2) gradation and asphalt content are within the action limits specified in paragraphs 401-6.5a and 5b, and (3) the voids in the mineral aggregate are within the limits of Table 2.

If the initial test section should prove to be unacceptable, the necessary adjustments to the JMF, plant operation, placing procedures, and/or rolling procedures shall be made. A second test section shall then be placed. If the second test section also does not meet specification requirements, both sections shall be removed at the Contractor's expense. Additional test sections, as required, shall be constructed and evaluated for conformance to the specifications. Any additional sections that are not acceptable shall be removed at the Contractor's expense. Full production shall not begin until an acceptable test section has been constructed and accepted in writing by the Engineer. Once an acceptable test section has been placed, payment for the initial test section and the section that meets specification requirements shall be made in accordance with paragraph 401-8.1.

Job mix control testing shall be performed by the Contractor at the start of plant production and in conjunction with the calibration of the plant for the JMF. If aggregates produced by the plant do not satisfy the gradation requirements or produce a mix that meets the JMF, it will be necessary to reevaluate and redesign the mix using plant-produced aggregates. Specimens shall be prepared and the optimum asphalt content determined in the same manner as for the original JMF tests.

Contractor will not be allowed to place the test section until the Contractor Quality Control Program, showing conformance with the requirements of Paragraph 401-6.1, has been approved, in writing, by the Engineer.

CONSTRUCTION METHODS

401-4.1 WEATHER LIMITATIONS. The HMA shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the Engineer, if requested; however, all other requirements including compaction shall be met.

TABLE 401-4 SURFACE TEMPERATURE LIMITATIONS OF UNDERLYING COURSE		
Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches (7.5 cm) or greater	40	4
Greater than 2 inches (50 mm) but less than 3 inches (7.5 cm)	45	7

401-4.2 HMA PLANT. Plants used for the preparation of HMA shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 with the following changes:

Requirements for all plants include:

- a. Truck scales.** The HMA shall be weighed on approved scales furnished by the Contractor, or on certified public scales at the Contractor’s expense. Scales shall be inspected and sealed as often as the Engineer deems necessary to assure their accuracy. Scales shall conform to the requirements of the General Provisions, subsection 90-01.

In lieu of scales, and as approved by the Engineer, HMA weight may be determined by the use of an electronic weighing system equipped with an automatic printer that weighs the total HMA production and as often thereafter as requested by the Engineer.

- b. Testing facilities.** The Contractor shall ensure laboratory facilities are provided at the plant for the use of the Engineer. The lab shall have sufficient space and equipment so that both testing representatives (Engineer’s and Contractor’s) can operate efficiently. The lab shall meet the requirements of ASTM D3666 including all necessary equipment, materials, calibrations, current reference standards to comply with the specifications and a masonry saw with diamond blade for trimming pavement cores and samples.

The plant testing laboratory shall have a floor space area of not less than 200 square feet (18.5 sq m), with a ceiling height of not less than 7-1/2 feet (2 m). The laboratory shall be weather tight, sufficiently heated in cold weather, air-conditioned in hot weather to maintain temperatures for testing purposes of 70°F ±5°F (21°C ±2.3°C). The plant testing laboratory shall be located on the plant site to provide an unobstructed view, from one of its windows, of the trucks being loaded with the plant mix materials. In addition, the facility shall include the minimum:

- (1) Adequate artificial lighting.
- (2) Electrical outlets sufficient in number and capacity for operating the required testing equipment and drying samples.
- (3) A minimum of two (2) Underwriter's Laboratories approved fire extinguishers of the appropriate types and class.
- (4) Work benches for testing.
- (5) Desk with chairs and file cabinet.
- (6) Sanitary facilities convenient to testing laboratory.
- (7) Exhaust fan to outside air.
- (8) Sink with running water.

Failure to provide the specified facilities shall be sufficient cause for disapproving HMA plant operations.

Laboratory facilities shall be kept clean, and all equipment shall be maintained in proper working condition. The Engineer shall be permitted unrestricted access to inspect the Contractor's laboratory facility and witness quality control activities. The Engineer will advise the Contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to be adversely affecting the test results, the incorporation of the materials into the work shall be suspended immediately and will not be permitted to resume until the deficiencies are satisfactorily corrected.

- c. **Inspection of plant.** The Engineer, or Engineer's authorized representative, shall have access, at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; and checking the temperatures maintained in the preparation of the mixtures.
- d. **Storage bins and surge bins.** The HMA stored in storage and surge bins shall meet the same requirements as HMA loaded directly into trucks and may be permitted under the following conditions:
 - (1) Stored in non-insulated bins for a period of time not to exceed three (3) hours.
 - (2) Stored in insulated bins for a period of time not to exceed eight (8) hours.

If the Engineer determines that there is an excessive amount of heat loss, segregation, or oxidation of the HMA due to temporary storage, no temporary storage will be allowed.

401-4.3 HAULING EQUIPMENT. Trucks used for hauling HMA shall have tight, clean, and smooth metal beds. To prevent the HMA from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the Engineer. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

401-4.3.1 MATERIAL TRANSFER VEHICLE (MTV). Material transfer vehicles are not required.

401-4.4 HMA PAVERS. HMA pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of HMA that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface.

The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation.

The hopper shall be equipped with a distribution system to place the HMA uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

If, during construction, it is found that the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued and satisfactory equipment shall be provided by the Contractor.

401-4.4.1 AUTOMATIC GRADE CONTROLS. The HMA paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor-directed mechanisms or devices that will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within $\pm 0.1\%$.

The controls shall be capable of working in conjunction with any of the following attachments:

- a. Ski-type device of not less than 30 feet (9 m) in length.
- b. Taut string-line (wire) set to grade.
- c. Short ski or shoe.
- d. Laser control.

401-4.5 ROLLERS. Rollers of the vibratory, steel wheel, and pneumatic-tired type shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the HMA. The number, type, and weight of rollers shall be sufficient to compact the HMA to the required density while it is still in a workable condition.

All rollers shall be specifically designed and suitable for compacting HMA concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used. Depressions in pavement surfaces caused by rollers shall be repaired by the Contractor at their own expense.

The use of equipment that causes crushing of the aggregate will not be permitted.

401-4.6. DENSITY DEVICE. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall also supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new HMA. These densities shall be supplied to the Engineer upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

401-4.7 PREPARATION OF ASPHALT BINDER. The asphalt binder shall be heated in a manner that will avoid local overheating and provide a continuous supply of the asphalt binder to the mixer at a uniform temperature. The temperature of unmodified asphalt binder delivered to the mixer shall be sufficient to provide a suitable viscosity for adequate coating of the aggregate particles, but shall not

exceed 325°F (160°C) when added to the aggregate. The temperature of modified asphalt binder shall be no more than 350°F (175°C) when added to the aggregate.

401-4.8 PREPARATION OF MINERAL AGGREGATE. The aggregate for the HMA shall be heated and dried. The maximum temperature and rate of heating shall be such that no damage occurs to the aggregates. The temperature of the aggregate and mineral filler shall not exceed 350°F (175°C) when the asphalt binder is added. Particular care shall be taken that aggregates high in calcium or magnesium content are not damaged by overheating. The temperature shall not be lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

401-4.9 PREPARATION OF HMA. The aggregates and the asphalt binder shall be weighed or metered and introduced into the mixer in the amount specified by the JMF. The combined materials shall be mixed until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. Wet mixing time shall be the shortest time that will produce a satisfactory mixture, but not less than 25 seconds for batch plants. The wet mixing time for all plants shall be established by the Contractor, based on the procedure for determining the percentage of coated particles described in ASTM D2489, for each individual plant and for each type of aggregate used. The wet mixing time will be set to achieve 95% of coated particles. For continuous mix plants, the minimum mixing time shall be determined by dividing the weight of its contents at operating level by the weight of the mixture delivered per second by the mixer. The moisture content of all HMA upon discharge shall not exceed 0.5%.

401-4.10 PREPARATION OF THE UNDERLYING SURFACE. Immediately before placing the HMA, the underlying course shall be cleaned of all dust and debris. A tack coat shall be applied in accordance with Item P-603, if shown on the plans.

401-4.11 LAYDOWN PLAN, TRANSPORTING, PLACING, AND FINISHING. Prior to the placement of the HMA, the Contractor shall prepare a laydown plan for approval by the Engineer. This is to minimize the number of cold joints in the pavement. The laydown plan shall include the sequence of paving laydown by stations, width of lanes, temporary ramp locations, and laydown temperature. The laydown plan shall also include estimated time of completion for each portion of the work (that is, milling, paving, rolling, cooling, etc.). Modifications to the laydown plan shall be approved by the Engineer.

The HMA shall be transported from the mixing plant to the site in vehicles conforming to the requirements of paragraph 401-4.3. Deliveries shall be scheduled so that placing and compacting of HMA is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to atmospheric temperature.

The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose for the first lift of all runway and taxiway pavements. Successive lifts of HMA surface course may be placed using a ski, or laser control per paragraph 401-4.4.1, provided grades of the first lift of HMA surface course meet the tolerances of paragraphs 401-5.2b(6) as verified by a survey. Contractor shall survey each lift of HMA surface course and certify to Engineer that every lot of each lift meets the grade tolerances of paragraph 401-5.2b(6) before the next lift can be placed.

The initial placement and compaction of the HMA shall occur at a temperature suitable for obtaining density, surface smoothness, and other specified requirements but not less than 250°F (121°C).

Edges of existing HMA pavement abutting the new work shall be saw cut and carefully removed as shown on the drawings and coated with asphalt tack coat before new material is placed against it.

Upon arrival, the HMA shall be placed to the full width by a HMA paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the HMA mat. Unless otherwise permitted, placement of the HMA shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The HMA shall be placed in consecutive adjacent strips having a minimum width of 17-1/2 feet (m) except where edge lanes require less width to complete the area. Additional screed sections shall not be attached to widen paver to meet the minimum lane width requirements specified above unless additional auger sections are added to match. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 foot (30 cm); however, the joint in the surface top course shall be at the centerline of crowned pavements. Transverse joints in one course shall be offset by at least 10 feet (3 m) from transverse joints in the previous course.

Transverse joints in adjacent lanes shall be offset a minimum of 10 feet (3 m).

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the HMA may be spread and luted by hand tools.

Areas of segregation in the surface course, as determined by the Engineer, shall be removed and replaced at the Contractor's expense. The area shall be removed by saw cutting and milling a minimum of 2 inches (50 mm) deep. The area to be removed and replaced shall be a minimum width of the paver and a minimum of 10 feet (3 m) long.

401-4.12 COMPACTION OF HMA. After placing, the HMA shall be thoroughly and uniformly compacted by power rollers. The surface shall be compacted as soon as possible when the HMA has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once.

Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the HMA to the roller, the wheels shall be equipped with a scraper and kept properly moistened but excessive water will not be permitted.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power driven tampers. Tampers shall weigh not less than 275 pounds (125 kg), have a tamping plate width not less than 15 inches (38 cm), be rated at not less than 4,200 vibrations per minute, and be suitably equipped with a standard tamping plate wetting device.

Any HMA that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

401-4.13 JOINTS. The formation of all joints shall be made in such a manner as to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade.

The roller shall not pass over the unprotected end of the freshly laid HMA except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh HMA against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F (80°C); or are irregular, damaged, uncompacted or otherwise defective shall be cut back 3 inches (75 mm) to 6 inches (150 mm) to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material shall be removed from the project. Asphalt tack coat or other product approved by the Engineer shall be applied to the clean, dry joint, prior to placing any additional fresh HMA against the joint. Any laitance produced from cutting joints shall be removed by vacuuming and washing. The cost of this work shall be considered incidental to the cost of the HMA.

The Contractor may provide additional joint density quality control by use of joint heaters at the Contractor's expense. Electrically powered infrared heating equipment should consist of one or more low-level radiant energy heaters to uniformly heat and soften the pavement joints. The heaters should be configured to uniformly heat an area up to 18 inches (0.5 m) in width and 3 inches (75 mm) in depth. Infrared equipment shall be thermostatically controlled to provide a uniform, consistent temperature increase throughout the layer being heated up to a maximum temperature range of 200 to 300°F (93 to 150°C).

Propane powered infrared heating equipment shall be attached to the paving machine and the output of infrared energy shall be in the one to six micron range. Converters shall be arranged end to end directly over the joint to be heated in sufficient numbers to continuously produce, when in operation, a minimum of 240,000 BTU per hour. The joint heater shall be positioned not more than one inch (25 mm) above the pavement to be heated and in front of the paver screed and shall be fully adjustable. Heaters will be required to be in operation at all times.

The heaters shall be operated so they do not produce excessive heat when the units pass over new or previously paved material.

401-4.14 SAW-CUT GROOVING. If shown on the plans, saw cut grooves shall be provided as specified in Item P-621.

401-4.15 DIAMOND GROOVING. When required, diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive. The saw blades shall be assembled in a cutting head mounted on a machine designed specifically for diamond grinding that will produce the required texture and smoothness level without damage to the pavement. The saw blades shall be 1/8-inch (3-mm) wide and there shall be a minimum of 55 to 60 blades per 12 inches (300 mm) of cutting head width; the actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Each machine shall be capable of cutting a path at least 3 feet (0.9 m) wide. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the pavement will not be permitted. The depth of grinding shall not exceed 1/2 inch (13mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. Areas that have been ground

will be sealed with a P-608 surface treatment as directed by the Engineer. It may be necessary to seal a larger area to avoid surface treatment creating any conflict with runway or taxiway markings.

401-4.16 NIGHTTIME PAVING REQUIREMENTS. Paving during nighttime construction shall require the following:

- a. All paving machines, rollers, distribution trucks and other vehicles required by the Contractor for his operations shall be equipped with artificial illumination sufficient to safely complete the work.
- b. Minimum illumination level shall be twenty (20) horizontal foot-candles and maintained in the following areas:
 - (1) An area of 30 feet (9 m) wide by 30 feet (9 m) long immediately behind the paving machines during the operations of the machines.
 - (2) An area 15 feet (4.5 m) wide by 30 feet (9 m) long immediately in front and back of all rolling equipment, during operation of the equipment.
 - (3) An area 15 feet (4.5 m) wide by 15 feet (4.5 m) long at any point where an area is being tack coated prior to the placement of pavement.
- c. As partial fulfillment of the above requirements, the Contractor shall furnish and use, complete artificial lighting units with a minimum capacity of 3,000 watt electric beam lights, affixed to all equipment in such a way to direct illumination on the area under construction.
- d. A lighting plan must be submitted by the Contractor and approved by the Engineer prior to the start of any nighttime work.

MATERIAL ACCEPTANCE

401-5.1 ACCEPTANCE SAMPLING AND TESTING. Unless otherwise specified, all acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Engineer at no cost to the Contractor except that coring as required in this section shall be completed and paid for by the Contractor.

Testing organizations performing these tests shall be accredited in accordance with ASTM D3666. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction. All equipment in Contractor furnished laboratories shall be calibrated by an independent testing organization prior to the start of operations at the Contractor's expense.

- a. **Hot mixed asphalt.** Plant-produced HMA shall be tested for air voids on a lot basis. Sampling shall be from material deposited into trucks at the plant or from trucks at the job site. Samples shall be taken in accordance with ASTM D979.

A standard lot shall be equal to one day's production or 2000 tons (1814 metric tons) whichever is smaller. If the day's production is expected to exceed 2000 tons (1814 metric tons), but less than 4000 tons (3628 metric tons), the lot size shall be 1/2 day's production. If the day's

production exceeds 4000 tons (3628 metric tons), the lot size shall be an equal sized fraction of the day's production, but shall not exceed 2000 tons (1814 metric tons).

Where more than one plant is simultaneously producing HMA for the job, the lot sizes shall apply separately for each plant.

(1) Sampling. Each lot will consist of four equal sublots. Sufficient HMA for preparation of test specimens for all testing will be sampled by the Engineer on a random basis, in accordance with the procedures contained in ASTM D3665. Samples will be taken in accordance with ASTM D979.

The sample of HMA may be put in a covered metal tin and placed in an oven for not less than 30 minutes nor more than 60 minutes to stabilize to compaction temperature. The compaction temperature of the specimens shall be as specified in the JMF.

(2) Testing. Air voids will be determined by the Engineer in accordance with ASTM D3203. One set of laboratory compacted specimens will be prepared for each subplot in accordance with ASTM D6925 at the number of gyrations required by paragraph 401-3.2, Table 1. Each set of laboratory compacted specimens will consist of three test specimens prepared from the same sample.

Prior to testing, the bulk specific gravity of each test specimen shall be measured by the Engineer in accordance with ASTM D2726 or ASTM D6752 using the procedure for laboratory-prepared thoroughly dry specimens for use in computing air voids and pavement density.

For air voids determination, the theoretical maximum specific gravity of the mixture shall be measured one time for each subplot in accordance with ASTM D2041. The value used in the air voids computation for each subplot shall be based on theoretical maximum specific gravity measurement for the subplot.

(3) Acceptance. Acceptance of plant produced HMA for air voids shall be determined by the Engineer in accordance with the requirements of paragraph 401-5.2b.

c. In-place HMA. HMA placed in the field shall be tested for mat and joint density on a lot basis. A standard lot shall be equal to one day's production or 2000 tons (1814 metric tons) whichever is smaller. If the day's production is expected to exceed 2000 tons (1814 metric tons), but less than 4000 tons (3628 metric tons), the lot size shall be 1/2 day's production. If the day's production exceeds 4000 tons (3628 metric tons), the lot size shall be an equal sized fraction of the day's production, but shall not exceed 2000 tons (1814 metric tons).

(1) Mat density. The lot size shall be the same as that indicated in paragraph 401-5.1a and shall be divided into four equal sublots. One core of finished, compacted HMA shall be taken by the Contractor from each subplot. Core locations will be determined by the Engineer on a random basis in accordance with procedures contained in ASTM D3665. Cores for mat density shall not be taken closer than one foot (30 cm) from a transverse or longitudinal joint.

(2) Joint density. The lot size shall be the total length of longitudinal joints constructed by a lot of HMA as defined in paragraph 401-5.1a. The lot shall be divided into four equal sublots. One core of finished, compacted HMA shall be taken by the Contractor from each subplot. Core locations will be determined by the Engineer on a random basis in accordance with

procedures contained in ASTM D3665. All cores for joint density shall be taken centered on the joint. The minimum core diameter for joint density determination shall be 5 inches (125 mm).

- (3) **Sampling.** Samples shall be neatly cut with a diamond core drill bit. Samples will be taken in accordance with ASTM D979. The minimum diameter of the sample shall be 5 inches (125 mm). Samples that are clearly defective, as a result of sampling, shall be discarded and another sample taken. The Contractor shall furnish all tools, labor, and materials for cutting samples, cleaning, and filling the cored pavement. Cored pavement shall be cleaned and core holes shall be filled in a manner acceptable to the Engineer and within one day after sampling. Laitance produced by the coring operation shall be removed immediately.

The top most lift of HMA shall be completely bonded to the underlying layer. If any of the cores reveal that the surface is not bonded to the layer immediately below the surface then additional cores shall be taken as directed by the Engineer in accordance with paragraph 401-5.1b to determine the extent of any delamination. All delaminated areas shall be completely removed by milling to the limits and depth and replaced as directed by the Engineer at no additional cost.

- (4) **Testing.** The bulk specific gravity of each cored sample will be measured by the Engineer in accordance with ASTM D2726 or ASTM D6752. Samples will be taken in accordance with ASTM D979. The percent compaction (density) of each sample will be determined by dividing the bulk specific gravity of each subplot sample by the average bulk specific gravity of all laboratory prepared specimens for the lot, as determined in paragraph 401-5.1a(2). The bulk specific gravity used to determine the joint density at joints formed between different lots shall be the lowest of the bulk specific gravity values from the two different lots.
- (5) **Acceptance.** Acceptance of field placed HMA for mat density will be determined by the Engineer in accordance with the requirements of paragraph 401-5.2b(1). Acceptance for joint density will be determined by the Engineer in accordance with the requirements of paragraph 401-5.2b(3).

- d. **Partial lots.** When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot, or when the Contractor and Engineer agree in writing to allow overages or other minor tonnage placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

The last batch produced where production is halted will be sampled, and its properties shall be considered as representative of the particular subplot from which it was taken. In addition, an agreed to minor placement will be sampled, and its properties shall be considered as representative of the particular subplot from which it was taken. Where three sublots are produced, they shall constitute a lot. Where one or two sublots are produced, they shall be incorporated into the next lot, and the total number of sublots shall be used in the acceptance plan calculation, that is, $n = 5$ or $n = 6$, for example. Partial lots at the end of asphalt production on the project shall be included with the previous lot. The lot size for field placed material shall correspond to that of the plant material, except that, in no cases, shall less than three (3) cored samples be obtained, that is, $n = 3$.

401-5.2 ACCEPTANCE CRITERIA.

- a. **General.** Acceptance will be based on the following characteristics of the HMA and completed pavement as well as the implementation of the Contractor Quality Control Program and test results:

- (1) Air voids
- (2) Mat density
- (3) Joint density
- (4) Thickness
- (5) Smoothness
- (6) Grade

Mat density and air voids will be evaluated for acceptance in accordance with paragraph 401-5.2b(1). Joint density will be evaluated for acceptance in accordance with paragraph 401-5.2b(3).

Thickness will be evaluated by the Engineer for compliance in accordance with paragraph 401-5.2b(4). Acceptance for smoothness will be based on the criteria contained in paragraph 401-5.2b(5). Acceptance for grade will be based on the criteria contained in paragraph 401-5.2b(7).

The Engineer may at any time, reject and require the Contractor to dispose of any batch of HMA which is rendered unfit for use due to contamination, segregation, incomplete coating of aggregate, or improper mix temperature. Such rejection may be based on only visual inspection or temperature measurements. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if it can be demonstrated in the laboratory, in the presence of the Engineer, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

b. **Acceptance criteria.**

- (1) **Mat density and air voids.** Acceptance of each lot of plant produced material for mat density and air voids shall be based on the percentage of material within specification limits (PWL). If the PWL of the lot equals or exceeds 90%, the lot shall be acceptable. Acceptance and payment shall be determined in accordance with paragraph 401-8.1.
- (2) **Joint density.** Acceptance of each lot of plant produced HMA for joint density shall be based on the PWL. If the PWL of the lot is equal to or exceeds 90%, the lot shall be considered acceptable. If the PWL is less than 90%, the Contractor shall evaluate the reason and act accordingly. If the PWL is less than 80%, the Contractor shall cease operations and until the reason for poor compaction has been determined. If the PWL is less than 71%, the pay factor for the lot used to complete the joint shall be reduced by five (5) percentage points. This lot pay factor reduction shall be incorporated and evaluated in accordance with paragraph 401-8.1.
- (3) **Thickness.** Thickness of each lift of surface course shall be evaluated by the Engineer for compliance to the requirements shown on the plans. Measurements of thickness shall be made by the Engineer using the cores extracted for each subplot for density measurement. The maximum allowable deficiency at any point shall not be more than 1/4 inch (6 mm) less than the thickness indicated for the lift. Average thickness of lift, or combined lifts, shall not be less than the indicated thickness. Where the thickness tolerances are not met, the lot or subplot shall be corrected by the Contractor at his expense by removing the deficient area and replacing with new pavement. The Contractor, at his expense, may take additional cores as approved by the Engineer to circumscribe the deficient area.

(4) **Smoothness.** The final surface shall be free from roller marks. After the final rolling, but not later than 24 hours after placement, the surface of each lot shall be tested in both longitudinal and transverse directions for smoothness to reveal all surface irregularities exceeding the tolerances specified. The Contractor shall furnish paving equipment and employ methods that produce a finished surface course of the pavement shall not vary more than 1/4 inch (6mm) when evaluated with a 12-foot (3.7m) straightedge. When the surface course smoothness exceeds specification tolerances which cannot be corrected by diamond grinding of the surface course, full depth removal and replacement of surface course corrections shall be to the limit of the longitudinal placement. Corrections involving diamond grinding will be subject to the final pavement thickness tolerances specified. The Contractor shall apply a surface treatment per Item P-608 or P-609 to all areas that have been subject to grinding as directed by the Engineer.

(1) Transverse measurements. Transverse measurements will be taken for each lot placed. Transverse measurements will be taken perpendicular to the pavement centerline each 50 feet (15m) or more often as determined by the Engineer.

(i) Testing shall be continuous across all joints, starting with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. Smoothness readings will not be made across grade changes or cross slope transitions; at these transition areas, the straightedge position shall be adjusted to measure surface smoothness and not design grade or cross slope transitions. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. High spots on final surface course > 1/4 inch (6mm) in transverse direction shall be corrected with diamond grinding per paragraph 401-4.15 or by removing and replacing full depth of surface course. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The area corrected by grinding should not exceed 10% of the total area and these areas shall be retested after grinding.

(ii) The joint between lots shall be tested separately to facilitate smoothness between lots. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface, with half the straightedge on one side of the joint and the other half of the straightedge on the other side of the joint. Measure the maximum gap between the straightedge and the pavement surface in the area between these two high points. One measurement shall be taken at the joint every 50 feet (15m) or more often if directed by the Engineer. Deviations on final surface course > 1/4 inch (6mm) in transverse direction shall be corrected with diamond grinding per paragraph 401-4.15 or by removing and replacing full depth of surface course. Each measurement shall be

recorded and a copy of the data shall be furnished to the Engineer at the end of each days testing.

- (2) Longitudinal measurements. Longitudinal measurements will be taken for each lot placed. Longitudinal tests will be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet (6m); and at the third points of paving lanes when widths of paving lanes are 20 ft (6m) or greater.
 - (i) Longitudinal Short Sections. Longitudinal Short Sections are when the longitudinal lot length is less than 200 feet (60m) and areas not requiring a profilograph. When approved by the Engineer, the first and last 15 feet (4.5m) of the lot can also be considered as short sections for smoothness. The finished surface shall not vary more than 1/4 inch (6mm) when evaluated with a 12-foot (3.7m) straightedge. Smoothness readings will not be made across grade changes or cross slope transitions; at these transition areas, the straightedge position shall be adjusted to measure surface smoothness and not design grade or cross slope transitions. Testing shall be continuous across all joints, starting with one-half the length of the straightedge at the edge of pavement section being tested and then moved ahead one-half the length of the straightedge for each successive measurement. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. Deviations on final surface course > 1/4 inch (6mm) in longitudinal direction will be corrected with diamond grinding per paragraph 401-4.15 or by removing and replacing full depth of surface course. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The area corrected by grinding should not exceed 10% of the total area and these areas shall be retested after grinding.
- (6) **Grade.** Grade shall be evaluated on the first day of placement and then as a minimum, every day bituminous material is placed to allow adjustments to paving operations if measurements do not meet specification requirements. The Contractor must submit the survey data to the Engineer by the following day after measurements have been taken. The finished surface of the pavement shall not vary from the gradeline elevations and cross-sections shown on the plans by more than 1/2 inch (12 mm). The finished grade of each lot will be determined by running levels at intervals of 50 feet (15 m) or less longitudinally and all breaks in grade transversely (not to exceed 50 feet (15 m)) to determine the elevation of the completed pavement. The Contractor shall pay the cost of surveying of the level runs that shall be performed by a licensed surveyor. The documentation, stamped and signed by a licensed surveyor, shall be provided by the Contractor to the Engineer. The lot size shall be 2,000 square yards (1,650 m²). When more than 15% of all the measurements within a lot are outside the specified tolerance, or if any one shot within the lot deviates 3/4 inch (19 mm) or more from planned grade, the Contractor shall remove the deficient area to the depth of the final course plus 1/2 inch (12 mm) of pavement and replace with new material. Skin patching shall not be

permitted. Isolated high points may be ground off provided the course thickness complies with the thickness specified on the plans. The surface of the ground pavement shall have a texture consisting of grooves between 0.090 and 0.130 inches (2 and 3.5 mm) wide. The peaks and ridges shall be approximately 1/32 inch (1 mm) higher than the bottom of the grooves. The pavement shall be left in a clean condition. The removal of all of the slurry resulting from the grinding operation shall be continuous. The grinding operation should be controlled so the residue from the operation does not flow across other lanes of pavement. High point grinding will be limited to 15 square yards (12.5 m²). Areas in excess of 15 square yards (12.5 m²) will require removal and replacement of the pavement in accordance with the limitations noted above. The Contractor shall apply a surface treatment per P-608 to all areas that have been subject to grinding.

- c. **Percentage of material within specification limits (PWL).** The PWL shall be determined in accordance with procedures specified in Section 110 of the General Provisions. The specification tolerance limits (L) for lower and (U) for upper are contained in Table 5.

TABLE 401-5 GYRATORY ACCEPTANCE LIMITS FOR AIR VOIDS, DENSITY		
TEST PROPERTY	Specification Tolerance	
	L	U
Air Voids Total Mix (%)	2	5
Mat Density (%)	96.3	101.3
Joint Density (%)	93.3	-

- d. **Outliers.** All individual tests for mat density and air voids shall be checked for outliers (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers shall be discarded, and the PWL shall be determined using the remaining test values. The criteria in Table 5 is based on production processes which have a variability with the following standard deviations:

Surface Course Mat Density (%), 1.30
 Base Course Mat Density (%), 1.55
 Joint Density (%), 2.1

The Contractor should note that (1) 90 PWL is achieved when consistently producing a surface course with an average mat density of at least 98% with 1.30% or less variability, (2) 90 PWL is achieved when consistently producing a base course with an average mat density of at least 97.5% with 1.55% or less variability, and (3) 90 PWL is achieved when consistently producing joints with an average joint density of at least 96% with 2.1% or less variability.

401-5.3 RESAMPLING PAVEMENT FOR MAT DENSITY.

- a. **General.** Resampling of a lot of pavement will only be allowed for mat density, and then, only if the Contractor requests same, in writing, within 48 hours after receiving the written test results from the Engineer. A retest will consist of all the sampling and testing procedures contained in paragraphs 401-5.1b and 401-5.2b(1). Only one resampling per lot will be permitted.

- (1) A redefined PWL shall be calculated for the resampled lot. The number of tests used to calculate the redefined PWL shall include the initial tests made for that lot plus the retests.
 - (2) The cost for resampling and retesting shall be borne by the Contractor.
- b. Payment for resampled lots.** The redefined PWL for a resampled lot shall be used to calculate the payment for that lot in accordance with Table 6.
- c. Outliers.** Check for outliers in accordance with ASTM E178, at a significance level of 5%.

CONTRACTOR QUALITY CONTROL

401-6.1 GENERAL. The Contractor shall develop a Quality Control Program in accordance with Section 100 of the General Provisions. The program shall address all elements that affect the quality of the pavement including, but not limited to:

- a. Mix design
- b. Aggregate grading
- c. Quality of materials
- d. Stockpile management
- e. Proportioning
- f. Mixing and transportation
- g. Placing and finishing
- h. Joints
- i. Compaction
- j. Surface smoothness
- k. Personnel
- l. Laydown plan

The Contractor shall perform quality control sampling, testing, and inspection during all phases of the work and shall perform them at a rate sufficient to ensure that the work conforms to the contract requirements, and at minimum test frequencies required by paragraph 401-6.3 and Section 100 of the General Provisions. As a part of the process for approving the Contractor's plan, the Engineer may require the Contractor's technician to perform testing of samples to demonstrate an acceptable level of performance.

No partial payment will be made for materials that are subject to specific quality control requirements without an approved plan.

401-6.2 CONTRACTOR TESTING LABORATORY. The lab shall meet the requirements of ASTM D3666 including all necessary equipment, materials, and current reference standards to comply with the specifications.

401-6.3 QUALITY CONTROL TESTING. The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to these specifications and as set forth in the approved Quality Control Program. The testing program shall include, but not necessarily be limited to, tests for the control of asphalt content, aggregate gradation, temperatures, aggregate moisture, field compaction, and surface smoothness. A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

- a. **Asphalt content.** A minimum of two asphalt content tests shall be performed per lot in accordance with ASTM D6307 or ASTM D2172 if the correction factor in ASTM D6307 is greater than 1.0. The asphalt content for the lot will be determined by averaging the test results.
- b. **Gradation.** Aggregate gradations shall be determined a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136, and ASTM C117.
- c. **Moisture content of aggregate.** The moisture content of aggregate used for production shall be determined a minimum of once per lot in accordance with ASTM C566.
- d. **Moisture content of HMA.** The moisture content shall be determined once per lot in accordance with ASTM D1461.
- e. **Temperatures.** Temperatures shall be checked, at least four times per lot, at necessary locations to determine the temperatures of the dryer, the asphalt binder in the storage tank, the HMA at the plant, and the HMA at the job site.
- f. **In-place density monitoring.** The Contractor shall conduct any necessary testing to ensure that the specified density is being achieved. A nuclear gauge may be used to monitor the pavement density in accordance with ASTM D2950.
- g. **Additional testing.** Any additional testing that the Contractor deems necessary to control the process may be performed at the Contractor's option.
- h. **Monitoring.** The Engineer reserves the right to monitor any or all of the above testing.

401-6.4 SAMPLING. When directed by the Engineer, the Contractor shall sample and test any material that appears inconsistent with similar material being sampled, unless such material is voluntarily removed and replaced or deficiencies corrected by the Contractor. All sampling shall be in accordance with standard procedures specified.

401-6.5 CONTROL CHARTS. The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for aggregate gradation, asphalt content, and VMA. The VMA for each subplot will be calculated and monitored by the Quality Control laboratory.

Control charts shall be posted in a location satisfactory to the Engineer and shall be kept current. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a problem and the Contractor is not taking satisfactory corrective action, the Engineer may suspend production or acceptance of the material.

- a. **Individual measurements.** Control charts for individual measurements shall be established to maintain process control within tolerance for aggregate gradation, asphalt content, and VMA. The control charts shall use the job mix formula target values as indicators of central tendency for the following test parameters with associated Action and Suspension Limits:

TABLE 401-6		
Control Chart Limits For Individual Measurements		
Sieve	Action Limit	Suspension Limit
3/4 inch (19 mm)	±6%	±9%
1/2 inch (12 mm)	±6%	±9%
3/8 inch (9 mm)	±6%	±9%
No. 4 (4.75 mm)	±6%	±9%
No. 16 (1.18 mm)	±5%	±7.5%
No. 50 (0.30 mm)	±3%	±4.5%
No. 200 (0.075 mm)	±2%	±3%
Asphalt Content	±0.45%	±0.70%
VMA	-1.00%	-1.50%

- b. **Range.** Control charts for range shall be established to control process variability for the test parameters and Suspension Limits listed below. The range shall be computed for each lot as the difference between the two test results for each control parameter. The Suspension Limits specified below are based on a sample size of $n = 2$. Should the Contractor elect to perform more than two tests per lot, the Suspension Limits shall be adjusted by multiplying the Suspension Limit by 1.18 for $n = 3$ and by 1.27 for $n = 4$.

TABLE 401-7	
Control Chart Limits Based On Range (Based On $n = 2$)	
Sieve	Suspension Limit
1/2 inch (12 mm)	11%
3/8 inch (9 mm)	11%
No. 4 (4.75 mm)	11%
No. 16 (1.18 mm)	9%
No. 50 (0.30 mm)	6%
No. 200 (0.075 mm)	3.5%
Asphalt Content	0.8%

- c. **Corrective Action.** The Contractor Quality Control Program shall indicate that appropriate action shall be taken when the process is believed to be out of tolerance. The Plan shall contain sets of rules to gauge when a process is out of control and detail what action will be taken to bring the process into control. As a minimum, a process shall be deemed out of control and production stopped and corrective action taken, if:
- a. One point falls outside the Suspension Limit line for individual measurements or range;
- Or
- b. Two points in a row fall outside the Action Limit line for individual measurements.

401-6.6 QUALITY CONTROL REPORTS. The Contractor shall maintain records and shall submit reports of quality control activities daily, in accordance with the Contractor Quality Control Program described in General Provisions, Section 100.

METHOD OF MEASUREMENT

401-7.1 MEASUREMENT. HMA shall be measured by the number of tons (kg) of HMA used in the accepted work. Recorded batch weights or truck scale weights will be used to determine the basis for the tonnage.

BASIS OF PAYMENT

401-8.1 PAYMENT. Payment for a lot of HMA meeting all acceptance criteria as specified in paragraph 401-5.2 shall be made based on results of tests for mat density and air voids. Payment for acceptable lots shall be adjusted according to paragraph 401-8.1a for mat density and air voids and 401-8.1c for smoothness, subject to the limitation that:

- a. The total project payment for plant mix bituminous concrete pavement **shall not exceed 100 percent** of the product of the contract unit price and the total number of tons (kg) of HMA used in the accepted work (See Note 1 under [Table 401-8](#)).
- b. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.
- c. **Basis of adjusted payment.** The pay factor for each individual lot shall be calculated in accordance with Table 6. A pay factor shall be calculated for both mat density and air voids. The lot pay factor shall be the higher of the two values when calculations for both mat density and air voids are 100% or higher. The lot pay factor shall be the product of the two values when only one of the calculations for either mat density or air voids is 100% or higher. The lot pay factor shall be the lower of the two values when calculations for both mat density and air voids are less than 100%. If PWL for joint density is less than 71 percent then the lot pay factor shall be reduced by 5% but be no higher than 95%.

For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. Payment shall be subject to the total project payment limitation specified in paragraph 401-8.1. Payment in excess of 100% for accepted lots of HMA shall be used to offset payment for accepted lots of bituminous concrete pavement that achieve a lot pay factor less than 100%.

TABLE 401-8 PRICE ADJUSTMENT SCHEDULE	
Percentage of material within specification limits (PWL)	Lot pay factor (percent of contract unit price)
96 – 100	106
90 – 95	PWL + 10
75 – 89	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject ²

¹ Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment above 100% shall be subject to the total project payment limitation specified in paragraph 401-8.1.

² The lot shall be removed and replaced. However, the Engineer may decide to allow the rejected lot to remain. In that case, if the Engineer and Contractor agree in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment shall be reduced by the amount withheld for the rejected lot.

HMA placed above the specified grade shall not be included in the quantities for payment.

401-8.1.1. PAYMENT. Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Pay Unit</u>
P-401-1	Bituminous Surface Course	Ton
P-401-2	Bituminous Binder Course	Ton

TESTING REQUIREMENTS

ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates

ASTM D979	Standard Practice for Sampling Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867	Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method

ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyrotory Compactor
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
AASHTO T030	Standard Method of Test for Mechanical Analysis of Extracted Aggregate
AASHTO T110	Standard Method of Test for Moisture or Volatile Distillates in Hot Mix Asphalt (HMA)
AASHTO T275	Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Hot Mix Asphalt (HMA) Using Paraffin-Coated Specimens
AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method
Asphalt	Institute Handbook MS-26, Asphalt Binder
Asphalt Institute MS-2	Mix Design Manual, 7th Edition

MATERIAL REQUIREMENTS

ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder

END OF ITEM P-401

ITEM L-109 INSTALLATION OF AIRPORT ELECTRICAL BUILDING EQUIPMENT

109-1.1. This item shall consist of furnishing all airport electrical building equipment, wiring, cable, conduit, and grounding systems. This work shall also include the marking and labeling of equipment and the labeling or tagging of wires; the testing of the installation; and the furnishing of all incidentals necessary to place it in operating condition as a completed unit to the satisfaction of the Engineer.

EQUIPMENT AND MATERIALS

109 -2.1 GENERAL.

- a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified and listed under Advisory Circular (AC) 150/5345-53, Airport Lighting Equipment Certification Program.
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.
- c. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to provide materials in accordance with these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.
- d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. **Clearly** and **boldly** mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.
- e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be provided to the Engineer in electronic (PDF format), organized by specification section. The Engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and codes, specified herein.
- f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

109-2.2 RIGID STEEL CONDUIT. Rigid steel conduit and fittings shall be per Underwriters Laboratories Standards 6 and 514B.

109-2.3 FAA APPROVED EQUIPMENT. Certain items of airport lighting equipment installed in the Airport Electrical Building are covered by individual FAA equipment specifications. The specifications are listed below:

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors

109-2.4 L-829 CONSTANT CURRENT REGULATORS. The L-829 CCRs shall be new and ETL certified according to the requirements of the above referenced FAA AC. The L-829 CCRs shall meet the technical requirements noted within the “Basis for Design L-828 / L-829 Constant Current Regulators” table found on Dwg. EP-09, Electrical Details (Sheet 4 of 4). Contractor shall be responsible for verifying/coordinating the input voltage and control voltage in the field.

Each CCR shall include two Instruction Manuals.

109-2.5 OTHER ELECTRICAL EQUIPMENT. All other regularly used commercial items of electrical equipment not covered by FAA equipment specifications shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers (IEEE) or the National Electrical Manufacturer's Association (NEMA). When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and plans. Equipment selected and installed by the Contractor shall maintain the interrupting current rating of the existing systems or specified rating whichever is greater.

109-2.6 WIRE. Wire (in conduit) rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L824 Underground Electrical Cables for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

a. Control circuits. Unless otherwise indicated on the plans, wire shall be not less than No. 12 American wire gauge (AWG) and shall be insulated for 600 volts.

b. Power Circuits.

- (1) 600 volts maximum -- wire shall be No. 12 AWG or larger and insulated for at least 600 volts.
- (2) 3,000 volts maximum -- wire shall be No. 8 AWG or larger and insulated for at least 3,000 volts.
- (3) Over 3,000 volts -- wire shall be No. 8 AWG or larger and insulated for at least the circuit voltage.

109-2.7 SHORT CIRCUIT / COORDINATION / DEVICE EVALUATION / ARC FLASH ANALYSIS. The Contractor shall, based upon the equipment provided, include as a part of the submittal process the electrical system “Short Circuit / Coordination / Device evaluation / Arc Flash Analysis”. The analysis shall be performed by the equipment manufacturer and submitted in a written report. The analysis shall be signed and sealed by a registered Professional Engineer from the state in which the project is located. The analysis shall comply with NFPA-70E and IEEE 1584.

The analysis will include: one line diagrams, short circuit analysis, coordination analysis, equipment evaluation, arc flash analysis and arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary.

The selected firms field service Engineer shall perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will furnish and install the arc flash labels. The components worst case incident energy will be considered the available arc flash energy at that specific point in the system. Submit three written copies and one electronic copy of the report.

CONSTRUCTION METHODS

INSTALLATION OF EQUIPMENT IN ELECTRICAL BUILDINGS

109-3.1 GENERAL. The Contractor shall furnish, install, and connect all equipment, equipment accessories, conduit, cables, wires, grounds, and support necessary to insure a complete and operable electrical distribution center for the airport lighting system as specified herein and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction.

109-3.2 DUCT AND CONDUIT. The Contractor shall reuse existing square-type exposed metallic ducts with hinged cover for the circuits in the Airport Electrical Building. Separate low voltage (600V or less) and high voltage (above 600V) square-type ducts exist in the Airport Electrical Building as shown on the plans.

Conduit shall be used between square ducts and equipment or between different items of equipment when the equipment is designed for conduit connection. When the equipment is not designed for conduit connection, conductors shall enter the square-type control duct through insulating bushings in the duct or on the conduit risers.

109-3.3 WIRING AND CONNECTIONS. The Contractor shall make all necessary electrical connections in the vault in accordance with the wiring diagrams furnished and as directed by the Engineer. In wiring to the terminal blocks, the Contractor shall leave sufficient extra length on each control lead to make future changes in connections at the terminal block. This shall be accomplished by running each control lead the longest way around the box to the proper terminal. Leads shall be neatly laced in place.

109-3.4 MARKING AND LABELING. All equipment, control wires, terminal blocks, etc. shall be tagged, marked, or labeled as specified below:

a. Wire Identification. The Contractor shall furnish and install self-sticking wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the

terminal blocks. Wire labels, if used, shall be of the self-sticking pre-printed type and of the manufacturer's recommended size for the wire involved. Identification markings designated in the plans shall be followed. Tags, if used, shall be of fiber not less than 3/4-inch in diameter and not less than 1/32-inch thick. Identification markings designated in the plans shall be stamped on tags by means of small tool dies. Each tag shall be securely tied to the proper wire by a nonmetallic cord.

b. Labels. The Contractor shall attach identifying labels on the cases of regulators, breakers, and distribution and control relay cases, as designated by the Engineer. The letters and numerals shall be not less than 1 inch in height and shall be of proportionate width. The Contractor shall also mark the correct circuit designations in accordance with the wiring diagram on the terminal marking strips which are a part of each terminal block.

METHOD OF MEASUREMENT

109-4.1 The quantity of Airport Electrical Building Equipment, including new airfield lighting equipment, to be paid for under this item shall consist of all equipment installed, connected, and accepted as a complete unit ready for operation and as a complete installation.

BASIS OF PAYMENT

109-5.1 Payment will be made at the contract unit price for all completed and accepted Airport Electrical Building Equipment installation, including new airfield lighting equipment installed. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, electrical inspections, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Pay Unit</u>
L-109-1	Installation of New L-829, <u>20kW</u> CCR	Each
L-109-2	Installation of New L-829, <u>15kW</u> CCR	Each

MATERIAL REQUIREMENTS

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
Fed. Spec.J-C-30	Cable and Wire, Electrical (Power, fixed installation)
Commercial Item Description (CID) A-A 59544 Cable and Wire, Electrical (Power, Fixed Installation)	
AC 150/5345-7	Specifications for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-53	Airport Lighting Equipment Certification Program

IEEE 1584	Guide for Performing Arc-Flash Hazard Calculations
UL Standard 6	Electrical Rigid Metal Conduit – Steel
NFPA-70	National Electrical Code (NEC)
NFPA-70E	Standard for Electrical Safety in the Workplace

END OF ITEM L-109

ITEM L-110 AIRPORT UNDERGROUND ELECTRICAL DUCT BANKS AND CONDUITS

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed or removed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turving trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 GENERAL.

- a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the Engineer.
- b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the Engineer. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the Engineer and replaced with materials, that comply with these specifications, at the Contractor's cost.
- c. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. **Clearly and boldly** mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.
- d. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be prepared by specification section and submitted electronically (in PDF format) to the Engineer. The Engineer reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.
- e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 STEEL CONDUIT. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10 mil thick coat of asphaltum sealer or shall have a factory bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mil of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions.

110-2.3 PLASTIC CONDUIT. Plastic conduit and fittings shall conform to the following requirements:

- UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.
- UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).
- UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.
- UL 651A covers W-C-1094-Rigid PVC Conduit and high density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

- a. Type I–Schedule 40 PVC suitable for underground use either direct-buried or encased in concrete.
- b. Type II–Schedule 40 PVC suitable for either above ground or underground use.
- c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.
- d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 SPLIT CONDUIT. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 CONDUIT SPACERS. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 CONCRETE. Concrete shall conform to the requirements of Item P-610, Structural Portland Cement Concrete, using with a minimum 28-day compressive strength of 3,500 psi. Where reinforced duct banks are specified, reinforcing steel shall conform to ASTM A615 Grade 60. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part.

110-2.7 FLOWABLE BACKFILL. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.8 DETECTABLE WARNING TAPE. Plastic, detectable, American Wood Preservers Association (AWPA) Red (electrical power lines, cables, conduit and lighting cable) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-

150 mm) wide. Continuous legend shall read "Caution Buried Electric Line Below." Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 GENERAL. The Contractor shall install, extend, or remove underground duct banks and conduits at the approximate locations indicated on the plans. The Engineer shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. No duct bank or underground conduit shall be less than 18 inches (0.5 m) below finished grade. Where under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors IMMEDIATELY prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the Engineer of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200 pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4 inch (6 mm) sieve. Flowable backfill may alternatively be used. The Contractor shall ascertain the type of soil or rock to be excavated before bidding. All such rock removal shall be performed and paid for under Item P-152.

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the Engineer. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the Engineer, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Alternatively, additional duct bank supports that are adequate and stable shall be installed, as approved by the Engineer.

All excavation shall be unclassified and shall be considered incidental to the respective L-110 pay item of which it is a component part. Dewatering necessary for duct installation, erosion and turbidity control, per Federal, state, and local requirements is incidental to its respective pay item as a part of Item L-110. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-110 Item.

Unless otherwise specified, excavated materials that are deemed by the Engineer to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the Engineer and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

- a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred
- b. Trenching, etc., in cable areas shall then proceed with approval of the Engineer, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 DUCT BANKS. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inch (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize

the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the Engineer shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the Engineer.

110-3.3 CONDUITS WITHOUT CONCRETE ENCASUREMENT. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4 inch (6 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the Engineer for review prior to use.

110-3.4 MARKERS. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word “DUCT” or “CONDUIT” on each marker slab. Impression of letters shall be done in a manner, approved by the Engineer, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the Engineer. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the Engineer. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 BACKFILLING FOR CONDUITS. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 “Excavation and Embankment” except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the Engineer.

110-3.6 BACKFILLING FOR DUCT BANKS. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 “Excavation and Embankment” except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period’s construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the Engineer.

110-3.7 RESTORATION. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include topsoiling, seeding, and mulching in accordance with the contract documents. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This

FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

110-3.8 REMOVAL OF EXISTING DUCT BANK. Existing duct bank shall be removed and properly disposed of from the site as specified in the Contract Documents. Contractor shall locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type, and protect existing utilities to remain from damage. Holes, open trench, and excavations generated as a result of removal operations shall be properly filled, compacted, and surface restored including topsoiling, seeding, and mulching.

METHOD OF MEASUREMENT

110-4.1 Underground conduits and duct banks shall be measured by the linear feet of conduits and duct banks installed or removed, including encasement, locator tape, trenching and backfill with designated material, and for drain lines, the termination at the drainage structure, all measured in place, completed, and accepted. Separate measurement shall be made for the various types and sizes.

BASIS OF PAYMENT

110-5.1 Payment will be made at the contract unit price per linear foot for each type and size of conduit and duct bank completed and accepted, or removed, including trench excavation and backfill with the designated material, and, for drain lines, the termination at the drainage structure. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item per the provisions and intent of the plans and specifications.

Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Pay Unit</u>
L-110-1	Non-Encased Electrical Conduit, 2" Sch. 40 PVC	Linear Foot
L-110-2	Non-Encased Electrical Conduit, 2" RGS	Linear Foot
L-110-3	Concrete Encased Electrical Duct Bank, 9-Way, 4" Sch. 40 PVC	Linear Foot
L-110-4	Remove Existing Electrical Duct Bank	Linear Foot
L-110-5	Remove Existing Cable and Conduit	Linear Foot

MATERIAL REQUIREMENTS

Advisory Circular (AC) 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2,700 kN-m/m ³))
ASTM D2167	Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
NFPA-70	National Electrical Code (NEC)
Underwriters Laboratories (UL) Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

ITEM L-125 INSTALLATION OF AIRPORT LIGHTING SYSTEMS

DESCRIPTION

125-1.1 This item shall consist of furnishing and installing new L-861T medium intensity elevated quartz taxiway edge lights, L-862 high intensity elevated quartz runway edge lights, L-850C high intensity in-pavement quartz runway edge lights, and L-804(L) elevated runway guard lights in accordance with these specifications and as shown on the plans. This item shall also include all wire, cable connections, and isolation transformers, the furnishing and installing of all necessary conduits and fittings and all necessary mounting structures. It shall also include the testing of the installation and all incidentals necessary to place the lights in operation as completed units to the satisfaction of the Engineer.

This item shall also consist of removing existing elevated runway and taxiway lights in accordance with these specifications and as shown on the plans. This item shall also include removal of all wire and cable, conduits and fittings, and mounting structures. It shall also include removal of all incidentals to the satisfaction of the Engineer.

The systems shall be installed, removed, relocated, or altered as shown in the plans.

The Owner retains the right to salvage any usable equipment; however for bidding purposes the Contractor shall assume that all removed electrical equipment (except lighting fixtures and/or guidance signs) shall be disposed of by the Contractor at a location off the Airport property. For salvaged materials (light fixtures and/or parts), it shall be assumed for bidding purposes that the salvage location will be on Airport property.

EQUIPMENT AND MATERIALS

125-2.1 GENERAL.

- a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be approved under the Airport Lighting Equipment Certification Program per AC 150/5345-53, current version.
- b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification, when requested by the Engineer.
- c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the Engineer) and replaced with materials that comply with these specifications at the Contractor's cost.
- d. All materials and equipment used to construct this item shall be submitted to the Engineer for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. **Clearly** and **boldly** mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data.

Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals. Only Third Party certified manufacturers, listed in AC 150/5345-53, Appendix 3 Addendum (as required) and meeting the BUY AMERICAN preference requirements can provide equipment and materials specified in the Contract Documents. Documentation certifying compliance with the BUY AMERICAN preference rules for Airport Improvement Program (AIP) cited in 49 USC §50101) shall be included with each equipment and material submittal.

- e. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the plans and specifications. The Contractor's submittals shall be neatly bound in a properly sized 3-ring binder, tabbed by specification section. The Engineer reserves the right to reject any and all equipment, materials, or procedures that do not meet the system design and the standards and codes, specified in this document.
- f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner. The Contractor shall be responsible to maintain a minimum insulation resistance per AC 150/5340-26B, Maintenance Airport Visual aid Facilities, Table 5-1 and paragraph 5.1.3.1, with isolation transformers connected in new circuits and new segments of existing circuits through the end of the contract warranty period.

125-2.2 TAXIWAY AND RUNWAY EDGE LIGHTS. The edge lights shall conform to the requirements of AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures; and FAA Engineering Brief No. 67 "Light Sources other than Incandescent and Xenon for Airport Lighting and Obstruction Lighting Fixtures."

125-2.3 RUNWAY GUARD LIGHTS. The in-pavement runway guard lights shall conform to the requirements of AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures; and FAA Engineering Brief No. 67 "Light Sources other than Incandescent and Xenon for Airport Lighting and Obstruction Lighting Fixtures."

125-2.4 ISOLATION TRANSFORMERS. The isolation transformers shall conform to the requirements of AC 150/5345-47 (latest edition), Specification for Series to Series Isolation Transformers for Airport Lighting Systems. All isolation transformers shall be ETL certified.

- **ELEVATED TAXIWAY EDGE LIGHTS.** The basis for design for new isolation transformer serving L-861T (QUARTZ) elevated taxiway edge lights shall be as follows: L-830-1, 30/45 Watts, 60 Hz, 6.6A/6.6A.
- **ELEVATED RUNWAY EDGE LIGHTS.** The basis for design for new isolation transformer serving L-862 (QUARTZ) elevated runway edge lights shall be as follows: L-830-18, 150 Watts, 60 Hz, 6.6A/6.6A.
- **IN-PAVEMENT RUNWAY EDGE LIGHTS.** The basis for design for new isolation transformer serving L-850C (QUARTZ) inset runway edge lights shall be as follows: L-830-6, 200 Watts, 60 Hz, 6.6A/6.6A.

- **ELEVATED RUNWAY GUARD LIGHTS.** The basis for design for new isolation transformer serving L-804(L) elevated runway guard lights shall be: L-830-3, 65 Watt, 60 Hz, 6.6A/6.6A.

125-2.5 CABLE CONNECTORS. Cable connectors shall be plug-in only conforming to the requirements of FAA AC 150/5345-26 (latest edition), Specification for L-823 Plug and Receptacle, Cable Connectors.

125-2.6 TAPE. Electrical tape shall conform to L-108, "Installation of Underground Cable for Airports."

125-2.7 CONDUIT. Conduit shall conform to L-110, "Airport Underground Electrical Duct Banks and Conduits."

125-2.8 ADHESIVE COMPOUNDS FOR LIGHT FIXTURES. Adhesive compounds (epoxy) for light fixtures shall conform to P-606, "Adhesive Compounds, Two-Component for Sealing Wire and Lights in Pavement".

125-2.9 SQUEEZE CONNECTORS. Squeeze connectors, where shown or specified, shall be equal to Crouse-Hinds Company, Type CGB cable connector with neoprene rubber bushing.

125-2.10 HEAT SHRINK WRAP. All splice connections shall be sealed with heat applied "shrink wrap" tubing as manufactured for use on Series Lighting Circuits. Each end of the tubing shall have adhesive on the interior that flows when heated to seal any void.

125-2.11 CONCRETE. Concrete shall conform to Item P-610, Structural Portland Cement Concrete, with a minimum 28-day compressive strength of 3,500 psi. Concrete and reinforcing steel are incidental to the respective pay item of which they are a component part. **For in-pavement light installations, a High Early Strength concrete additive shall be added to the concrete mix design.**

125-2.12 ADHESIVE COMPOUNDS FOR LIGHT FIXTURES. Adhesive compounds (epoxy) for light fixtures shall conform to P-606, "Adhesive Compounds, Two-Component for Sealing Wire and Lights in Pavement".

125-2.13 SEALANT AROUND LIGHT FIXTURES. The sealant to be used around light fixtures shall be a self-leveling silicone joint sealant is a one-part cold-applied, easy-to-use, self-leveling silicone material that cures to an ultra-low-modulus silicone rubber upon exposure to atmospheric moisture. The cured silicone rubber remains flexible over the entire temperature range expected in pavement applications (i.e. -20° - 300° F). The product must conform to or meet the following standards: ASTM D5893 Type SL, FAA P-605 for silicone joint sealants, SS-S-200E (section 4.4.12) Flame Test Requirements and EN 14187-5 Hydrolysis Test. The product shall be Dow-Corning 890-SL Silicone Joint Sealant or an approved equal.

125-2.14 HEAVY DUTY LIGHT BASES. Light bases for in-pavement semi-flush mounted lights shall conform to the requirements of FAA Specification L-868 (Load Bearing) and shall be L-868, Class IA or IB (see plans), Size B (12 inch diameter). All base can shall be ETL certified.

125-2.15 BASE CAN EXTENSIONS AND SPACER RINGS. All base can extensions and spacer ring materials shall conform to the requirements of FAA AC 150/5345-42 (latest edition), Specification for Airport Light Bases, Transformer Housing, Junction Boxes and Accessories. All base can extensions and spacer rings shall be ETL certified.

- a. Spacer Rings for use on any in-pavement light shall be L-868, Class 1A or IB (see plans), Size B (12-inch diameter), with an 11-1/4 inch bolt circle, and shall vary in height from a 1/16 inch minimum to 1-inch maximum. The Contractor shall order a sufficient quantity to provide proper adjustment of lights in the field.

125-2.16 SNOW PLOW RINGS. In-pavement semi-flush mounted lights shall use uni-directional snow plow rings conforming to the requirements of FAA Specification L-868 (Load Bearing) and compatible with L-868, Class IA or IB (see plans), Size B (12 inch diameter) base cans and the semi-flush in-pavement light fixture. All snow plow rings shall be ETL certified.

125-2.17 IN-PAVEMENT LIGHT FIXTURE BOLTS. Bolts for all in-pavement light fixtures and bases shall be a SAE Grade 2 hex head “all thread” carbon steel bolts having ceramic-metallic/fluoropolymer coating (orange color). The maximum bolt length shall be three inches (3-1/2”). All bolts shall use a two-part washer system for installation. **In addition to supplying the specified bolts, the Contractor shall supply a torque limiter as part of the project. At the completion of the project, the torque limiter shall be given to the Owner.**

125-2.19 IDENTIFICATION TAGS. I.D. tags shall be furnished and installed in accordance with the details shown in the plans.

CONSTRUCTION METHODS

125-3.1 GENERAL. The installation and testing details for the systems shall be as specified in the applicable advisory circulars and the contract documents.

125-3.2 REMOVALS. All light fixtures or base plates and base cans shown on the plans to be removed shall be removed, including but not limited to the light or base plate, base can, and any miscellaneous electrical items. Any existing light fixtures or base plates, along with any miscellaneous electrical items, will be salvaged and returned over to the Owner. The light bases, or portions of a light base, are to be disposed of off airport property by the Contractor at no expense to the Owner, if the Owner does not desire the material to be salvaged. The void remaining after the removal of the item shall be backfilled as required in accordance with the specifications for Item P-152, Excavation and Embankment, and restored in accordance with Items T-901 Seeding, T-905 Topsoiling, and T-908 Mulching.

125-3.3 SALVAGE OF EQUIPMENT Any light fixture (edge light, guard light, etc.), light base cans, base can covers, light can rings (pavement dam, flange, spacer, etc.), bolts, junction cans, guidance signs, transformers, and any other equipment deemed salvageable by the Owner shall be **salvaged to the Owner on a daily basis**. The equipment salvage return location shall be designated by the Owner at the beginning of the project. Cabling will not be salvaged for this project.

125-3.4 PLACING RUNWAY EDGE OR RUNWAY GUARD LIGHTS. The light fixtures and light bases shall be installed at the locations indicated in the plans. The exact location of the lights shall be as laid out by the Contractor and verified by the Engineer.

125-3.5 INSTALLATION OF LIGHT BASES (ELEVATED EDGE LIGHTS & JUNCTION BOXES) IN TURF. The new light bases or junction cans shall be installed at the locations indicated on the drawings. The exact location and elevation of the light bases shall be determined in the field by the Contractor based on final grades and verified by the Engineer.

Each light base or junction box shall be installed in accordance with the details shown on the Contract Drawings and shall be placed on bedding material and backfilled with material consisting of hard, durable particles so graded that 100% will pass a 1- inch sieve, and not more than 20% will pass a #200 sieve and shall be free from loam, silt, clay, or organic matter.

125-3.6 INSTALLATION OF LIGHT BASES (IN-PAVEMENT). The new light bases for in-pavement lights shall be installed at the locations indicated on the drawings. The exact location and finish setting elevation of the light bases shall be determined in the field by the Contractor based on final grades and verified by the Engineer.

The Contractor shall core the existing pavement with a diameter large enough to perform all of the work necessary for a complete installation (i.e. grounding, conduit connections, etc.). After the setting of the light base, all light base ancillary components and connections (i.e. grounding, conduit connections, etc.) shall be installed prior to any backfilling.

The backfill material used shall be as shown on the details for the different type of light installations. The backfill material shall be installed to the limits and depths as shown in the detail. The backfill for in-pavement lights shall be Portland cement concrete as defined within this specification. The backfill material shall be allowed to properly set-up prior to installing any surface treatment.

For shoulder and non-aircraft loading pavements, all surfaces of the backfill material must be dry and free from dust, dirt, grease, loose materials and other matter that will inhibit surface bonding of the repair mastic compound. With proper pavement temperatures at 40°F (4°C) or higher, dispense hot trench or removal pavement patch material onto the properly prepared surface, in layers if needed. Level and smooth with the surrounding pavement surface to form a durable, smooth riding repair in accordance with the patch material manufacturer's recommendations.

For aircraft loading pavements, the bituminous pavement courses shall be installed in accordance with P-401, "*Plant Mix Bituminous Concrete Pavement*".

125-3.7 MOUNTING FIXTURES. As noted on the plans, the base can ring extensions, spacer rings and fixture mounting rings (if applicable) shall be installed. All installation work shall be performed in accordance with the manufacturer's recommendations and as required by the FAA Advisory Circulars. All light fixtures shall be mounted securely to the light base in accordance with the manufacturer's recommendations using ceramic coated bolts with at least 3/4" extension below the flange depths of the base can ring extension. The fixtures shall receive the adhesive compounds and sealants around the light fixtures as shown on the details.

125-3.8 ELECTRICAL CONNECTION. The Contractor shall furnish all labor and materials and shall make complete electrical connections in accordance with the wiring diagram furnished with the project plans. The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electric Code.

125-3.9 INSTALLING ISOLATION TRANSFORMERS. The isolation transformer for new and existing retrofitted base mounted lights and guidance signs shall be installed per FAA requirements. Transformers shall be placed on a brick in such manner as not to block the drain.

All existing light fixtures and guidance signs having new cabling installed on its circuit passing through the fixture or sign shall be retrofitted with new transformers and connectors.

125-3.10 GROUNDING. Each light fixture and sign shall be grounded in accordance with the details as shown on the Contract Drawings and as required by the FAA Advisory Circulars.

125-3.11 IN-PAVEMENT LIGHT FIXTURE BOLT INSTALLATIONS. All ceramic coated bolts shall be installed using a torque limiter, impact wrenches will not be allowed. A maximum of 185 inch-lbs of torque shall be used for tightening bolts. The use of anti-seize or thread locking compounds shall not be used with ceramic coated bolts. **As noted above, a torque limiter shall be turned over to the Owner at the end of the project for their use at no additional cost.**

125-3.12 TAPING CONNECTIONS. All L-823 connections shall be taped with one inner layer of rubber or synthetic rubber tape as specified above and one outer layer of plastic tape. The taping shall be one-half lapped and extend 1/2 inches to each side of the connection joint. All L-823 connector/cable joints shall be sealed with heat shrink wrap. The plug/receptacle mating shall not be shrink wrapped.

METHOD OF MEASUREMENT

125-4.1 The quantity of light fixture assemblies installed and measured under an identified item shall be the number of each type installed and accepted by the Engineer.

125-4.2 The quantity of light fixtures or base plates and base cans to be removed and measured under an identified item shall be the number of each type removed, and accepted by the Engineer. As noted above, the Owner shall have the first right of refusal for any salvaging of the materials. If the Owner does not desire to salvage the materials, the Contractor shall properly dispose of the materials off the site.

BASIS OF PAYMENT

125-5.1 Payment will be made at the contract unit price for each complete light fixture assembly installed and accepted by the Engineer. This price shall be full compensation for all materials, labor, equipment, tools, excavation, backfill and compaction and incidentals necessary to complete this item.

125-5.2 Payment will be made at the contract unit price for each light fixture or base plate and base can, which is removed by the Contractor and accepted by the Engineer. This price shall be full compensation for all materials, labor, equipment, tools, excavation, disposal or salvage of the materials, backfill and compaction and incidentals necessary to complete this item to the satisfaction of the Engineer.

Payment will be made under:

<u>Item No.</u>	<u>Description</u>	<u>Pay Unit</u>
L-125-1	L-861T Medium Intensity Base-Mounted Quartz Taxiway Edge Light	Each

L-125-2	L-862 High Intensity Base-Mounted Quartz Runway Edge Light	Each
L-125-3	L-850C High Intensity Inset Quartz Runway Edge Light	Each
L-125-4	L-804(L) Elevated Runway Guard Light	Each
L-125-5	Remove Existing Base-Mounted Edge Light	Each
L-125-6	Remove Existing In-Pavement Runway Edge Light	Each
L-125-7	Remove Existing Runway Guard Light	Each

MATERIAL REQUIREMENTS

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits			
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors			
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories			
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures			
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems			
AC 150/5340-30	Design and Installation Details for Airport Visual Aids			
AC 150/5345-53	Airport Lighting Equipment Certification Program			
Commercial	Item	Description	A-A	59544
		Cable and Wire, Electrical (Power, Fixed Installation)		
FAA EB #67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Light Fixtures			
FAA EB #83	In Pavement Light Fixture Bolts			
NFPA-70	National Electrical Code (NEC)			

END OF ITEM L-125

ESTIMATE OF QUANTITIES - BASE BID

BID ITEM	DESCRIPTION OF ITEM	UNIT	QUANTITY	FINAL
M-100-1	MOBILIZATION (3% MAX.)	LS	1	
M-110-1	ENGINEER'S FIELD OFFICE	LS	1	
M-120-1	MAINTENANCE AND PROTECTION OF TRAFFIC	LS	1	
M-120-2	LOW-PROFILE CONSTRUCTION BARRICADES	EA	970	
M-120-3	LIGHTED RUNWAY CLOSURE MARKERS	EA	2	
M-150-1	PROJECT SURVEY AND STAKEOUT	LS	1	
P-100-1	GEOTEXTILE STABILIZATION FABRIC	SY	31,300	
P-101-1	PAVEMENT EXCAVATION	SY	41,800	
P-101-2	MISCELLANEOUS COLD MILLING	SY	1,220	
P-101-3	PAINT REMOVAL	SF	4,370	
P-152-1	UNCLASSIFIED EXCAVATION AND DISPOSAL	CY	58,400	
P-152-2	UNDERCUT EXCAVATION AND BACKFILL	CY	5,900	
P-152-3	EMBANKMENT IN PLACE	CY	1,900	
P-153-1	CONTROLLED LOW STRENGTH MATERIAL	CY	40	
P-156-1	SILT FENCE-TEMPORARY	LF	2,100	
P-156-2	DRAINAGE STRUCTURE INLET PROTECTION, SILT FENCE-TEMPORARY	LF	200	
P-156-3	DRAINAGE STRUCTURE INLET PROTECTION, GRAVEL BAG-TEMPORARY	CY	4	
P-156-4	SEED AND MULCH-TEMPORARY	SY	66,140	
P-156-5	CONCRETE WASHOUT STRUCTURE	EA	2	
P-156-6	CONSTRUCTION ENTRANCE	SY	150	
P-209-1	CRUSHED AGGREGATE BASE COURSE	CY	21,000	
P-401-1	BITUMINOUS SURFACE COURSE	TON	9,900	
P-401-2	BITUMINOUS BINDER COURSE	TON	14,700	
P-603-1	BITUMINOUS TACK COAT	GAL	12,000	
P-620-1	WHITE RUNWAY AND TAXIWAY MARKING	SF	11,900	
P-620-2	YELLOW RUNWAY AND TAXIWAY MARKING	SF	12,800	
P-620-3	BLACK RUNWAY AND TAXIWAY MARKING	SF	27,300	
P-620-4	PREFORMED THERMOPLASTIC SURFACE PAINTED HOLDING POSITION SIGN	SF	1,340	
P-620-5	TEMPORARY RUNWAY AND TAXIWAY MARKING	SF	2,970	
D-701-1	REINFORCED CONCRETE PIPE CLASS IV, 30 INCH DIAMETER	LF	500	
D-701-2	REINFORCED CONCRETE PIPE CLASS III, 12 INCH DIAMETER	LF	230	
D-701-3	HIGH DENSITY POLYETHYLENE (HDPE), 8 INCH DIAMETER	LF	130	
D-701-4	REMOVE EXISTING DRAINAGE PIPE	LF	510	
D-703-1	CONCRETE PLUGS FOR SEWER PIPE	EA	3	
D-705-1	6" PERFORATED HDPE UNDERDRAIN (INCLUDING POROUS BACKFILL AND FILTER FABRIC)	LF	9,180	
D-705-2	UNDERDRAIN CLEANOUT	EA	40	
D-705-3	REMOVE EXISTING UNDERDRAIN PIPE	LF	7,950	
D-705-4	REMOVE EXISTING UNDERDRAIN CLEANOUT	EA	22	
D-751-1	RECTANGULAR DRAINAGE STRUCTURE, 3'x3'	EA	2	
D-751-2	ALTER EXISTING DRAINAGE STRUCTURE	EA	12	
D-751-3	ADJUST EXISTING DRAINAGE STRUCTURE - RAISE / LOWER (MINOR)	EA	4	
D-751-4	ADJUST EXISTING DRAINAGE STRUCTURE - RAISE (MAJOR)	EA	4	
D-751-5	REMOVE EXISTING DRAINAGE STRUCTURE	EA	2	
L-108-1	NO. 8 AWG, 5KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH, DUCT BANK, OR CONDUIT	LF	25,000	
L-108-2	NO. 6 AWG, SOLID, BARE COUNTERPOISE WIRE, INSTALLED IN TRENCH, ABOVE THE DUCT BANK OR CONDUIT, INCLUDING GROUND RODS AND GROUND CONNECTORS	LF	10,000	
L-108-3	NO. 6 AWG, 5KV, L-824, TYPE C CABLE, INSTALLED IN TRENCH DUCT BANK, OR CONDUIT	LF	13,000	
L-108-4	SENSOR (V) CABLE	LF	11,000	
L-109-1	INSTALL CONSTANT CURRENT REGULATOR (CCR) IN ELECTRICAL VAULT, 20 KW	EA	2	
L-109-2	INSTALL CONSTANT CURRENT REGULATOR (CCR) IN ELECTRICAL VAULT, 15 KW	EA	2	
L-110-1	NON-ENCASED ELECTRICAL CONDUIT, 2" SCH. 40 PVC	LF	23,300	
L-110-2	NON-ENCASED ELECTRICAL CONDUIT, 2" RGS	LF	5,000	
L-110-3	CONCRETE ENCASED ELECTRICAL DUCT BANK, 9-WAY, 4" SCH. 40 PVC	LF	510	
L-110-4	REMOVE EXISTING ELECTRICAL DUCT BANK	LF	670	
L-110-5	REMOVE EXISTING CABLE AND CONDUIT	LF	10,110	
L-115-1	ELECTRICAL MANHOLE, 6' x 6' PRECAST CONCRETE	EA	4	
L-115-2	ELECTRICAL JUNCTION STRUCTURE, CLASS IA, TYPE L-867, SIZE B	EA	20	
L-115-3	EXISTING ELECTRICAL MANHOLE ELEVATION ADJUSTMENT	EA	2	
L-115-4	REMOVE EXISTING ELECTRICAL MANHOLE	EA	8	
L-125-1	L-861T MEDIUM INTENSITY BASE-MOUNTED QUARTZ TAXIWAY EDGE LIGHT	EA	136	
L-125-2	L-862 HIGH INTENSITY BASE-MOUNTED QUARTZ RUNWAY EDGE LIGHT	EA	14	
L-125-3	L-850C HIGH INTENSITY IN-PAVEMENT QUARTZ RUNWAY EDGE LIGHT	EA	2	
L-125-4	L-804(L) ELEVATED RUNWAY GUARD LIGHT	EA	4	
L-125-5	REMOVE EXISTING BASE-MOUNTED ELEVATED EDGE LIGHT	EA	149	
L-125-6	REMOVE EXISTING IN-PAVEMENT RUNWAY EDGE LIGHT	EA	10	
L-125-7	REMOVE EXISTING RUNWAY GUARD LIGHT	EA	8	
L-130-1	REPLACE PAVEMENT SURFACE SENSOR	EA	1	
L-853-1	RETROREFLECTIVE DGE MARKER, BLUE, 30" HEIGHT	EA	8	
L-858-1	SIZE 3 AIRFIELD GUIDANCE SIGN, INCLUDING CONCRETE FOUNDATION	EA	16	
L-858-2	SIZE 1 AIRFIELD GUIDANCE SIGN, INCLUDING CONCRETE FOUNDATION	EA	7	
L-858-3	REMOVE EXISTING AIRFIELD GUIDANCE SIGN	EA	22	
L-858-4	ALTER EXISTING SIGN PANEL	EA	6	
T-901-1	SEEDING	AC	9	

ESTIMATE OF QUANTITIES - BASE BID (CONT.)

T-902-1	SOIL RESTORATION	AC	5	
T-905-1	TOPSOILING (OBTAINED ON SITE)	CY	3,550	
T-908-1	MULCHING	AC	9	


ESTIMATE OF QUANTITIES - ADD ALTERNATE NO. 1 (T/W 'M' REPAIRS)

BID ITEM	DESCRIPTION OF ITEM	UNIT	QUANTITY	FINAL
M-100-1	MOBILIZATION (3% MAX.)	LS	1	
M-110-1	ENGINEER'S FIELD OFFICE	LS	1	
M-120-1	MAINTENANCE AND PROTECTION OF TRAFFIC	LS	1	
M-120-2	LOW-PROFILE CONSTRUCTION BARRICADES	EA	365	
M-120-3	LIGHTED RUNWAY CLOSURE MARKERS	EA	2	
M-150-1	PROJECT SURVEY AND STAKEOUT	LS	1	
P-101-4	COLD MILLING	SY	4,000	
P-101-5	PAVEMENT REPAIRS, TYPE 1	LF	1,700	
P-101-6	PAVEMENT REPAIRS, TYPE 2	LF	500	
P-401-1	BITUMINOUS SURFACE COURSE	TON	800	
P-603-1	BITUMINOUS TACK COAT	GAL	400	
P-620-2	YELLOW RUNWAY AND TAXIWAY MARKING	SF	700	
P-620-4	PREFORMED THERMOPLASTIC SURFACE PAINTED HOLDING POSITION SIGN	SF	669	

DRAWING SHEET INDEX

SHEET NO.	DWG. NO.	DESCRIPTION
1	CV-00	COVER
2	IN-01	SHEET INDEX AND QUANTITY TABLES
3	GP-01	GENERAL PLAN
4	CP-01	HORIZONTAL & VERTICAL CONTROL PLAN - OVERALL
5	GN-01	GENERAL NOTES
6	GN-02	ABBREVIATIONS AND LEGEND
7	CS-01	CONSTRUCTION SAFETY & PHASING PLAN (SHEET 1 OF 3)
8	CS-02	CONSTRUCTION SAFETY & PHASING PLAN (SHEET 2 OF 3)
9	CS-03	CONSTRUCTION SAFETY & PHASING PLAN (SHEET 3 OF 3)
10	CD-01	CONSTRUCTION SAFETY & PHASING PLAN DETAILS (SHEET 1 OF 2)
11	CD-02	CONSTRUCTION SAFETY & PHASING PLAN DETAILS (SHEET 2 OF 2)
12	DE-01	EXISTING CONDITIONS & DEMOLITION PLAN (SHEET 1 OF 5)
13	DE-02	EXISTING CONDITIONS & DEMOLITION PLAN (SHEET 2 OF 5)
14	DE-03	EXISTING CONDITIONS & DEMOLITION PLAN (SHEET 3 OF 5)
15	DE-04	EXISTING CONDITIONS & DEMOLITION PLAN (SHEET 4 OF 5)
16	DE-05	EXISTING CONDITIONS & DEMOLITION PLAN (SHEET 5 OF 5)
17	GE-01	GEOMETRY PLAN & HORIZONTAL AND VERTICAL CONTROL (SHEET 1 OF 4)
18	GE-02	GEOMETRY PLAN & HORIZONTAL AND VERTICAL CONTROL (SHEET 2 OF 4)
19	GE-03	GEOMETRY PLAN & HORIZONTAL AND VERTICAL CONTROL (SHEET 3 OF 4)
20	GE-04	GEOMETRY PLAN & HORIZONTAL AND VERTICAL CONTROL (SHEET 4 OF 4)
21	PR-01	PROFILES (SHEET 1 OF 2)
22	PR-02	PROFILES (SHEET 2 OF 2)
23	TS-01	TYPICAL SECTIONS - 1
24	TS-02	TYPICAL SECTIONS - 2
25	TS-03	TYPICAL SECTIONS - 3
26	GR-01	GRADING & DRAINAGE PLAN (SHEET 1 OF 4)
27	GR-02	GRADING & DRAINAGE PLAN (SHEET 2 OF 4)
28	GR-03	GRADING & DRAINAGE PLAN (SHEET 3 OF 4)
29	GR-04	GRADING & DRAINAGE PLAN (SHEET 4 OF 4)
30	DR-01	DRAINAGE DETAILS (SHEET 1 OF 3)
31	DR-02	DRAINAGE DETAILS (SHEET 2 OF 3)
32	DR-03	DRAINAGE DETAILS (SHEET 3 OF 3)
33	DP-01	DRAINAGE PROFILES
34	EC-01	EROSION & SEDIMENT CONTROL PLAN (SHEET 1 OF 4)
35	EC-02	EROSION & SEDIMENT CONTROL PLAN (SHEET 2 OF 4)
36	EC-03	EROSION & SEDIMENT CONTROL PLAN (SHEET 3 OF 4)
37	EC-04	EROSION & SEDIMENT CONTROL PLAN (SHEET 4 OF 4)
38	EC-05	EROSION & SEDIMENT CONTROL DETAILS (SHEET 1 OF 2)
39	EC-06	EROSION & SEDIMENT CONTROL DETAILS (SHEET 2 OF 2)
40	EC-07	EROSION & SEDIMENT CONTROL NOTES
41	EP-01	LIGHTING & SIGNAGE PLAN (SHEET 1 OF 5)
42	EP-02	LIGHTING & SIGNAGE PLAN (SHEET 2 OF 5)
43	EP-03	LIGHTING & SIGNAGE PLAN (SHEET 3 OF 5)
44	EP-04	LIGHTING & SIGNAGE PLAN (SHEET 4 OF 5)
45	EP-05	LIGHTING & SIGNAGE PLAN (SHEET 5 OF 5)
46	EP-06	ELECTRICAL DETAILS (SHEET 1 OF 4)
47	EP-07	ELECTRICAL DETAILS (SHEET 2 OF 4)
48	EP-08	ELECTRICAL DETAILS (SHEET 3 OF 4)
49	EP-09	ELECTRICAL DETAILS (SHEET 4 OF 4)
50	MK-01	MARKING PLAN (SHEET 1 OF 4)
51	MK-02	MARKING PLAN (SHEET 2 OF 4)
52	MK-03	MARKING PLAN (SHEET 3 OF 4)
53	MK-04	MARKING PLAN (SHEET 4 OF 4)
54	MK-05	MARKING DETAILS (SHEET 1 OF 2)
55	MK-06	MARKING DETAILS (SHEET 2 OF 2)

CONSTRUCTION BID SET

	5/25/2018	ADDENDUM NO. 1: ADDED ITEMS L-853, L-858, T-901, T-902, T-905, AND T-908 TO BASE BID QTY TABLE	JPM
	REV	DATE	DESCRIPTION
	BY		

Syracuse Regional Airport Authority
CITY OF SYRACUSE, STATE OF NEW YORK
RECONFIGURE TAXIWAYS C, F, B, G, AND E

SHEET INDEX AND QUANTITY TABLES

SCALE: NO SCALE	DESIGN: JPM	IN-01 2 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

 **McFarland Johnson**
2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

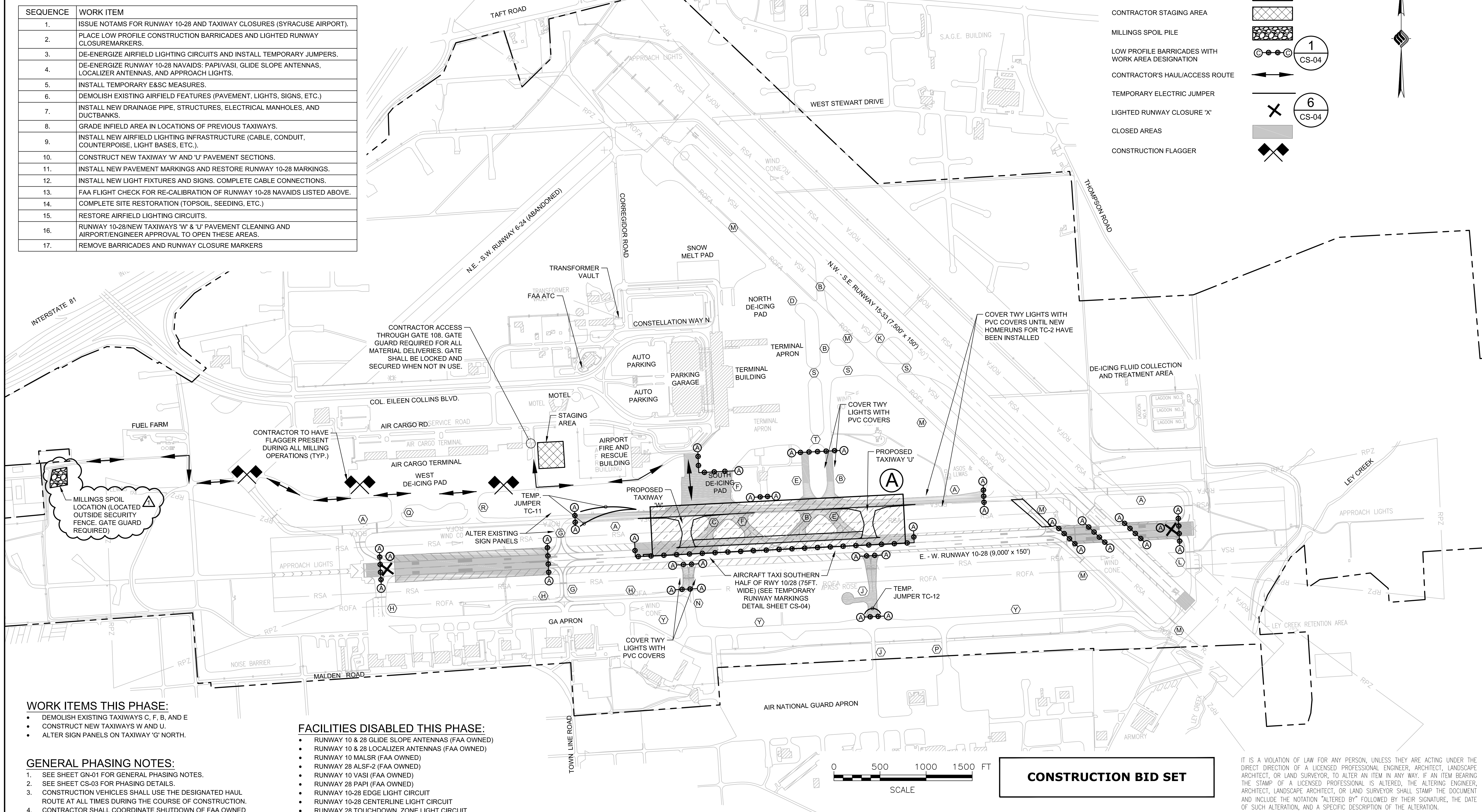
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY, IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

WORK ITEMS/SEQUENCE OF CONSTRUCTION - THIS PHASE:

SEQUENCE	WORK ITEM
1.	ISSUE NOTAMS FOR RUNWAY 10-28 AND TAXIWAY CLOSURES (SYRACUSE AIRPORT).
2.	PLACE LOW PROFILE CONSTRUCTION BARRICADES AND LIGHTED RUNWAY CLOSURE MARKERS.
3.	DE-ENERGIZE AIRFIELD LIGHTING CIRCUITS AND INSTALL TEMPORARY JUMPERS.
4.	DE-ENERGIZE RUNWAY 10-28 NAVAIDS: PAPI/VASI, GLIDE SLOPE ANTENNAS, LOCALIZER ANTENNAS, AND APPROACH LIGHTS.
5.	INSTALL TEMPORARY E&SC MEASURES.
6.	DEMOLISH EXISTING AIRFIELD FEATURES (PAVEMENT, LIGHTS, SIGNS, ETC.)
7.	INSTALL NEW DRAINAGE PIPE, STRUCTURES, ELECTRICAL MANHOLES, AND DUCTBANKS.
8.	GRADE INFIELD AREA IN LOCATIONS OF PREVIOUS TAXIWAYS.
9.	INSTALL NEW AIRFIELD LIGHTING INFRASTRUCTURE (CABLE, CONDUIT, COUNTERPOISE, LIGHT BASES, ETC.).
10.	CONSTRUCT NEW TAXIWAY 'W' AND 'U' PAVEMENT SECTIONS.
11.	INSTALL NEW PAVEMENT MARKINGS AND RESTORE RUNWAY 10-28 MARKINGS.
12.	INSTALL NEW LIGHT FIXTURES AND SIGNS. COMPLETE CABLE CONNECTIONS.
13.	FAA FLIGHT CHECK FOR RE-CALIBRATION OF RUNWAY 10-28 NAVAIDS LISTED ABOVE.
14.	COMPLETE SITE RESTORATION (TOPSOIL, SEEDING, ETC.)
15.	RESTORE AIRFIELD LIGHTING CIRCUITS.
16.	RUNWAY 10-28/NEW TAXIWAYS 'W' & 'U' PAVEMENT CLEANING AND AIRPORT/ENGINEER APPROVAL TO OPEN THESE AREAS.
17.	REMOVE BARRICADES AND RUNWAY CLOSURE MARKERS

LEGEND

- CONSTRUCTION AREA THIS PHASE
- CONTRACTOR STAGING AREA
- MILLINGS SPOIL PILE
- LOW PROFILE BARRICADES WITH WORK AREA DESIGNATION
- CONTRACTOR'S HAUL/ACCESS ROUTE
- TEMPORARY ELECTRIC JUMPER
- LIGHTED RUNWAY CLOSURE 'X'
- CLOSED AREAS
- CONSTRUCTION FLAGGER



WORK ITEMS THIS PHASE:

- DEMOLISH EXISTING TAXIWAYS C, F, B, AND E
- CONSTRUCT NEW TAXIWAYS W AND U.
- ALTER SIGN PANELS ON TAXIWAY 'G' NORTH.

FACILITIES DISABLED THIS PHASE:

- RUNWAY 10 & 28 GLIDE SLOPE ANTENNAS (FAA OWNED)
- RUNWAY 10 & 28 LOCALIZER ANTENNAS (FAA OWNED)
- RUNWAY 10 MALSR (FAA OWNED)
- RUNWAY 28 ALSF-2 (FAA OWNED)
- RUNWAY 10 VASI (FAA OWNED)
- RUNWAY 28 PAPI (FAA OWNED)
- RUNWAY 10-28 EDGE LIGHT CIRCUIT
- RUNWAY 10-28 CENTERLINE LIGHT CIRCUIT
- RUNWAY 28 TOUCHDOWN ZONE LIGHT CIRCUIT
- TAXIWAY CIRCUIT #1

GENERAL PHASING NOTES:

1. SEE SHEET GN-01 FOR GENERAL PHASING NOTES.
2. SEE SHEET CS-03 FOR PHASING DETAILS.
3. CONSTRUCTION VEHICLES SHALL USE THE DESIGNATED HAUL ROUTE AT ALL TIMES DURING THE COURSE OF CONSTRUCTION.
4. CONTRACTOR SHALL COORDINATE SHUTDOWN OF FAA OWNED FACILITIES WITH FAA TECH OPS.

PHASE REQUIREMENTS:

PHASE	WORK AREA	CALENDAR DAYS	REQUIREMENTS TO BEGIN	WORK HOUR RESTRICTIONS/ REQUIREMENTS	AIRFIELD CLOSURE AREAS	CLOSURE HOURS	LIQUIDATED DAMAGES	AIRPORT OPERATIONAL RESTRICTIONS
1	A	45	NOTICE TO PROCEED (NTP)	NONE	RUNWAY 10-28 TAXIWAYS C/F/B/E SOUTH DE-ICING PAD	24 HOURS/DAY	\$10,000/CALENDAR DAY OR PORTION THEREOF	RUNWAY 10-28 CLOSED CHANGED TAXI PATTERNS

CONSTRUCTION BID SET



McFarland Johnson
2525 STATE ROUTE 332
CANANDAQUA, NEW YORK 14424

REV	DATE	DESCRIPTION	BY
1	6/5/2018	ADDENDUM NO. 1: CLARIFIED LOCATION OF MILLINGS STOCKPILE	JPM

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

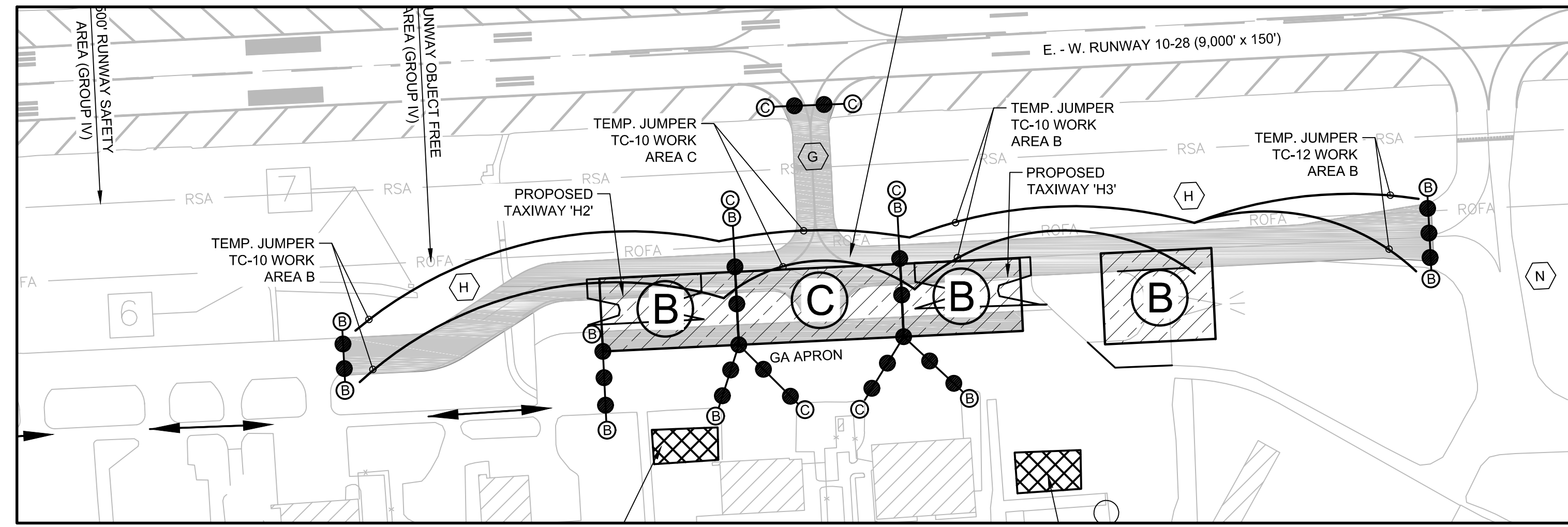
SYRACUSE REGIONAL AIRPORT AUTHORITY
CITY OF SYRACUSE, STATE OF NEW YORK
RECONFIGURE TAXIWAYS C, F, B, G, AND E

CONSTRUCTION SAFETY & PHASING PLAN (SHEET 1 OF 4)

SCALE: 1"=500'	DESIGN: JPM	CS-01 7 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

WORK ITEMS/SEQUENCE OF CONSTRUCTION - THIS PHASE:

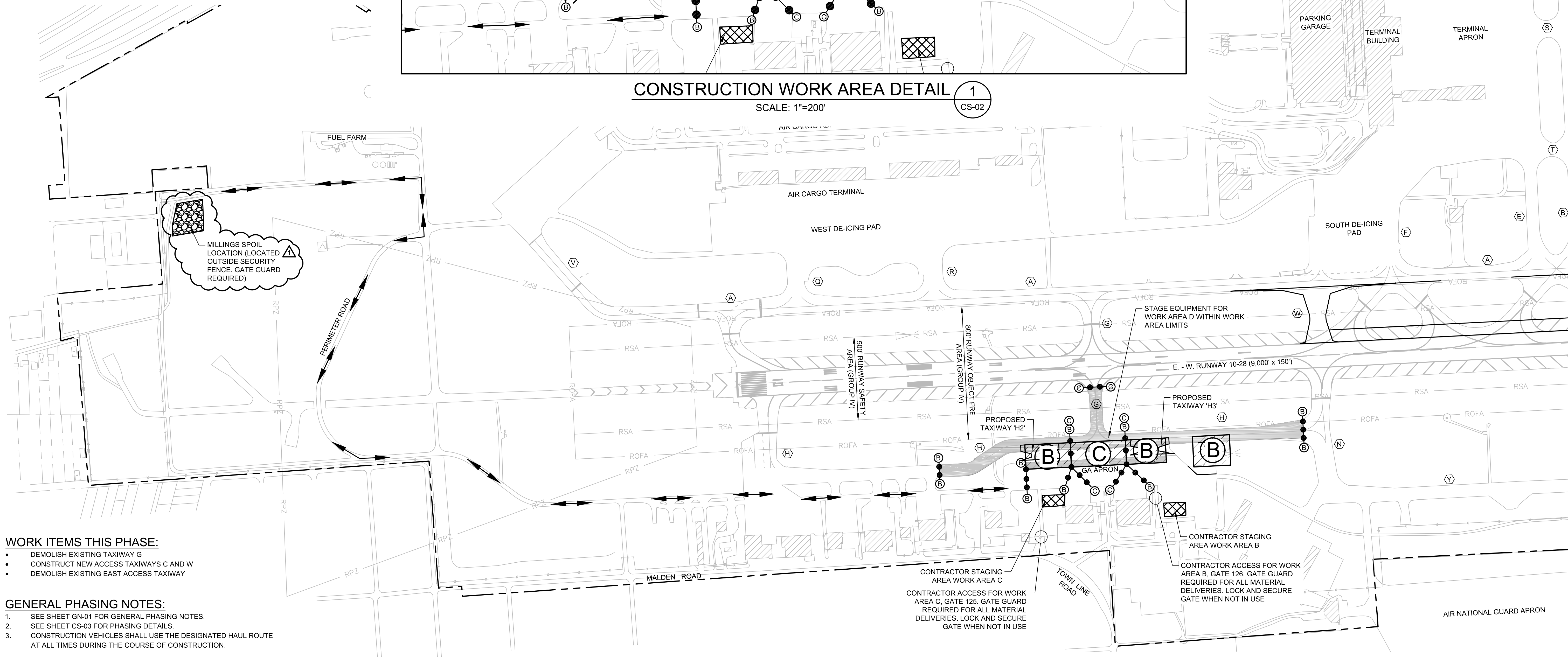
SEQUENCE	WORK ITEM
1.	ISSUE NOTAMS FOR AIRFIELD CLOSURES (SYRACUSE AIRPORT).
2.	PLACE LOW PROFILE CONSTRUCTION BARRICADES.
3.	DE-ENERGIZE AIRFIELD LIGHTING CIRCUITS AND INSTALL TEMPORARY JUMPERS.
4.	CONSTRUCT NEW TAXIWAY 'H3' AND DEMOLISH EXISTING ACCESS TAXIWAY (WORK AREA B).
5.	CONSTRUCT NEW TAXIWAY 'H2' (WORK AREA C) CONCURRENTLY WITH WORK AREA B.
6.	OPEN NEW TAXIWAYS 'H2' AND 'H3', DEMOLISH EXISTING TAXIWAY 'G' (WORK AREA D).
7.	RESTORE AIRFIELD LIGHTING CIRCUITS.
8.	SOUTH GA APRON/TAXIWAY 'H' PAVEMENT CLEANING AND AIRPORT/ENGINEER APPROVAL TO OPEN THESE AREAS.



CONSTRUCTION WORK AREA DETAIL 1
SCALE: 1"=200'

LEGEND

- CONSTRUCTION AREA THIS PHASE
- CONTRACTOR STAGING AREA
- MILLINGS SPOIL PILE
- LOW PROFILE BARRICADES WITH WORK AREA DESIGNATION
- CONTRACTOR'S HAUL/ACCESS ROUTE
- TEMPORARY ELECTRIC JUMPER
- CLOSED AREAS



WORK ITEMS THIS PHASE:

- DEMOLISH EXISTING TAXIWAY G
- CONSTRUCT NEW ACCESS TAXIWAYS C AND W
- DEMOLISH EXISTING EAST ACCESS TAXIWAY

GENERAL PHASING NOTES:

1. SEE SHEET GN-01 FOR GENERAL PHASING NOTES.
2. SEE SHEET CS-03 FOR PHASING DETAILS.
3. CONSTRUCTION VEHICLES SHALL USE THE DESIGNATED HAUL ROUTE AT ALL TIMES DURING THE COURSE OF CONSTRUCTION.

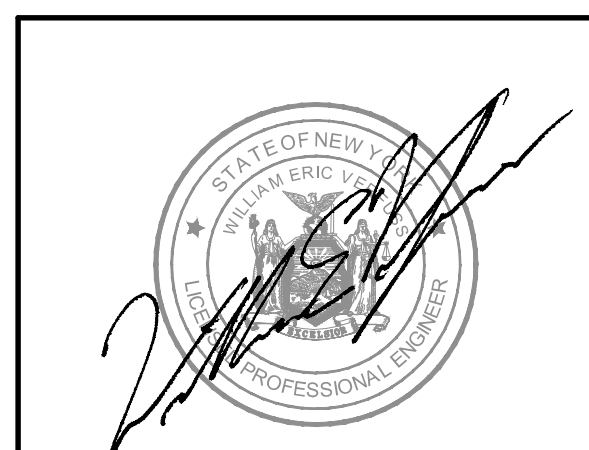
PHASE REQUIREMENTS:

PHASE	WORK AREA	CALENDAR DAYS	REQUIREMENTS TO BEGIN	WORK HOUR RESTRICTIONS/ REQUIREMENTS	AIRFIELD CLOSURE AREAS	CLOSURE HOURS	LIQUIDATED DAMAGES	AIRPORT OPERATIONAL RESTRICTIONS
2	B	25	COMPLETE PHASE 1	NONE	TAXIWAY H BETWEEN TW G AND ACCESS TW	24 HOURS/DAY	\$2,500/CALENDAR OR PORTION THEREOF	PORTION OF TAXIWAY H CLOSED TO TAXIING AIRCRAFT
2	C	5	COMPLETE WORK AREA 'B'	NONE	TAXIWAY G SOUTH, TAXIWAY G/H INTERSECTION	24 HOURS/DAY	\$2,500/CALENDAR DAY OR PORTION THEREOF	PORTION OF TAXIWAY H CLOSED TO TAXIING AIRCRAFT



CONSTRUCTION BID SET

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.



McFarland Johnson
2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

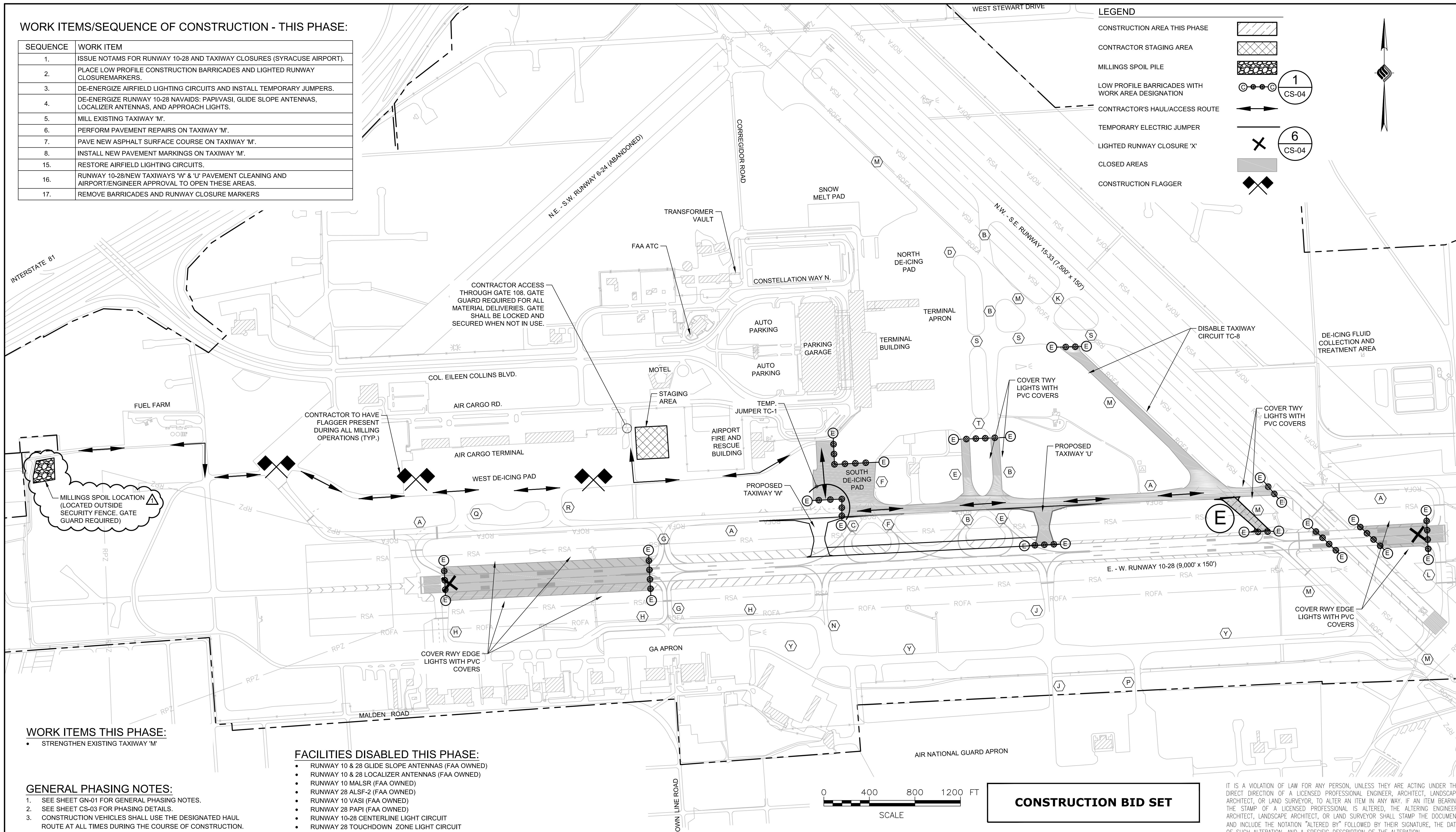
6/5/2018	ADDENDUM NO. 1: CLARIFIED LOCATION OF MILLINGS STOCKPILE	JPM
REV	DATE	DESCRIPTION
<p>SYRACUSE REGIONAL AIRPORT AUTHORITY CITY OF SYRACUSE, STATE OF NEW YORK RECONFIGURE TAXIWAYS C, F, B, G, AND E</p> <p>CONSTRUCTION SAFETY & PHASING PLAN (SHEET 2 OF 4)</p>		
SCALE: 1"=300'	DESIGN: JPM	CS-02 8 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

WORK ITEMS/SEQUENCE OF CONSTRUCTION - THIS PHASE:

SEQUENCE	WORK ITEM
1.	ISSUE NOTAMS FOR RUNWAY 10-28 AND TAXIWAY CLOSURES (SYRACUSE AIRPORT).
2.	PLACE LOW PROFILE CONSTRUCTION BARRICADES AND LIGHTED RUNWAY CLOSURE MARKERS.
3.	DE-ENERGIZE AIRFIELD LIGHTING CIRCUITS AND INSTALL TEMPORARY JUMPERS.
4.	DE-ENERGIZE RUNWAY 10-28 NAVAIDS: PAPI/VASI, GLIDE SLOPE ANTENNAS, LOCALIZER ANTENNAS, AND APPROACH LIGHTS.
5.	MILL EXISTING TAXIWAY 'M'.
6.	PERFORM PAVEMENT REPAIRS ON TAXIWAY 'M'.
7.	PAVE NEW ASPHALT SURFACE COURSE ON TAXIWAY 'M'.
8.	INSTALL NEW PAVEMENT MARKINGS ON TAXIWAY 'M'.
15.	RESTORE AIRFIELD LIGHTING CIRCUITS.
16.	RUNWAY 10-28/NEW TAXIWAYS 'W' & 'U' PAVEMENT CLEANING AND AIRPORT/ENGINEER APPROVAL TO OPEN THESE AREAS.
17.	REMOVE BARRICADES AND RUNWAY CLOSURE MARKERS

LEGEND

- CONSTRUCTION AREA THIS PHASE
- CONTRACTOR STAGING AREA
- MILLINGS SPOIL PILE
- LOW PROFILE BARRICADES WITH WORK AREA DESIGNATION
- CONTRACTOR'S HAUL/ACCESS ROUTE
- TEMPORARY ELECTRIC JUMPER
- LIGHTED RUNWAY CLOSURE 'X'
- CLOSED AREAS
- CONSTRUCTION FLAGGER



WORK ITEMS THIS PHASE:

- STRENGTHEN EXISTING TAXIWAY 'M'

FACILITIES DISABLED THIS PHASE:

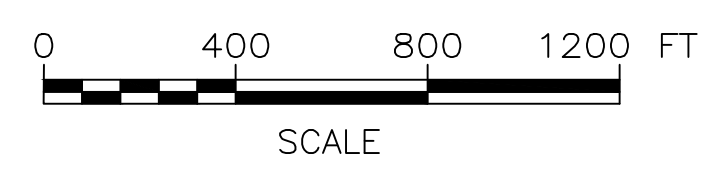
- RUNWAY 10 & 28 GLIDE SLOPE ANTENNAS (FAA OWNED)
- RUNWAY 10 & 28 LOCALIZER ANTENNAS (FAA OWNED)
- RUNWAY 10 MALSR (FAA OWNED)
- RUNWAY 28 ALSF-2 (FAA OWNED)
- RUNWAY 10 VASI (FAA OWNED)
- RUNWAY 28 PAPI (FAA OWNED)
- RUNWAY 10-28 CENTERLINE LIGHT CIRCUIT
- RUNWAY 28 TOUCHDOWN ZONE LIGHT CIRCUIT
- TAXIWAY CIRCUIT #8

GENERAL PHASING NOTES:

1. SEE SHEET GN-01 FOR GENERAL PHASING NOTES.
2. SEE SHEET CS-03 FOR PHASING DETAILS.
3. CONSTRUCTION VEHICLES SHALL USE THE DESIGNATED HAUL ROUTE AT ALL TIMES DURING THE COURSE OF CONSTRUCTION.
4. CONTRACTOR SHALL COORDINATE SHUTDOWN OF FAA OWNED FACILITIES WITH FAA TECH OPS.

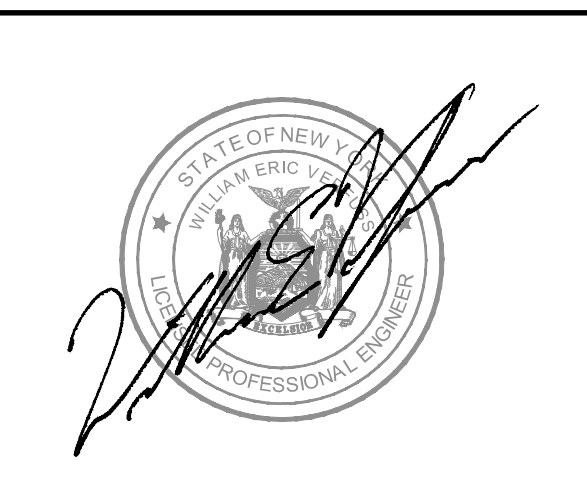
PHASE REQUIREMENTS:

PHASE	WORK AREA	CALENDAR HOURS	REQUIREMENTS TO BEGIN	WORK HOUR RESTRICTIONS/REQUIREMENTS	AIRFIELD CLOSURE AREAS	CLOSURE HOURS	LIQUIDATED DAMAGES	AIRPORT OPERATIONAL RESTRICTIONS
3	E	HOURS AS SHOWN	COMPLETE PHASE 1 AND PHASE 2	FRIDAY 6:00PM-SATURDAY 6:00PM (MILL/PAVE) SUNDAY 8:00AM-SUNDAY 6:00PM (PAINTING)	RUNWAY 10-28 TAXIWAYS E/B/U/M SOUTH DE-ICING PAD	24 HOURS/DAY	\$10,000/CALENDAR DAY OR PORTION THEREOF	RUNWAY 10-28 CLOSED BACK TAXI ON RUNWAY 10-28 REQUIRED



CONSTRUCTION BID SET

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1	6/5/2018	ADDENDUM NO. 1: CLARIFIED LOCATION OF MILLINGS STOCKPILE	JPM
REV	DATE	DESCRIPTION	BY

McFarland Johnson
2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

SYRACUSE REGIONAL AIRPORT AUTHORITY
CITY OF SYRACUSE, STATE OF NEW YORK
RECONFIGURE TAXIWAYS C, F, B, G, AND E

CONSTRUCTION SAFETY & PHASING PLAN (SHEET 3 OF 4)

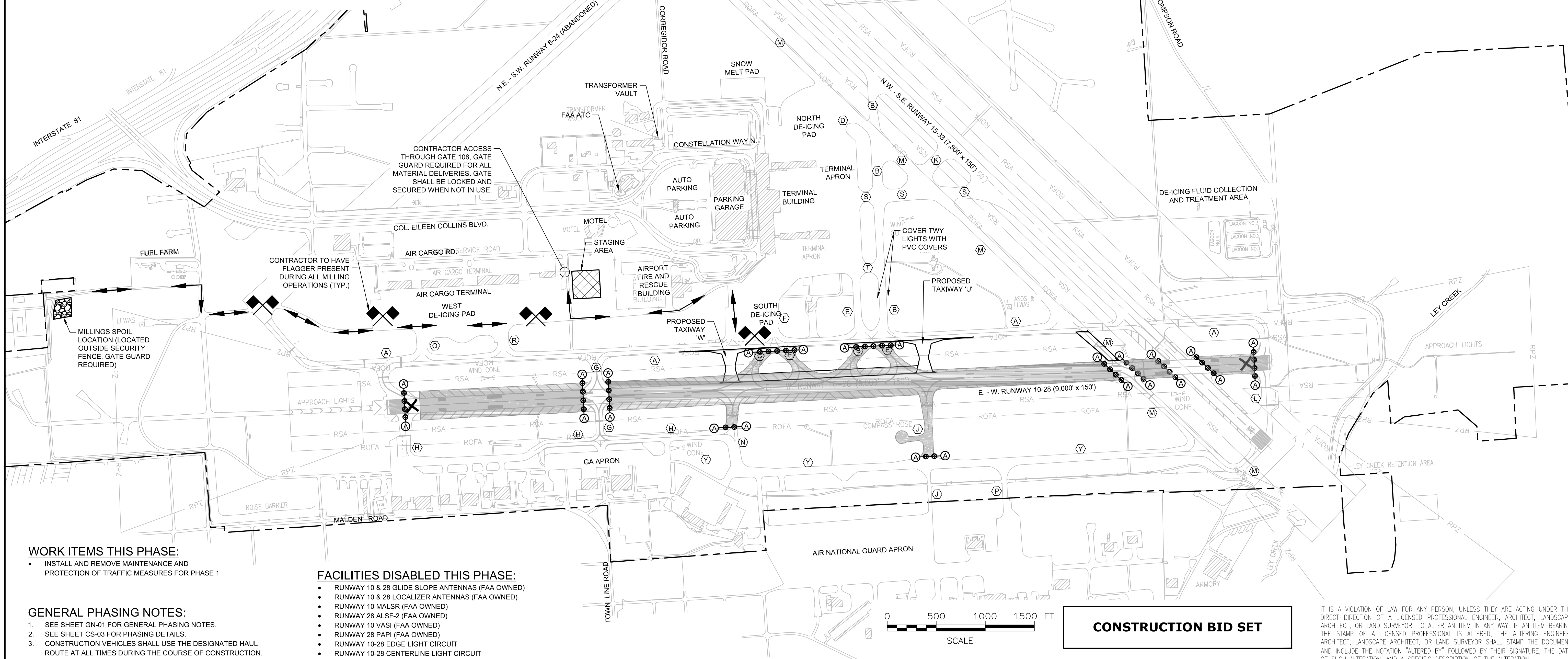
SCALE: 1"=200'	DESIGN: JPM	CS-03 9 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

WORK ITEMS/SEQUENCE OF CONSTRUCTION - THIS PHASE:

SEQUENCE	WORK ITEM
1.	ISSUE NOTAMS FOR RUNWAY 10-28 AND TAXIWAY CLOSURES (SYRACUSE AIRPORT).
2.	PLACE LOW PROFILE CONSTRUCTION BARRICADES AND LIGHTED RUNWAY CLOSURE MARKERS.
3.	INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY RETROREFLECTIVE EDGE MARKERS.
4.	DE-ENERGIZE AIRFIELD LIGHTING CIRCUITS AND INSTALL TEMPORARY JUMPERS.
5.	DE-ENERGIZE RUNWAY 10-28 NAVAIDS: PAPI/VASI, GLIDE SLOPE ANTENNAS, LOCALIZER ANTENNAS, AND APPROACH LIGHTS.
6.	FAA FLIGHT CHECK FOR RE-CALIBRATION OF RUNWAY 10-28 NAVAIDS LISTED IN SEQUENCE #5.
7.	RESTORE PAVEMENT MARKINGS AND REMOVE TEMPORARY RETROREFLECTIVE EDGE MARKERS.
8.	REMOVE TEMPORARY JUMPERS AND RESTORE AIRFIELD LIGHTING CIRCUITS.
9.	RUNWAY 10-28/NEW TAXIWAYS 'W' & 'U' PAVEMENT CLEANING AND AIRPORT/ENGINEER APPROVAL TO OPEN THESE AREAS.
10.	REMOVE BARRICADES AND RUNWAY CLOSURE MARKERS.
11.	REOPEN CLOSED AREAS.

LEGEND

- CONSTRUCTION AREA THIS PHASE
- CONTRACTOR STAGING AREA
- MILLINGS SPOIL PILE
- LOW PROFILE BARRICADES WITH WORK AREA DESIGNATION
- CONTRACTOR'S HAUL/ACCESS ROUTE
- TEMPORARY ELECTRIC JUMPER
- LIGHTED RUNWAY CLOSURE 'X'
- CLOSED AREAS
- CONSTRUCTION FLAGGER



WORK ITEMS THIS PHASE:

- INSTALL AND REMOVE MAINTENANCE AND PROTECTION OF TRAFFIC MEASURES FOR PHASE 1

FACILITIES DISABLED THIS PHASE:

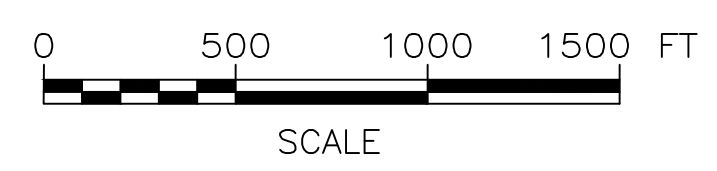
- RUNWAY 10 & 28 GLIDE SLOPE ANTENNAS (FAA OWNED)
- RUNWAY 10 & 28 LOCALIZER ANTENNAS (FAA OWNED)
- RUNWAY 10 MALSR (FAA OWNED)
- RUNWAY 28 ALSF-2 (FAA OWNED)
- RUNWAY 10 VASI (FAA OWNED)
- RUNWAY 28 PAPI (FAA OWNED)
- RUNWAY 10-28 EDGE LIGHT CIRCUIT
- RUNWAY 10-28 CENTERLINE LIGHT CIRCUIT
- RUNWAY 28 TOUCHDOWN ZONE LIGHT CIRCUIT

GENERAL PHASING NOTES:

- SEE SHEET GN-01 FOR GENERAL PHASING NOTES.
- SEE SHEET CS-03 FOR PHASING DETAILS.
- CONSTRUCTION VEHICLES SHALL USE THE DESIGNATED HAUL ROUTE AT ALL TIMES DURING THE COURSE OF CONSTRUCTION.
- CONTRACTOR SHALL COORDINATE SHUTDOWN OF FAA OWNED FACILITIES WITH FAA TECH OPS.

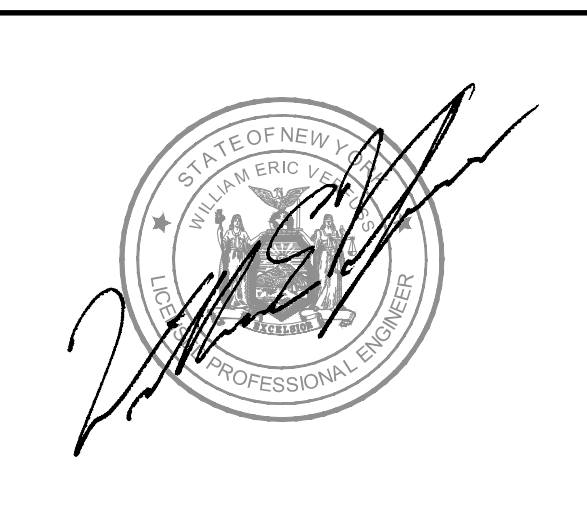
PHASE REQUIREMENTS:

PHASE	WORK AREA	CALENDAR TIME	REQUIREMENTS TO BEGIN	WORK HOUR RESTRICTIONS/ REQUIREMENTS	AIRFIELD CLOSURE AREAS	CLOSURE HOURS	LIQUIDATED DAMAGES	AIRPORT OPERATIONAL RESTRICTIONS
1	A	12HRS FOR INSTALL 12HRS FOR REMOVAL	NOTICE TO PROCEED (NTP)	NONE	RUNWAY 10-28 TAXIWAYS C/F/B/E	24 HOURS/DAY	\$10,000/CALENDAR DAY OR PORTION THEREOF	RUNWAY 10-28 CLOSED CHANGED TAXI PATTERNS



CONSTRUCTION BID SET

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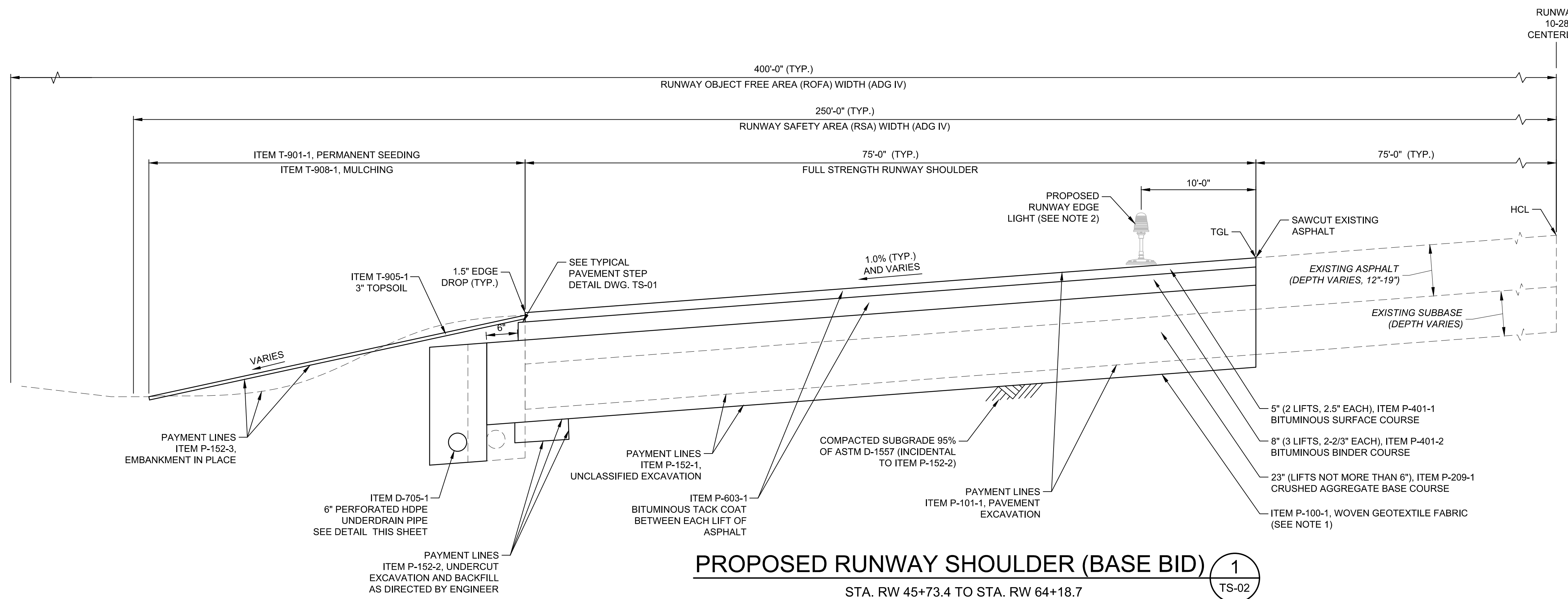
REV	DATE	DESCRIPTION	BY
1	6/6/2018	ADDENDUM NO. 1: ADDED WORK AREA FOR PHASE 1	JPM
		MPT INSTALLATION AND REMOVAL	

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2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

SYRACUSE REGIONAL AIRPORT AUTHORITY
CITY OF SYRACUSE, STATE OF NEW YORK
RECONFIGURE TAXIWAYS C, F, B, G, AND E

CONSTRUCTION SAFETY & PHASING PLAN (SHEET 4 OF 4)

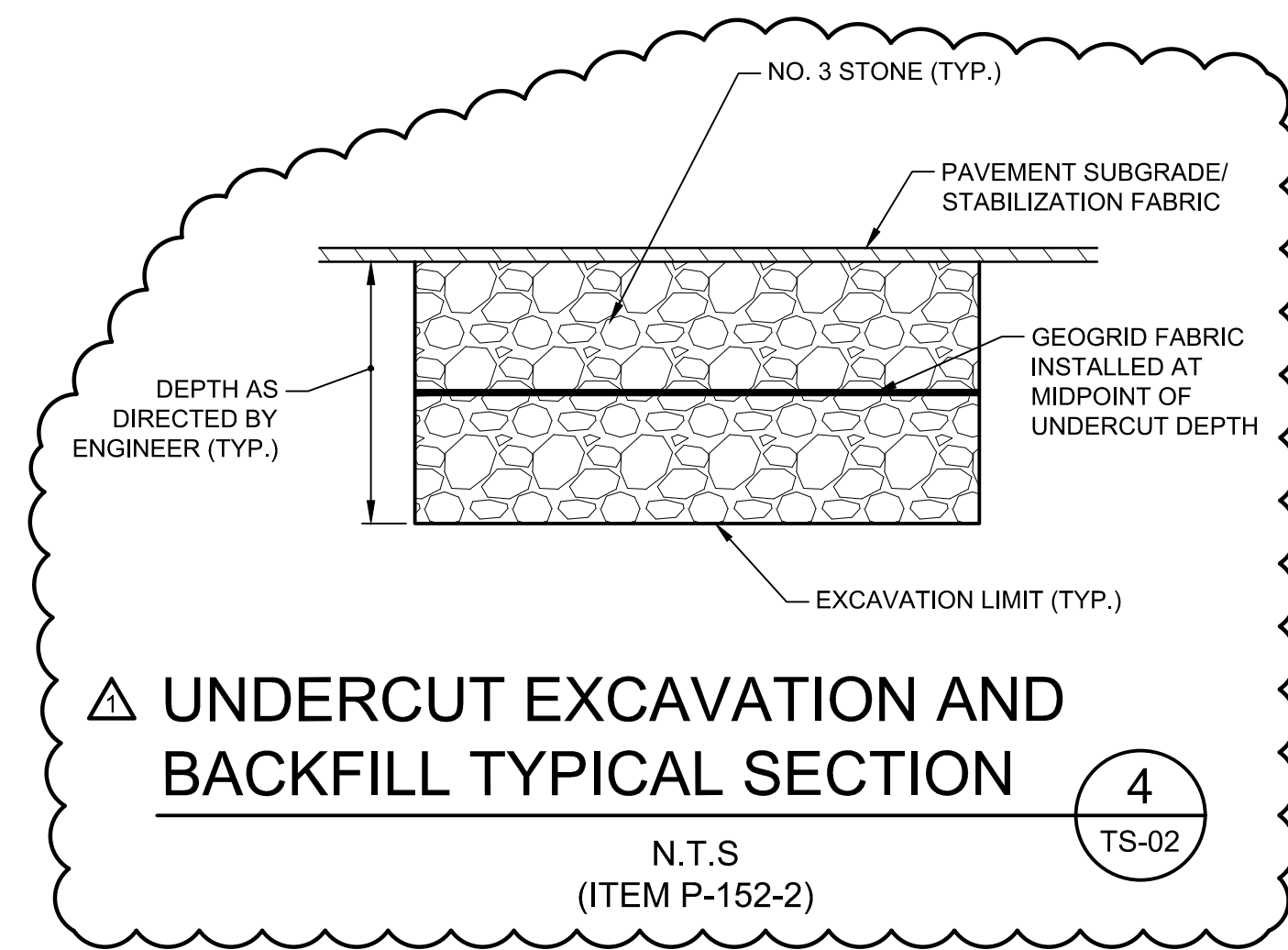
SCALE: 1"=500'	DESIGN: JPM	CS-04 10 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	



PROPOSED RUNWAY SHOULDER (BASE BID) 1

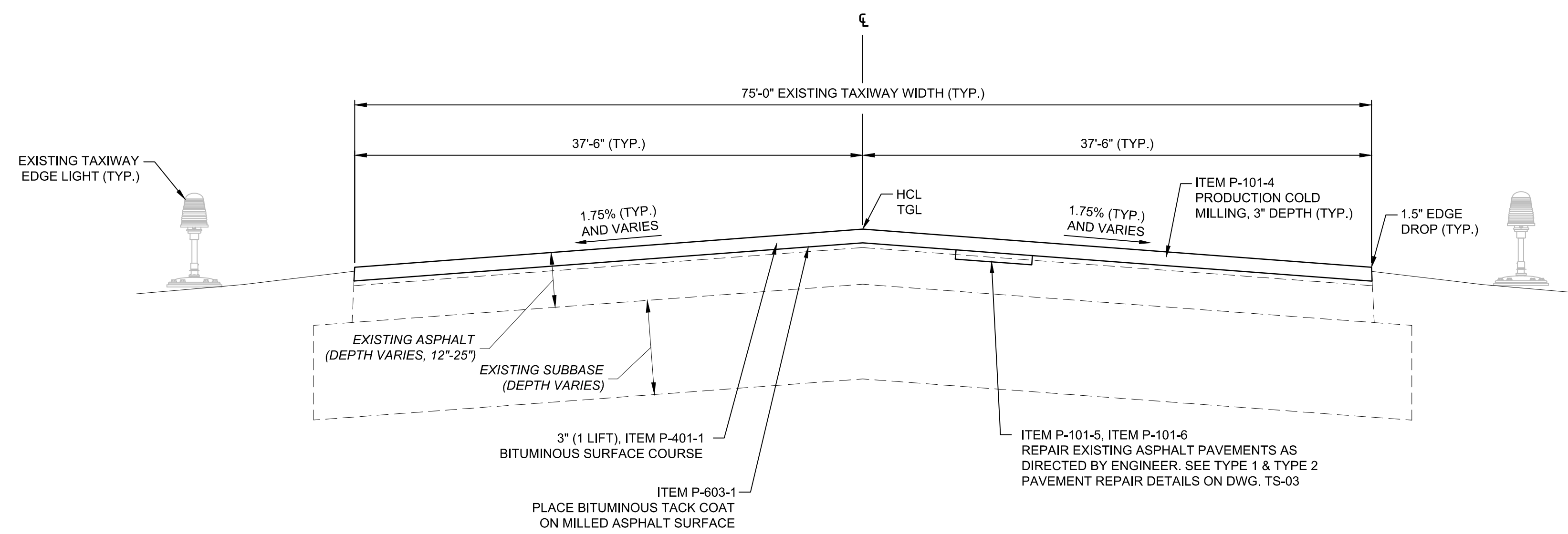
STA. RW 45+73.4 TO STA. RW 64+18.7
N.T.S.

- NOTE:
1. THE GEOTEXTILE FABRIC SHALL BE PLACED AT THE TOP OF SUBGRADE AND EXTEND TO THE UNDERDRAIN.
 2. FOR LOCATION AND TYPE OF EDGE LIGHTS, SEE DWG. NOS. EP-01 TO EP-07.



UNDERCUT EXCAVATION AND BACKFILL TYPICAL SECTION 4

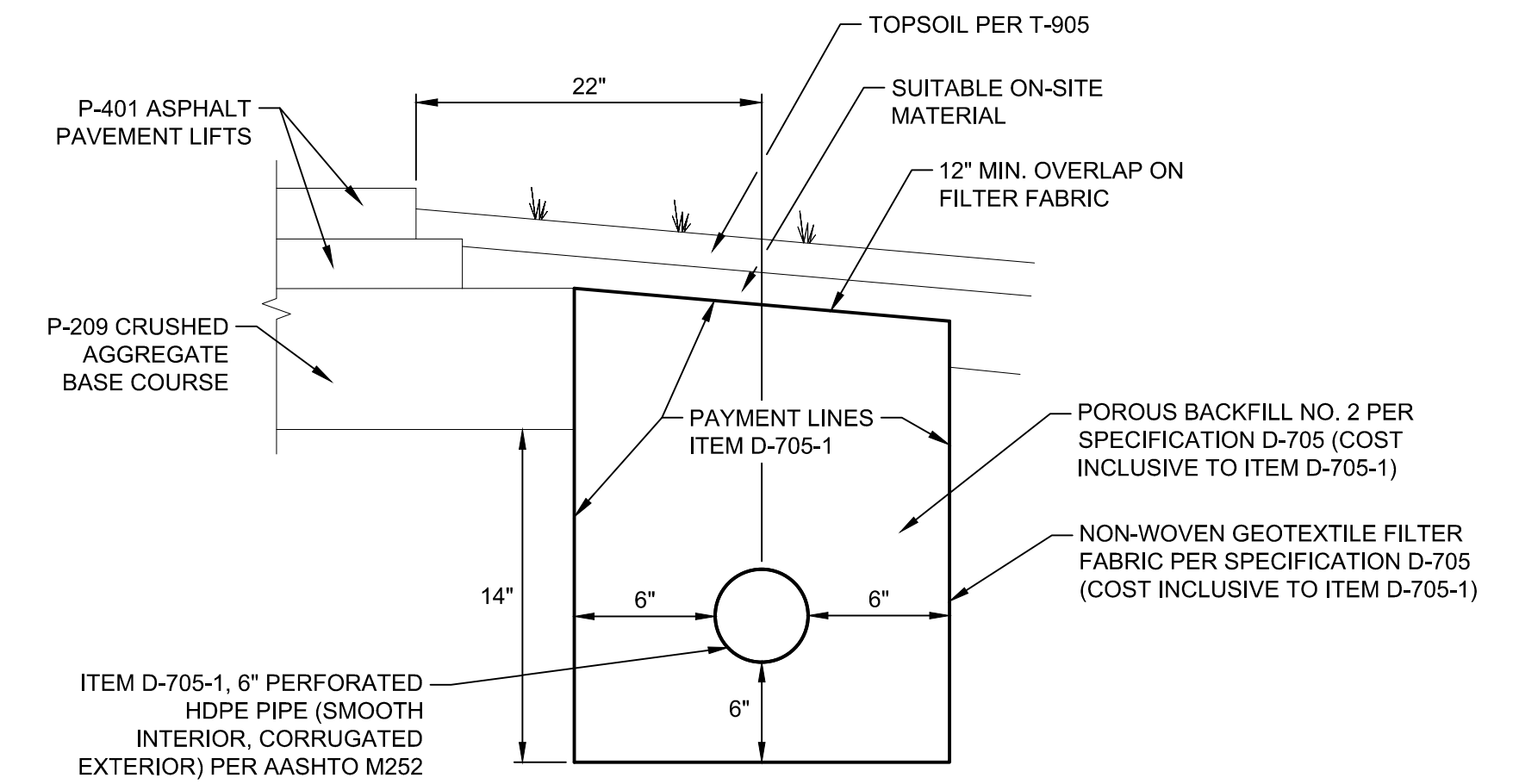
N.T.S.
(ITEM P-152-2)



TAXIWAY 'M' (ADD ALT NO. 1) 2

N.T.S.

- NOTE:
1. FOR LOCATION AND TYPE OF EDGE LIGHTS, SEE DWG. NOS. EP-01 TO EP-07.



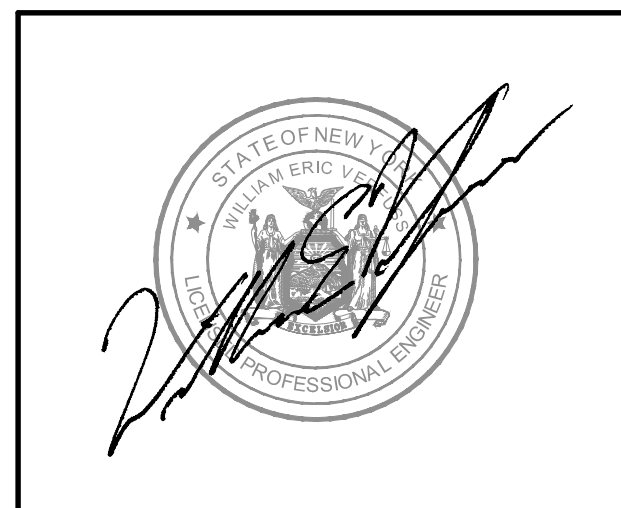
SHOULDER AND UNDERDRAIN DETAIL 3

N.T.S.
ITEM D-705-1

- NOTES:
1. ALL COSTS ASSOCIATED WITH INSTALLATION OF UNDERDRAIN PIPE, POROUS BACKFILL, AND FILTER FABRIC SHALL BE INCLUDED IN THE PRICE BID FOR ITEM D-705-1.
 2. FOR UNDERDRAIN CLEANOUT AND CONNECTION DETAILS, SEE DWG. DR-02.

CONSTRUCTION BID SET

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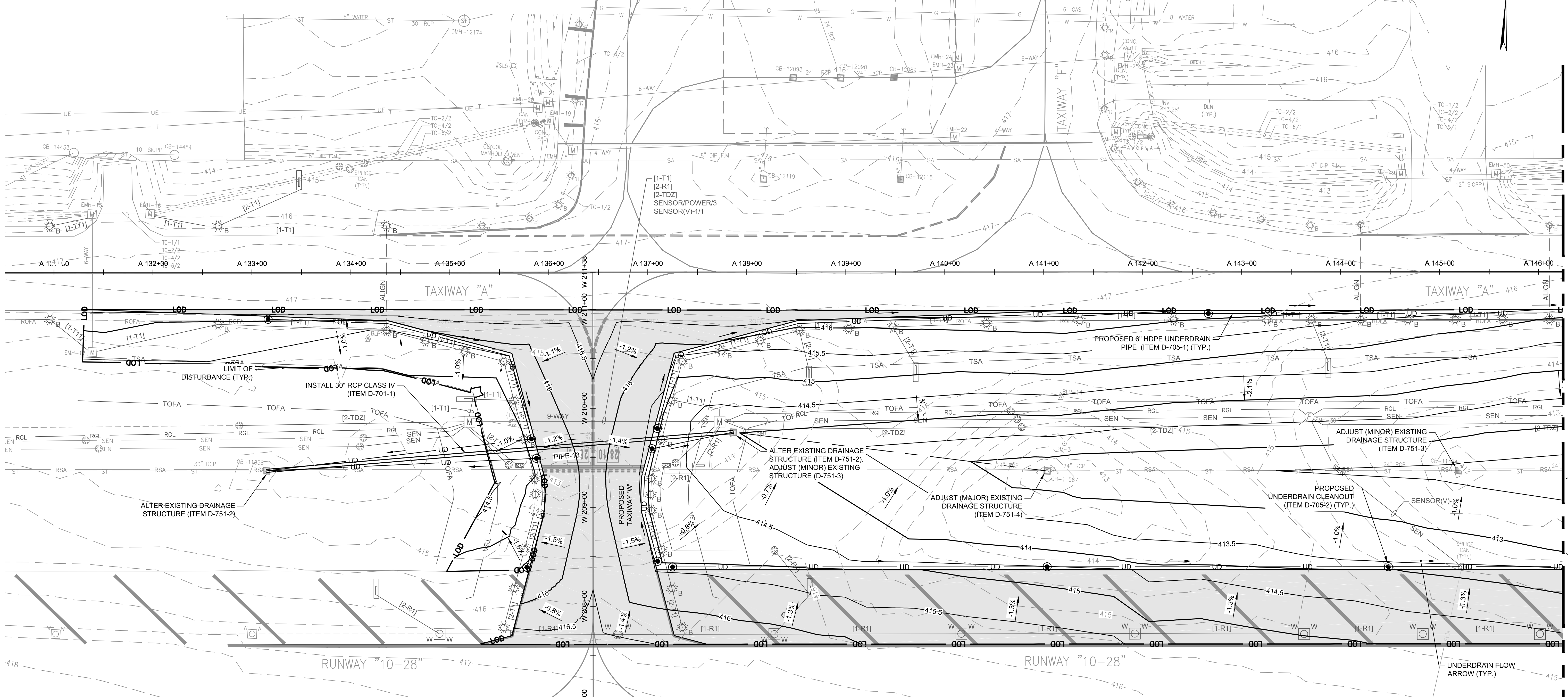


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2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

REV	DATE	DESCRIPTION	BY
1	6/5/2018	ADDENDUM NO. 1: ADDED UNDERCUT DETAIL	JPM

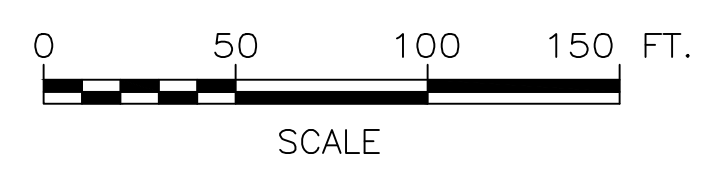
SYRACUSE REGIONAL AIRPORT AUTHORITY CITY OF SYRACUSE, STATE OF NEW YORK	
RECONFIGURE TAXIWAYS C, F, B, G, AND E	
TYPICAL SECTIONS - 2	
SCALE: AS SHOWN	DESIGN: JPM
DRAWN: JPM	PROJECT: 18180.04
CHECKED: WEV	DATE: MAY 2018

PIPE TABLE									
NAME	INLET DRAINAGE STRUCTURE	START STATION/OFFSET	START INVERT ELEV. (FT)	OUTLET DRAINAGE STRUCTURE	END STATION/OFFSET	END INVERT ELEV. (FT)	DESCRIPTION	LENGTH (LF)	SLOPE
PIPE-13	CB-11860	209+75.91 141.59 R	409.90	CB-11858	209+36.89 -329.80' L	403.80	30 INCH CONCRETE PIPE	473.01	1.29%



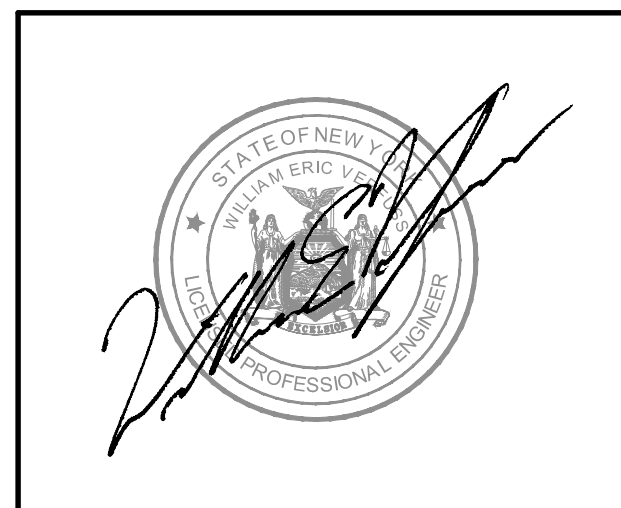
LEGEND	
UD	PROPOSED UNDERDRAIN
LOD	LIMIT OF DISTURBANCE
---	PROPOSED CIRCUITS
---	EXISTING CIRCUITS
RGL	PROPOSED SPARE CONDUIT FOR RUNWAY GUARD LIGHTS
SEN	PROPOSED SENSOR CIRCUIT
SEN	EXISTING SENSOR CIRCUIT
ST	PROPOSED DRAINAGE PIPE
---	EXISTING DRAINAGE PIPE
■	PROPOSED CATCH BASIN
■	EXISTING CATCH BASIN
○	PROPOSED UNDERDRAIN CLEANOUT
○	EXISTING DRAINAGE MANHOLE

- GENERAL NOTES:
- REFER TO DWG. NO. GN-02 FOR A COMPLETE DRAWING LEGEND AND LIST OF ABBREVIATIONS.
 - REFER TO DWG. NO. DR-01 AND DR-02 FOR DRAINAGE DETAILS.
 - REFER TO DWG. NO. DR-03 FOR UNDERDRAIN AND STRUCTURE ADJUSTMENT TABLES.
 - REFER TO DWG. NO. DP-01 FOR DRAINAGE PROFILES.



CONSTRUCTION BID SET

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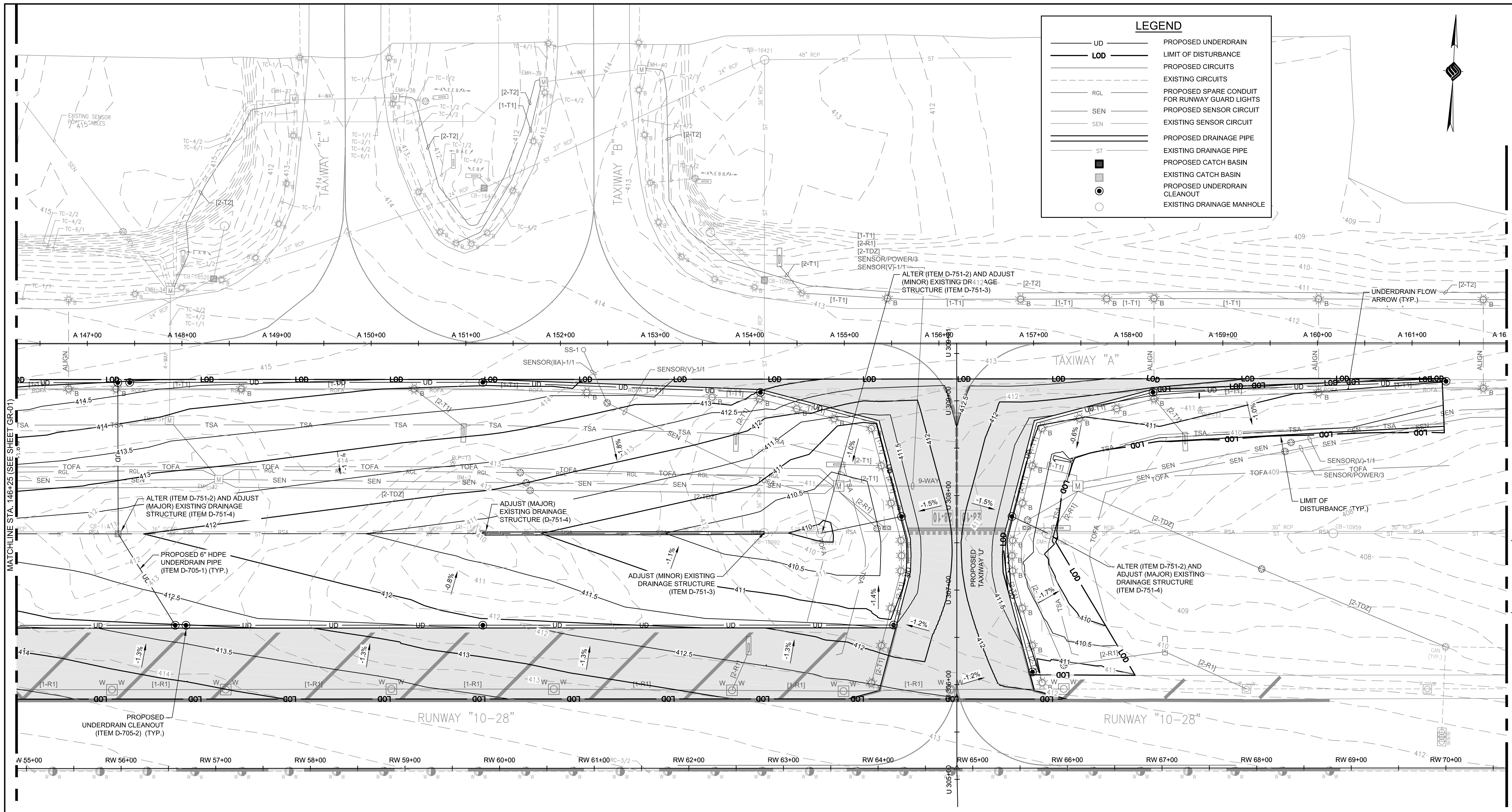


McFarland Johnson
 2525 STATE ROUTE 332
 CANANDAIGUA, NEW YORK 14424

6/5/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM
REV	DATE	DESCRIPTION
<p>SYRACUSE REGIONAL AIRPORT AUTHORITY CITY OF SYRACUSE, STATE OF NEW YORK RECONFIGURE TAXIWAYS C, F, B, G, AND E GRADING & DRAINAGE PLAN (SHEET 1 OF 4)</p>		
SCALE: 1"=50'	DESIGN: JPM	GR-01 26 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

MATCHLINE--SEE SHEET GR-04

MATCHLINE STA 146+25 (SEE SHEET GR-02)



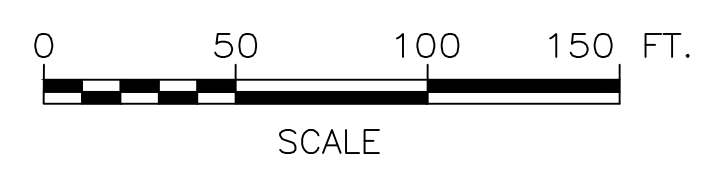
LEGEND

UD	PROPOSED UNDERDRAIN
LOD	LIMIT OF DISTURBANCE
---	PROPOSED CIRCUITS
---	EXISTING CIRCUITS
RGL	PROPOSED SPARE CONDUIT FOR RUNWAY GUARD LIGHTS
SEN	PROPOSED SENSOR CIRCUIT
SEN	EXISTING SENSOR CIRCUIT
---	PROPOSED DRAINAGE PIPE
---	EXISTING DRAINAGE PIPE
■	PROPOSED CATCH BASIN
■	EXISTING CATCH BASIN
○	PROPOSED UNDERDRAIN CLEANOUT
○	EXISTING DRAINAGE MANHOLE

MATCHLINE STA. 146+25 (SEE SHEET GR-01)

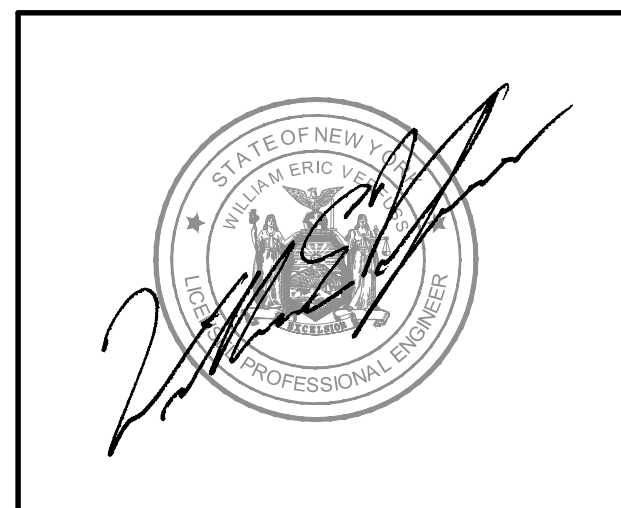
MATCHLINE STA. 162+00 (SEE SHEET GR-03)

- GENERAL NOTES:**
- REFER TO DWG. NO. GN-02 FOR A COMPLETE DRAWING LEGEND AND LIST OF ABBREVIATIONS.
 - REFER TO DWG. NO. DR-01 AND DR-02 FOR DRAINAGE DETAILS.
 - REFER TO DWG. NO. DR-03 FOR UNDERDRAIN AND STRUCTURE ADJUSTMENT TABLES.
 - REFER TO DWG. NO. DP-01 FOR DRAINAGE PROFILES.



CONSTRUCTION BID SET

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REV	DATE	DESCRIPTION	BY
	6/5/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM

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 CANANDAIGUA, NEW YORK 14424

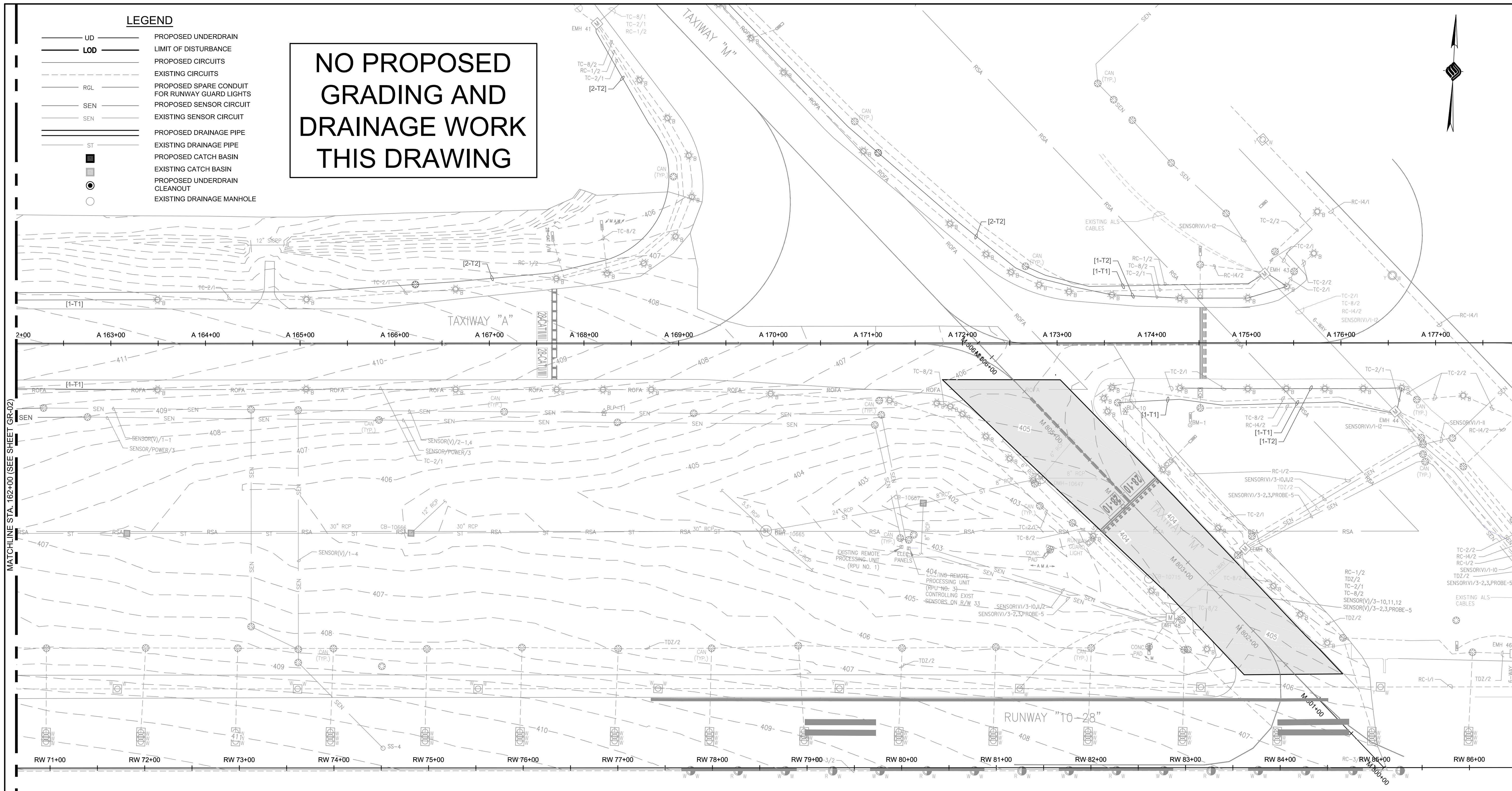
SYRACUSE REGIONAL AIRPORT AUTHORITY
 CITY OF SYRACUSE, STATE OF NEW YORK
RECONFIGURE TAXIWAYS C, F, B, G, AND E
GRADING & DRAINAGE PLAN (SHEET 2 OF 4)

SCALE: 1"=50'	DESIGN: JPM	GR-02 27 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

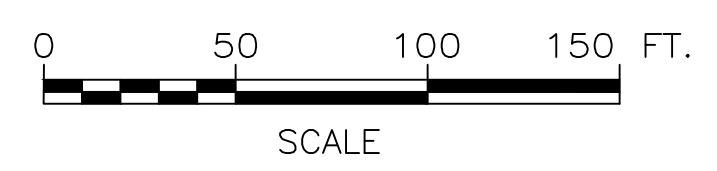
LEGEND

- UD — PROPOSED UNDERDRAIN
- LOD — LIMIT OF DISTURBANCE
- — PROPOSED CIRCUITS
- - - EXISTING CIRCUITS
- RGL — PROPOSED SPARE CONDUIT FOR RUNWAY GUARD LIGHTS
- SEN — PROPOSED SENSOR CIRCUIT
- SEN — EXISTING SENSOR CIRCUIT
- — PROPOSED DRAINAGE PIPE
- — EXISTING DRAINAGE PIPE
- — PROPOSED CATCH BASIN
- — EXISTING CATCH BASIN
- — PROPOSED UNDERDRAIN CLEANOUT
- — EXISTING DRAINAGE MANHOLE

NO PROPOSED GRADING AND DRAINAGE WORK THIS DRAWING



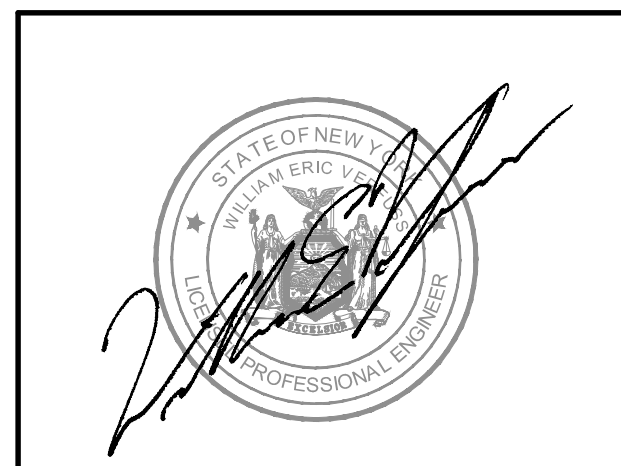
MATCHLINE STA. 162+00 (SEE SHEET GR-02)



CONSTRUCTION BID SET

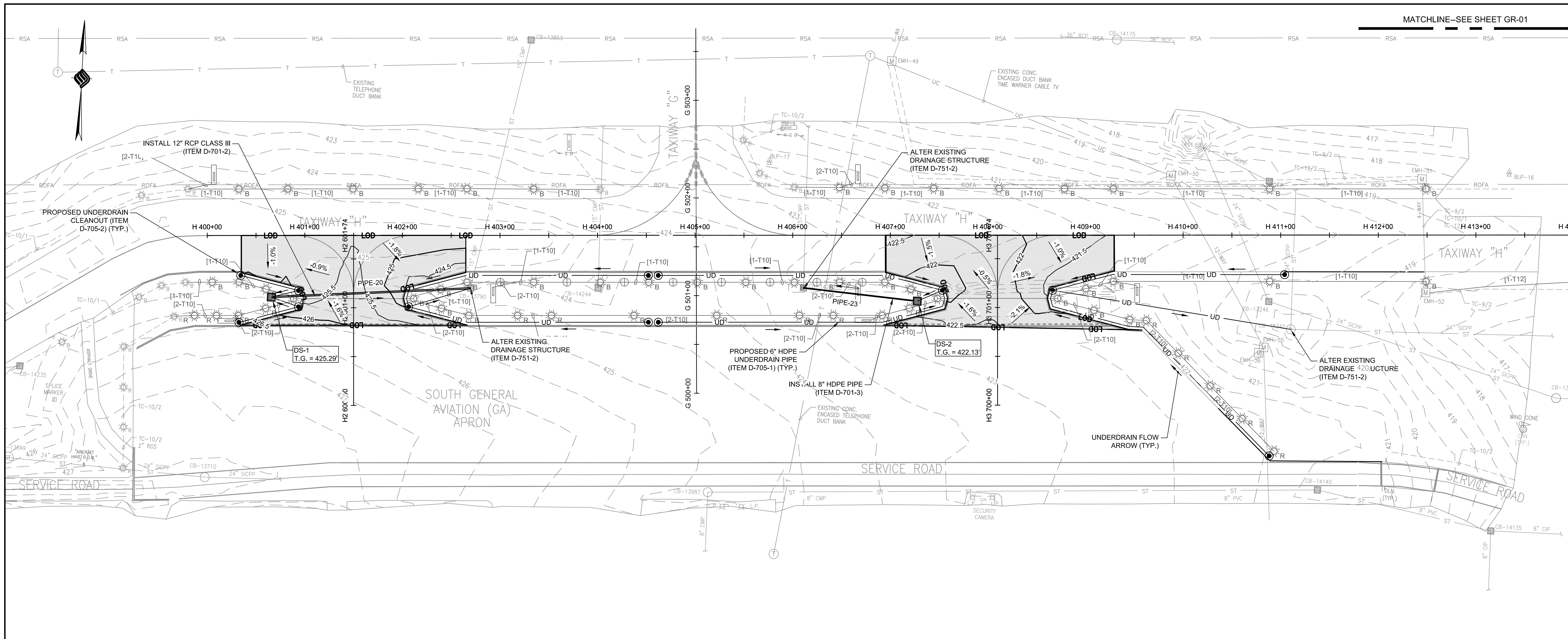
- GENERAL NOTES:**
1. REFER TO DWG. NO. GN-02 FOR A COMPLETE DRAWING LEGEND AND LIST OF ABBREVIATIONS.
 2. REFER TO DWG. NO. DR-01 AND DR-02 FOR DRAINAGE DETAILS.
 3. REFER TO DWG. NO. DR-03 FOR UNDERDRAIN AND STRUCTURE ADJUSTMENT TABLES.
 4. REFER TO DWG. NO. DP-01 FOR DRAINAGE PROFILES.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.



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2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

1	6/5/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM
REV	DATE	DESCRIPTION	BY
SYRACUSE REGIONAL AIRPORT AUTHORITY CITY OF SYRACUSE, STATE OF NEW YORK RECONFIGURE TAXIWAYS C, F, B, G, AND E GRADING & DRAINAGE PLAN (SHEET 3 OF 4)			
SCALE: 1"=50'	DESIGN: JPM	GR-03	
DRAWN: JPM	PROJECT: 18180.04	28 OF 55	
CHECKED: WEV	DATE: MAY 2018		



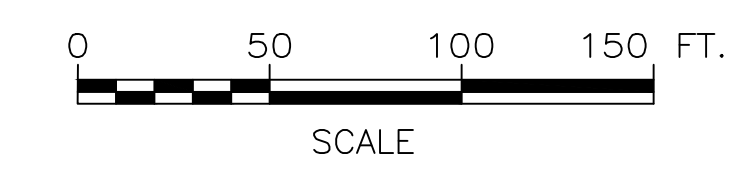
LEGEND

- UD — PROPOSED UNDERDRAIN
- LOD — LIMIT OF DISTURBANCE
- PROPOSED CIRCUITS
- - - EXISTING CIRCUITS
- RGL — PROPOSED SPARE CONDUIT FOR RUNWAY GUARD LIGHTS
- SEN — PROPOSED SENSOR CIRCUIT
- SEN — EXISTING SENSOR CIRCUIT
- PROPOSED DRAINAGE PIPE
- EXISTING DRAINAGE PIPE
- PROPOSED CATCH BASIN
- EXISTING CATCH BASIN
- PROPOSED UNDERDRAIN CLEANOUT
- EXISTING DRAINAGE MANHOLE

GENERAL NOTES:

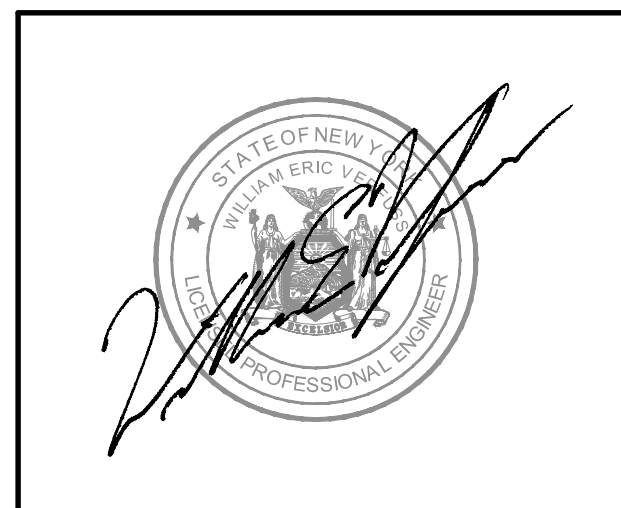
1. REFER TO DWG. NO. GN-02 FOR A COMPLETE DRAWING LEGEND AND LIST OF ABBREVIATIONS.
2. REFER TO DWG. NO. DR-01 AND DR-02 FOR DRAINAGE DETAILS.
3. REFER TO DWG. NO. DR-03 FOR UNDERDRAIN AND STRUCTURE ADJUSTMENT TABLES.
4. REFER TO DWG. NO. DP-01 FOR DRAINAGE PROFILES.

PIPE TABLE									
NAME	INLET DRAINAGE STRUCTURE	START STATION/OFFSET	START INVERT ELEV. (FT)	OUTLET DRAINAGE STRUCTURE	END STATION/OFFSET	END INVERT ELEV. (FT)	DESCRIPTION	LENGTH (LF)	SLOPE
PIPE-20	DS-1	601+10.95 -84.30 L	422.00	CB-13790	601+19.92 119.84' R	421.30	12 INCH CONCRETE PIPE	204.33	0.34%
PIPE-23	DS-2	701+06.54 -82.23 L	419.90	CB-14243	701+20.15 -198.87' L	419.60	8 INCH CORRUGATED HDPE PIPE	117.43	0.26%



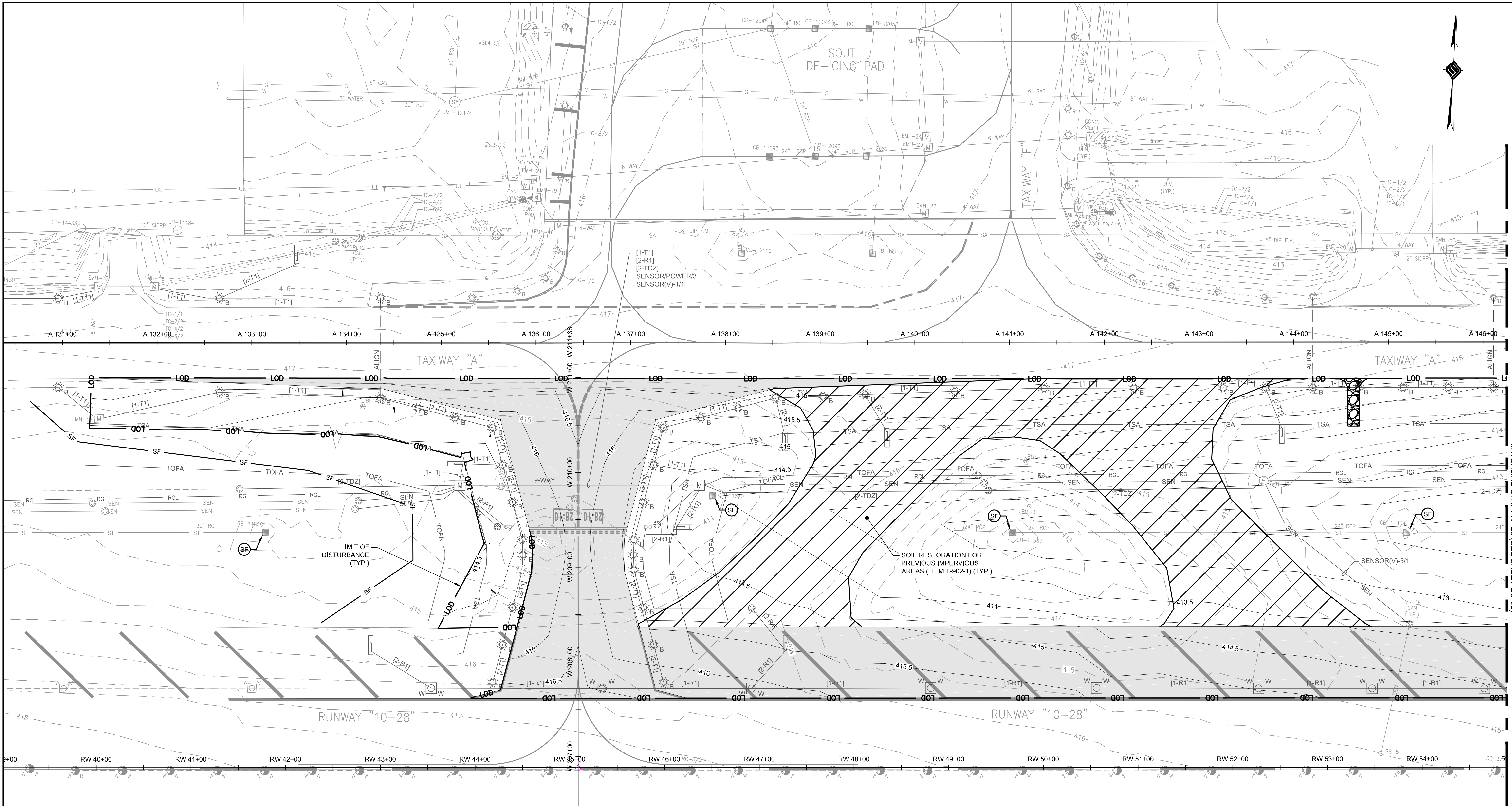
CONSTRUCTION BID SET

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 CANANDAIGUA, NEW YORK 14424

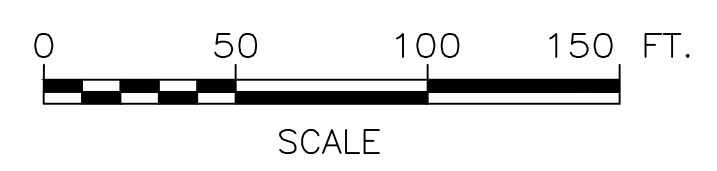
6/5/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM
REV	DATE	DESCRIPTION
<p>SYRACUSE REGIONAL AIRPORT AUTHORITY CITY OF SYRACUSE, STATE OF NEW YORK RECONFIGURE TAXIWAYS C, F, B, G, AND E GRADING & DRAINAGE PLAN (SHEET 4 OF 4)</p>		
SCALE: 1"=50'	DESIGN: JPM	GR-04 29 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	



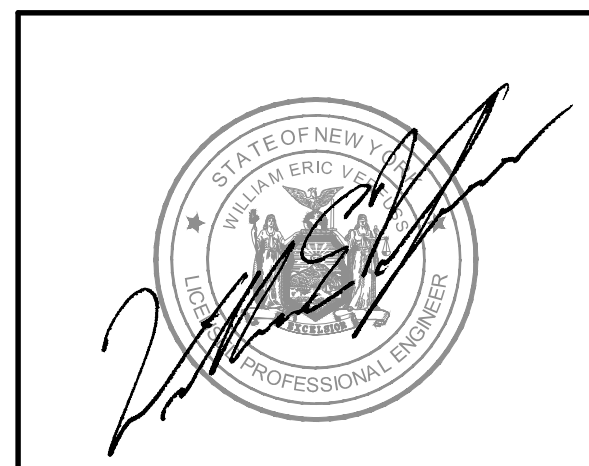
LEGEND

	ITEM T-902-1 - SOIL RESTORATION
	ITEM P-156-1, SILT FENCE-TEMPORARY
	ITEM P-156-2, DRAINAGE STRUCTURE INLET PROTECTION, SILT FENCE-TEMPORARY
	ITEM P-156-3, DRAINAGE STRUCTURE INLET PROTECTION, GRAVEL BAG-TEMPORARY
	ITEM P-156-6, CONSTRUCTION ENTRANCE

- GENERAL NOTES:**
- REFER TO DWG. NO. EC-05 AND EC-06 FOR EROSION AND SEDIMENT CONTROL DETAILS.
 - REFER TO DWG. NO. EC-07 FOR EROSION AND SEDIMENT CONTROL NOTES.
 - EXISTING PAVEMENT AREAS TO BE REMOVED SHALL BE RESTORED PER DETAIL SHOWN ON DWG. EC-06. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE PER ACRE UNDER ITEM T-902-1.
 - AREAS DISTURBED FOR LONGER THAN 7 CALENDAR DAYS SHALL BE TEMPORARILY SEEDDED AND MULCHED. REFER TO THE TEMPORARY SEEDING TABLE ON DWG. NO. EC-06.



CONSTRUCTION BID SET



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2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

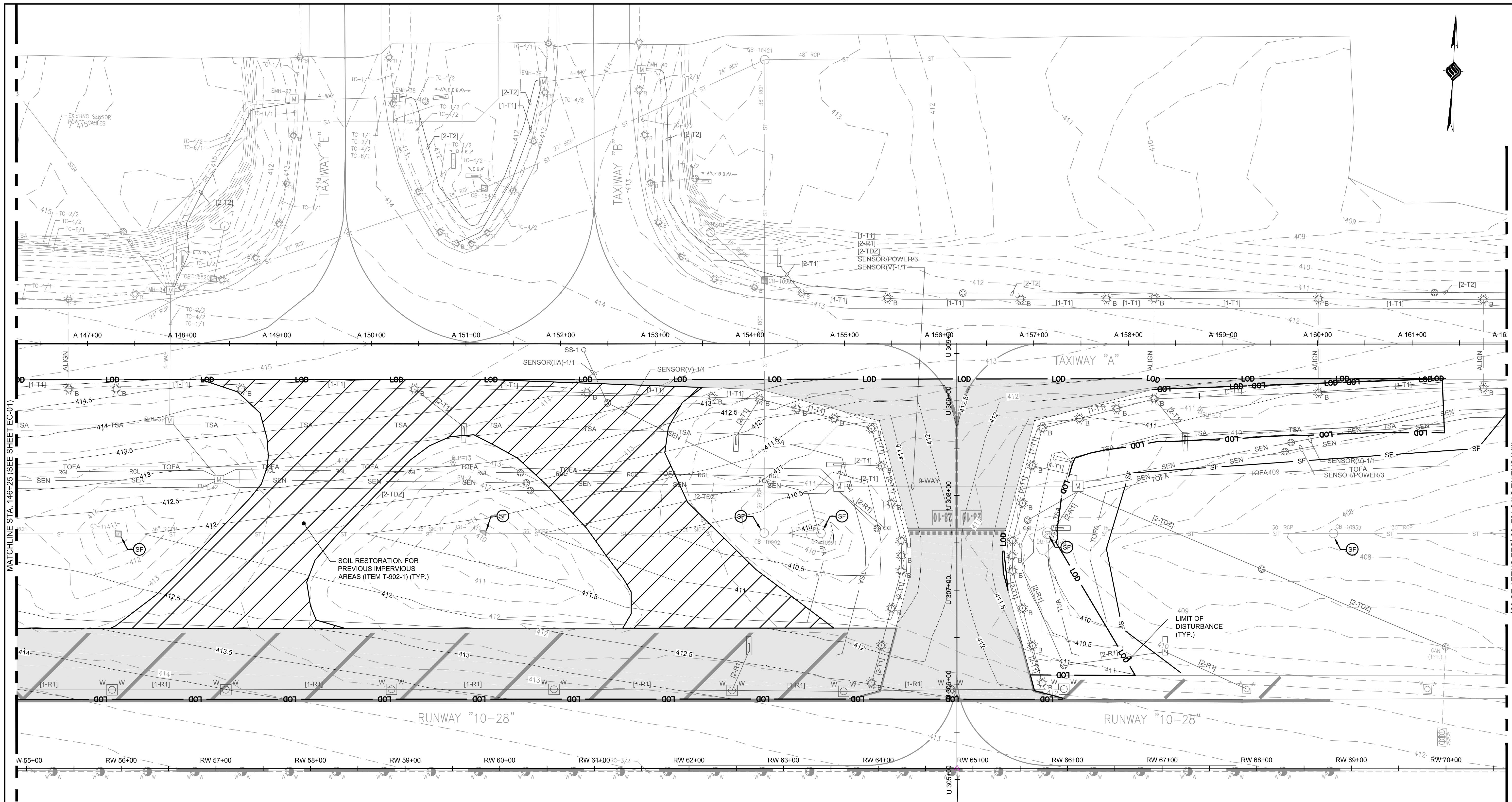
REV	DATE	DESCRIPTION	BY
	6/6/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM

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SYRACUSE REGIONAL AIRPORT AUTHORITY			
CITY OF SYRACUSE, STATE OF NEW YORK			
RECONFIGURE TAXIWAYS C, F, B, G, AND E			
EROSION & SEDIMENT CONTROL PLAN (SHEET 1 OF 4)			
SCALE:	1"=50'	DESIGN:	JPM
DRAWN:	JPM	PROJECT:	18180.04
CHECKED:	WEV	DATE:	MAY 2018
			EC-01
			34 OF 55

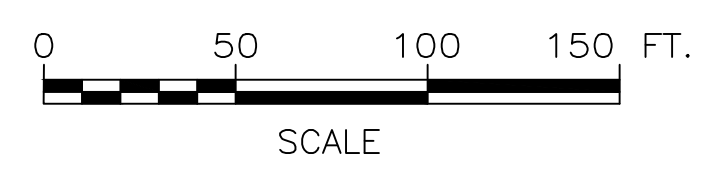
MATCHLINE STA. 146+25 (SEE SHEET EC-02)

K:\Syntec\18180\18180-Taxiway Reconfig\Drawings\Sheet Files\18180-04-01-EROS.Dwg, 6/6/2018 9:29:34 AM, jpmoore



MATCHLINE STA. 146+25 (SEE SHEET EC-01)

MATCHLINE STA. 162+00 (SEE SHEET EC-03)



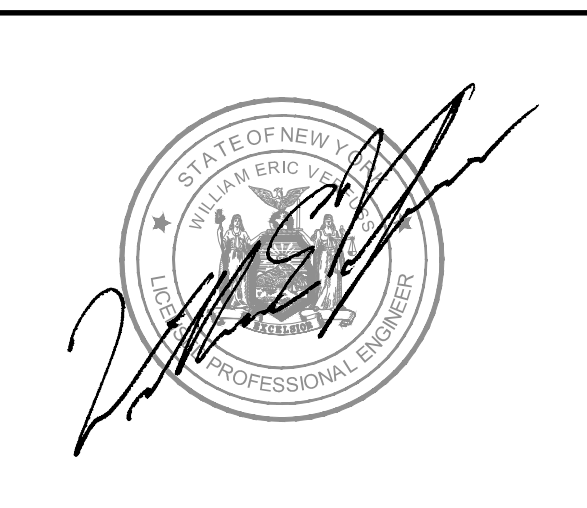
CONSTRUCTION BID SET

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LEGEND

	ITEM T-902-1 - SOIL RESTORATION
	ITEM P-156-1, SILT FENCE-TEMPORARY
	ITEM P-156-2, DRAINAGE STRUCTURE INLET PROTECTION, SILT FENCE-TEMPORARY
	ITEM P-156-3, DRAINAGE STRUCTURE INLET PROTECTION, GRAVEL BAG-TEMPORARY
	ITEM P-156-6, CONSTRUCTION ENTRANCE

- GENERAL NOTES:**
- REFER TO DWG. NO. EC-05 AND EC-06 FOR EROSION AND SEDIMENT CONTROL DETAILS.
 - REFER TO DWG. NO. EC-07 FOR EROSION AND SEDIMENT CONTROL NOTES.
 - EXISTING PAVEMENT AREAS TO BE REMOVED SHALL BE RESTORED PER DETAIL SHOWN ON DWG. EC-06. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE PER ACRE UNDER ITEM T-902-1.
 - AREAS DISTURBED FOR LONGER THAN 7 CALENDAR DAYS SHALL BE TEMPORARILY SEEDDED AND MULCHED. REFER TO THE TEMPORARY SEEDING TABLE ON DWG. NO. EC-06.



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 CANANDAIGUA, NEW YORK 14424

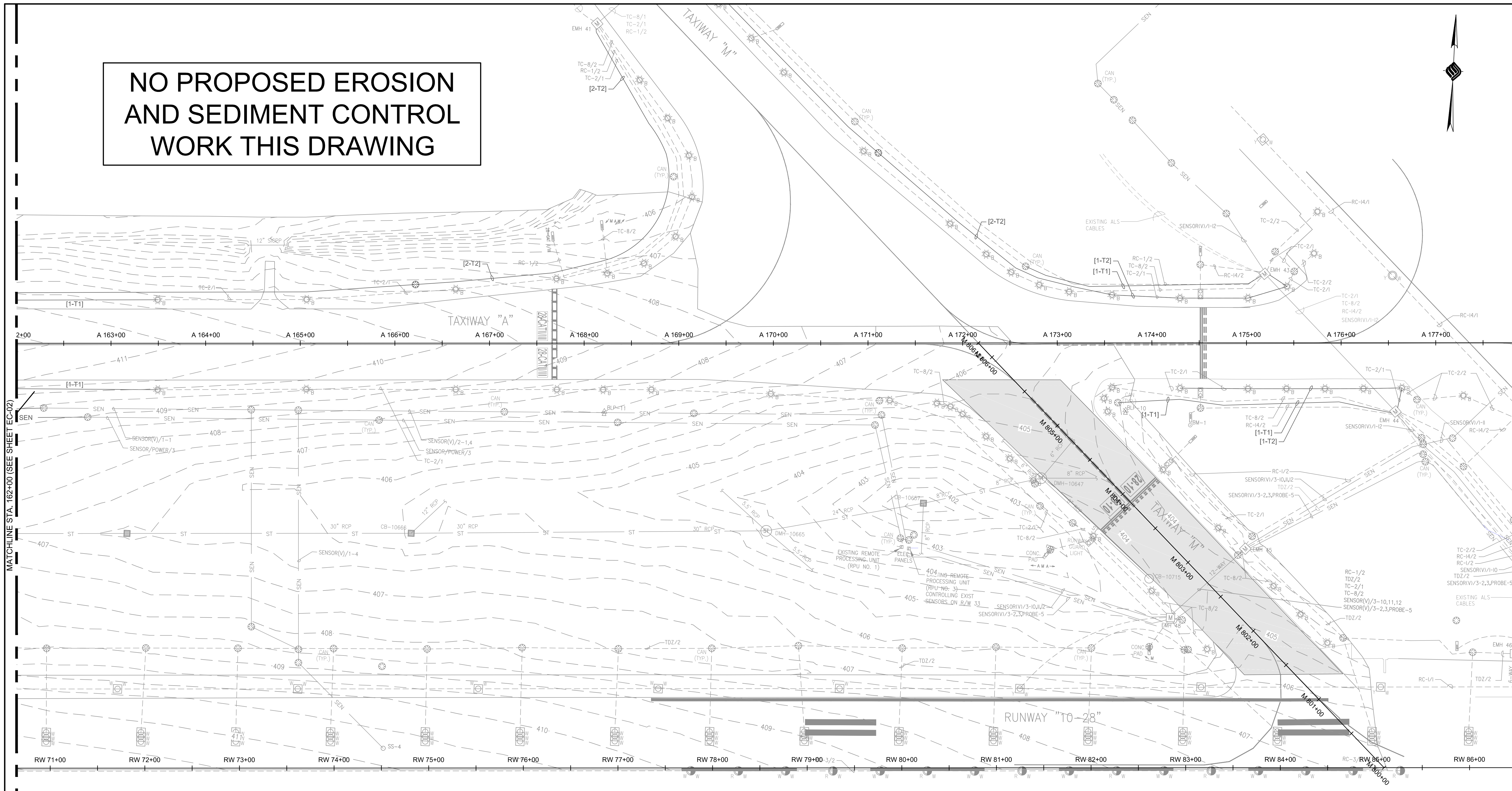
REV	DATE	DESCRIPTION	BY
1	6/6/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM

**SYRACUSE REGIONAL AIRPORT AUTHORITY
 CITY OF SYRACUSE, STATE OF NEW YORK
 RECONFIGURE TAXIWAYS C, F, B, G,
 AND E
 EROSION & SEDIMENT CONTROL PLAN
 (SHEET 2 OF 4)**

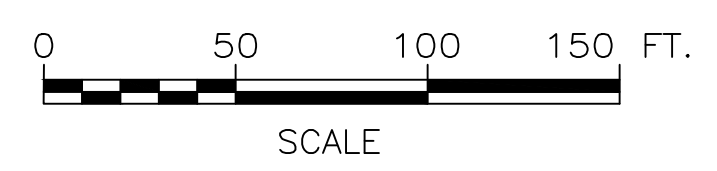
SCALE: 1"=50'	DESIGN: JPM	EC-02 35 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	

K:\Syracuse\18180\18180-Taxiway Reconfig\Design\Drawings\Sheet Files\18180-04-01-EROS.Dwg, 6/6/2018 9:30:23 AM, jpmcc

**NO PROPOSED EROSION
AND SEDIMENT CONTROL
WORK THIS DRAWING**



MATCHLINE STA. 162+00 (SEE SHEET EC-02)



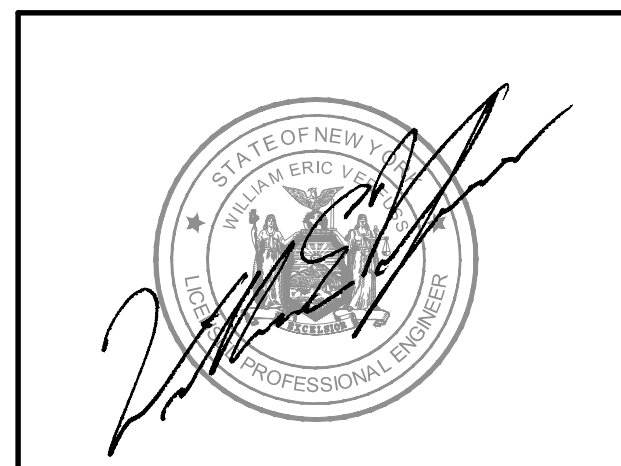
CONSTRUCTION BID SET

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

LEGEND

	ITEM T-902-1 - SOIL RESTORATION
	ITEM P-156-1, SILT FENCE-TEMPORARY
	ITEM P-156-2, DRAINAGE STRUCTURE INLET PROTECTION, SILT FENCE-TEMPORARY
	ITEM P-156-3, DRAINAGE STRUCTURE INLET PROTECTION, GRAVEL BAG-TEMPORARY
	ITEM P-156-6, CONSTRUCTION ENTRANCE

- GENERAL NOTES:**
- REFER TO DWG. NO. EC-05 AND EC-06 FOR EROSION AND SEDIMENT CONTROL DETAILS.
 - REFER TO DWG. NO. EC-07 FOR EROSION AND SEDIMENT CONTROL NOTES.
 - EXISTING PAVEMENT AREAS TO BE REMOVED SHALL BE RESTORED PER DETAIL SHOWN ON DWG. EC-06. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE PER ACRE UNDER ITEM T-902-1.
 - AREAS DISTURBED FOR LONGER THAN 7 CALENDAR DAYS SHALL BE TEMPORARILY SEEDDED AND MULCHED. REFER TO THE TEMPORARY SEEDING TABLE ON DWG. NO. EC-06.

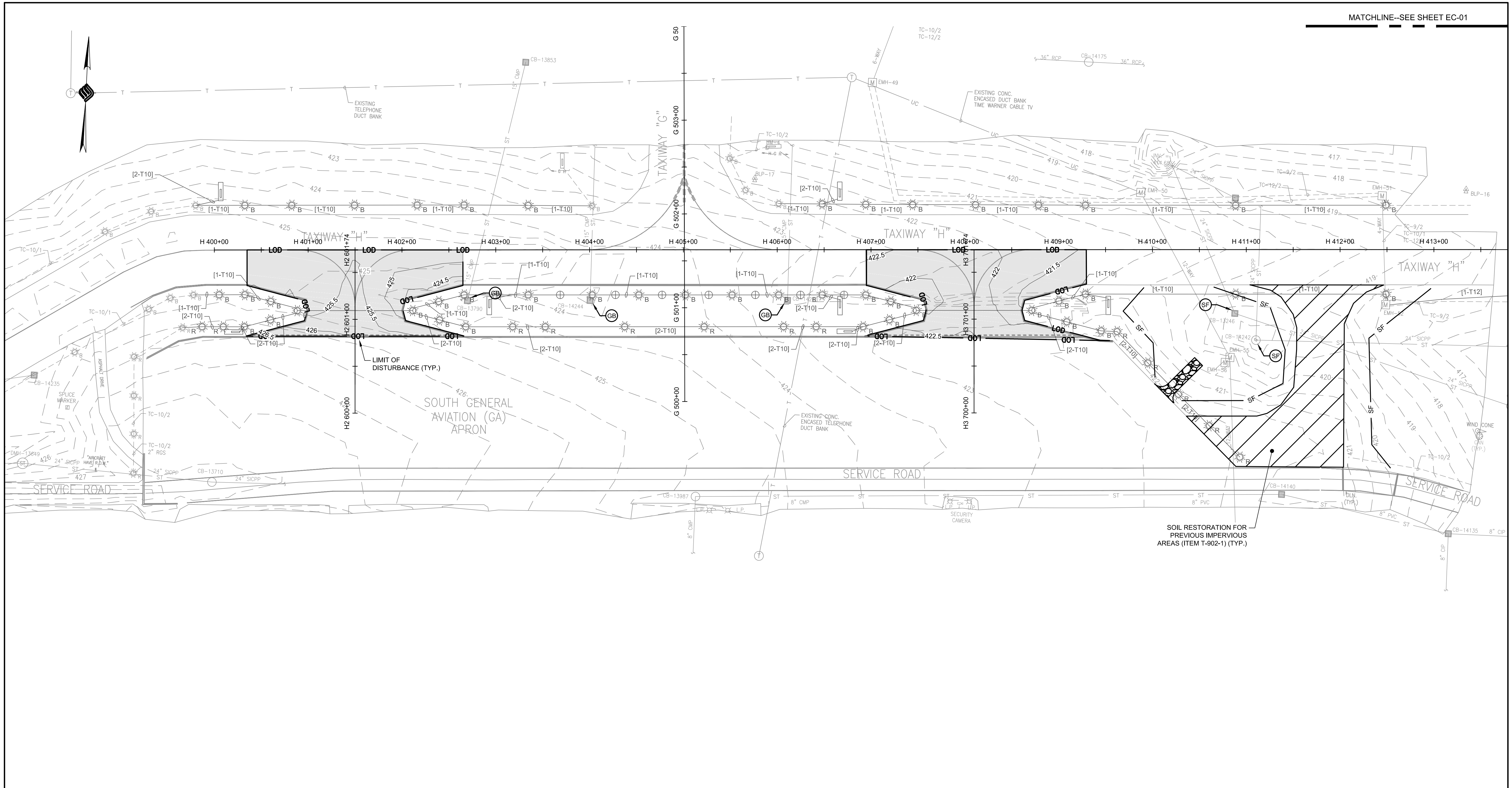


McFarland Johnson
2525 STATE ROUTE 332
CANANDAIGUA, NEW YORK 14424

REV	DATE	DESCRIPTION	BY
1	6/6/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM

**SYRACUSE REGIONAL AIRPORT AUTHORITY
CITY OF SYRACUSE, STATE OF NEW YORK
RECONFIGURE TAXIWAYS C, F, B, G,
AND E
EROSION & SEDIMENT CONTROL PLAN
(SHEET 3 OF 4)**

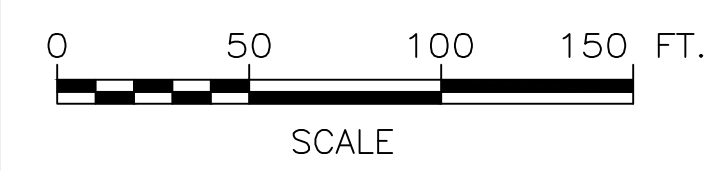
SCALE: AS SHOWN	DESIGN: JPM	EC-03 36 OF 55
DRAWN: JPM	PROJECT: 18180.04	
CHECKED: WEV	DATE: MAY 2018	



LEGEND

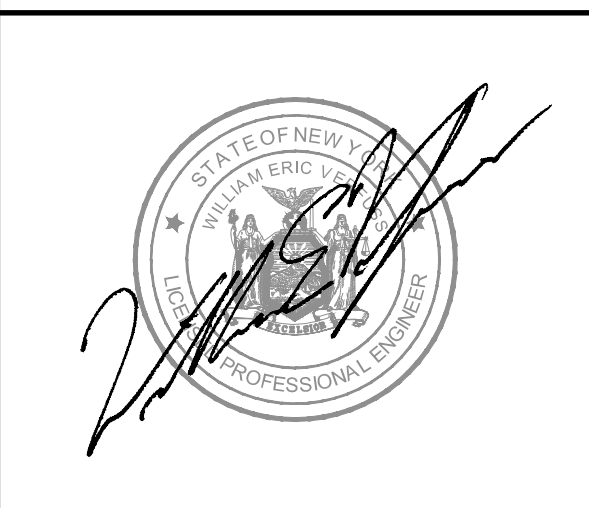
	ITEM T-902-1 - SOIL RESTORATION
	ITEM P-156-1, SILT FENCE-TEMPORARY
	ITEM P-156-2, DRAINAGE STRUCTURE INLET PROTECTION, SILT FENCE-TEMPORARY
	ITEM P-156-3, DRAINAGE STRUCTURE INLET PROTECTION, GRAVEL BAG-TEMPORARY
	ITEM P-156-6, CONSTRUCTION ENTRANCE

- GENERAL NOTES:**
- REFER TO DWG. NO. EC-05 AND EC-06 FOR EROSION AND SEDIMENT CONTROL DETAILS.
 - REFER TO DWG. NO. EC-07 FOR EROSION AND SEDIMENT CONTROL NOTES.
 - EXISTING PAVEMENT AREAS TO BE REMOVED SHALL BE RESTORED PER DETAIL SHOWN ON DWG. EC-06. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE PER ACRE UNDER ITEM T-902-1.
 - AREAS DISTURBED FOR LONGER THAN 7 CALENDAR DAYS SHALL BE TEMPORARILY SEEDED AND MULCHED. REFER TO THE TEMPORARY SEEDING TABLE ON DWG. NO. EC-06.



CONSTRUCTION BID SET

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECT DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.



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SYRACUSE REGIONAL AIRPORT AUTHORITY CITY OF SYRACUSE, STATE OF NEW YORK RECONFIGURE TAXIWAYS C, F, B, G, AND E EROSION & SEDIMENT CONTROL PLAN (SHEET 4 OF 4)			
SCALE: 1"=50'	DESIGN: JPM	EC-04 37 OF 55	
DRAWN: JPM	PROJECT: 18180.04		
CHECKED: WEV	DATE: MAY 2018		

REV	DATE	DESCRIPTION	BY

6/6/2018	ADDENDUM NO. 1: ADDED EXISTING CONTOUR LABELS	JPM
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