AMENDMENT NO. 1 TO USE AND LEASE AGREEMENT
FOR FUEL FACILITIES AND PIPELINE

TAMPA INTERNATIONAL AIRPORT

BY AND BETWEEN

HILLSBOROUGH COUNTY AVIATION AUTHORITY

AND

SOUTHWEST AIRLINES CO.

_____, 2019

Prepared by:

Real Estate Department
Attn.: Rebecca E. Waterman
Hillsborough County Aviation Authority
P. O. Box 22287
Tampa, FL 33622

AMENDMENT NO. 1 TO USE AND LEASE AGREEMENT
FOR FUEL FACILITIES AND PIPELINE
TAMPA INTERNATIONAL AIRPORT

This Amendment No. 1 to that certain Use and Lease Agreement for Fuel Facilities and Pipeline, by and between Hillsborough County Aviation Authority, a public body corporate existing under the laws of the State of Florida ("Authority") and SOUTHWEST AIRLINES CO., a corporation organized and existing under the laws of the State of Texas and authorized to do business in the State of Florida ("Company") (hereinafter individually and collectively referred to as "Party" or "Parties"), is entered into this _____ day of _____, 2019.

WITNESSETH:

WHEREAS, Authority and Company entered into a Use and Lease Agreement for Fuel Facilities and Pipeline (the "Agreement") for the operation, maintenance, lease, and service of Fuel Facilities owned by Authority, including the right to certain pipeline rights of way in the operation thereof serving Tampa International Airport ("Airport"); and

WHEREAS, since entering into the Agreement, Fuel Committee has upgraded the Fuel Facilities on four occasions, entering into Memorandum of Understandings with Authority to repay Authority for the sums Authority financed in connection with said upgrades; and

WHEREAS, this Amendment No. 1 ("Amendment No. 1") amends the Agreement to extend the term of the Agreement for five years, updates the Demised Premises and payments therefore, updates insurance requirements, and updates certain administrative provisions.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable consideration, the receipt and sufficiency whereof are hereby acknowledged, the Parties do agree that the Agreement is amended as follows:

1. The above recitals are true and correct and are incorporated herein.

2. Article 1, Definitions, Section 1.3, Fuel or Fueling Facilities, is hereby deleted in its entirety and replaced with the following:

   1.3 Fuel or Fueling Facilities – The bulk fuel storage facility on the Airport, consisting of above ground storage tanks; pumps, filters, valves, connecting piping, storage and shop

buildings, control room, transmission lines, hydrant loop piping around each airside terminal, hydrant valves and controls, along with miscellaneous structures and equipment necessary for a fully functioning jet fuel storage facility and underground hydrant system, serving the ramps and aprons at each airside terminal and common or segregated air cargo facilities, as further depicted on Exhibit “B” – Map of Fuel Facilities System at the Airport, which is attached hereto and incorporated herein by reference, as may be modified throughout the term of this Agreement.

3. Article 3, Demised Premises and Operating Area, Section 3.1, Demised Premises, is hereby deleted in its entirety and replaced with the following:

3.1 Demised Premises

In addition to the Fuel Facilities described in Article 1, Paragraph 1.3, Company hereby agrees to lease in common with others from the Authority land containing approximately 226,076 square feet, more or less, underlying the Fuel Storage Facilities, the location of which is further described on Exhibit "B" attached hereto and incorporated herein by reference. The elements described in Paragraphs 1.3, 3.1, 3.2 and 3.3 shall be hereinafter collectively referred to as the "Demised Premises".

4. Article 3, Demised Premises and Operating Area, Section 3.2, Pipeline Right of Way, is hereby deleted in its entirety and replaced with the following:

3.2 Pipeline Right of Way

Authority hereby grants to Company the right to use in common with others a pipeline right of way, the location and description of which is designated on Exhibit "B" and Exhibit "C"- Pipeline Right of Way, attached hereto and incorporated herein by reference.

The Pipeline Right of Way is 124,206 square feet, and is calculated as a three foot corridor along the 41,402 linear feet of pipeline leading from the Fuel Storage Facilities to each end location as follows:

Ending Location	Linear Feet from Fuel Storage Facilities
Federal Express	9,860 linear feet
Airside A	8,667 linear feet
Airside C	10,952 linear feet
Airsides E and F	11,923 linear feet

5. Article 3, Demised Premises and Operating Area, Section 3.4, Condition of Demised Premises, is hereby deleted in its entirety and replaced with the following:

The condition of the Demised Premises is described in the Evaluation of Jet A Fuel Systems Report prepared by URSGWC, dated February 1999; the TFC Fuel System Hydraulic Analysis Report Tampa International Airport Fuel Farm Renovations prepared by Prime Engineering Incorporated, dated September 2013; the API 570 Report Review & Recommendations, prepared by Currier Engineering Management Consulting, dated July 1, 2019; and in the collected Environmental Audit Reports of the Demised Premises, all of which are collectively referred to as "Assessment Reports" and listed in Exhibit "D" attached hereto and incorporated herein by reference.

6. Article 5, Term, is hereby deleted in its entirety and replaced with the following:

This Agreement shall become effective upon approval by the Authority and shall run for a term of twenty-five (25) years retroactive to October 1, 1999 and terminating on September 30, 2024.

7. Article 6, Payments, Section 6.1, Ground Rent for the Term, is hereby deleted in its entirety and replaced with the following:

6.1 Ground Rent for the Demised Premises

The Ground Rent for the Demised Premises due throughout the term of the Agreement shall be paid by Agent on Company's behalf in equal monthly installments, in advance on or before the first day of each and every month, without demand or invoice. The Ground Rent for the Demised Premises starting on October 1, 2019 is $174,376.40, payable at $14,531.37 monthly ("Ground Rent for the Demised Premises"). The Ground Rent for Demised Premises is calculated as follows:

Unimproved land totaling 226,076 square feet at $0.70 per square foot per year, which rent is $158,253.20 annually, payable at $13,187.77 monthly; and

Aeronautical vehicular pavement at Fuel Storage Facilities totaling 37,026 square feet at $0.10 per square foot per year, which rent is $3,702.60 annually, payable at $308.55 monthly; and

Pipeline Right of Way corridor totaling 124,206 square feet at $0.10 per square foot per year, which rent is $12,420.60 annually, payable at $1,035.05 monthly.

8. Article 6, Payments, Section 6.2, Ground Rental Adjustment, is hereby deleted in its entirety and replaced with the following:

6.2 Adjustment to the Ground Rent for the Demised Premises

Commencing on October 1, 2020 and on every October 1 of each year of the term of this Agreement thereafter, the Ground Rent for the Demised Premises will increase by 2.15%. The rental rate following the adjustment shall remain in effect until the next adjustment.

9. Article 6, Payments, Section 6.3, Fuel Facilities, Subsection (A)(1) is hereby deleted in its entirety and replaced with the following:

(1) Rent for the Fuel Facilities is comprised of Fuel Storage Facilities Rent and Improvements Payments Rent.

(a) Fuel Storage Facilities Rent

The annual rent for the Fuel Storage Facilities is $394,042.82, payable at $32,836.90 monthly ("Fuel Storage Facilities Rent").

(b) Improvements Payments Rent

Monthly payments of the following items, as set forth in certain agreements between the Fuel Committee and Authority, as more particularly described in Exhibit E, Fuel System Rates and Charges, which payments survive the termination of this Agreement (collectively, "Improvements Payments Rent"):

(i) Expansion of System – East Cargo Area to Emery, executed by Fuel Committee on behalf of Company and by Authority, dated July 2002, in the final amount of $3,802,040 amortized over 30 years at 8% interest, payable in monthly payments of $27,898.02, with a final payment date of June 2030; and

(ii) Expansion of System – East Cargo Area to Federal Express, executed by Fuel Committee on behalf of Company and by Authority, dated March 2003, in the final amount of $613,155 amortized over 30 years at 8% interest, payable in monthly payments of $4,499.11, with a final payment date of February 2033; and

(iii) Secondary Containment for Fuel Storage Tanks – Improvement costs set forth in that certain Memorandum of Understanding for Secondary Containment of Fuel Storage Tanks, executed by Fuel Committee on behalf of Company and by Authority, dated December 18, 2008, in the final amount of $4,696,086.84 amortized over 20 years at 7.25% interest, payable in monthly payments of $37,116.74, with a final payment date of December 2028; and

(iv) Amended Memorandum of Understanding for Bulk Fuel Storage Facility Upgrades – Improvement costs set forth in that certain Memorandum of Understanding for Fuel Facility Upgrades, executed by Fuel Committee on behalf of Company and by Authority, dated July 29, 2014, as amended, in the final amount of $9,759,800 amortized over 20 years at 5% interest, payable in monthly payments of $64,777.61, with a final payment date of December 2036;

Plus

Any residual costs not covered by Passenger Facility Charges ("PFCs") or Airport Improvement Program ("AIP") Grants or any other federal, State, or local programs, depending on the project, will be charged back to Company and amortized over the expected life of the improvement at 8%.

10. Article 6, Payments, Section 6.5, Place of Payments, is hereby added to the Agreement:

6.5 Place of Payments

Company will submit all payments required by this Agreement as follows:

(ELECTRONICALLY – PREFERRED METHOD)
Via ACH with Remittance Advice to Receivables@TampaAirport.com

or

(MAIL DELIVERY)
Hillsborough County Aviation Authority
Attn: Finance Department
Tampa International Airport
P. O. Box 22287
Tampa, Florida 33622-2287

or

(HAND DELIVERY)
Hillsborough County Aviation Authority
Attn: Finance Department
Tampa International Airport
4160 George J. Bean Parkway
Suite 2400, Administration Building
Tampa, Florida 33607

11. Article 19, Insurance, is hereby deleted in its entirety and replaced with the following:

ARTICLE 19
INSURANCE

19.1 Insurance Terms and Conditions

The Company must maintain (or cause to be maintained) the following limits and coverages uninterrupted or amended through the term of this Agreement. In the event the Company becomes in default of the following requirements, the Authority reserves the right to take whatever actions deemed necessary to protect its interests. Required liability policies other than Workers' Compensation/Employer's Liability, will provide that the Authority, members of the Authority's governing body, and the Authority's officers, volunteers, and employees are included as additional insureds.

19.2 Limits and Requirements

A. Workers' Compensation/Employer's Liability

The minimum limits of insurance (inclusive of any amount provided by an umbrella or excess policy) are:

Part One:	"Statutory"
Part Two:	
Each Accident	$1,000,000
Disease – Policy Limit	$1,000,000
Disease – Each Employee	$1,000,000

B. Commercial General Liability

The minimum limits of insurance (inclusive of any amounts provided by an umbrella or excess policy) covering the work performed pursuant to this Agreement

will be the amounts specified herein. Coverage will be provided for liability resulting out of, or in connection with, ongoing operations performed by, or on behalf of, the Company under this Agreement or the use or occupancy of the Demised Premises by, or on behalf of, the Company in connection with this Agreement. Coverage will be provided on a form no more restrictive than ISO Form CG 00 01. Additional insurance coverage will be provided on a form no more restrictive than ISO Form CG 20 11 01 96 and CG 20 37 10 01. The Commercial General Liability coverage may be satisfied using an Aviation Liability policy.

Agreement Specific	
General Aggregate	$250,000,000
Each Occurrence	$250,000,000
Personal and Advertising Injury	
Each Occurrence	$250,000,000
Products and Completed Operations	
Aggregate	$250,000,000

C. Business Auto Liability

Coverage will be provided for all owned, hired and non-owned vehicles. Coverage will be no more restrictive than Form CA 00 01. The minimum limits of insurance (inclusive of any amounts provided by an umbrella or excess policy) covering the work performed pursuant to this Agreement will be:

Each Occurrence – Bodily Injury and	
Property Damage Combined	$10,000,000

D. Property Insurance for the Fuel Facilities

Authority will maintain such insurance at all times. Said policy will insure all improvements now or hereafter located on the Demised Premises in an amount equal to the Replacement Cost Value of such improvements. The Company agrees to reimburse the Authority for the amount of any deductible applicable to any loss covered by the Authority's Property Insurance and sustained against the improvements located on the Demised Premises. However, such obligation to reimburse Authority for deductibles under Authority's Property Insurance shall not exceed $250,000.00 in any one loss or occurrence.

E. Environmental Insurance (Pollution)

Such insurance will be maintained by the Company, or caused by the Company to be maintained by the Agent, on a form acceptable to Authority for liability resulting from pollution or other environmental impairment, which arises out of, or in connection with, work under this Agreement. The Company will provide and maintain environmental coverage from the inception of the Agreement. If on an occurrence basis, the insurance must be maintained throughout the duration of the Agreement. If on a claims-made basis, insurance must respond to claims reported within three (3) years of the end of this Agreement. If the Company is unable to produce a Policy acceptable to Authority, Authority may purchase and provide such coverage, with the premium to be paid by the Company on a monthly basis as part of the Company's rents and fees, with no responsibility for Authority as to the financial responsibility of the insurance company used or the coverages provided. The limits of coverage will be:

Each Occurrence	$5,000,000
Policy Aggregate	$10,000,000

F. Personal Property Insurance - Contents

The Company is responsible for insuring its own personal property, including any contents, improvements, or betterments. The Authority reserves the right to obtain copies of all insurance policies that may serve as a source of recovery for damages.

19.3 Waiver of Subrogation

Company, for itself and on behalf of its insurers, to the fullest extent permitted by law without voiding the insurance required hereunder, waives all rights against Authority and members of Authority's governing body, Authority's officers, volunteers and employees, for damages or loss to the extent covered by any insurance maintained by Company. The Authority, for itself and on behalf of its insurers providing the insurance required under this Agreement, to the fullest extent permitted by law without voiding the insurance required hereunder, waives all rights against the Company and the Company's officers, agents, volunteers and employees, for damages or loss to the extent covered by any insurance maintained by the Authority hereunder.

19.4 Conditions of Acceptance

The insurance maintained by the Company throughout the term of this Agreement must conform at all times with Exhibit F, Standard Procedure S250.06, Contractual Insurance Terms and Conditions, in effect at the time of this Agreement, as may be amended from time to time.

12. Article 20, Damage or Destruction, is hereby deleted in its entirety and replaced with the following:

ARTICLE 20
DAMAGE OR DESTRUCTION

20.1 Partial Damage

If any part of Demised Premises, or adjacent facilities directly and substantially affecting the use of Demised Premises, shall be partially damaged by fire or other casualty, without regard to fault, and said circumstances do not render Demised Premises untenantable as reasonably determined by Authority, the same shall be repaired to usable condition with due diligence by Authority as hereinafter provided. No abatement of rentals shall accrue to Company so long as Demised Premises remain tenantable. Notwithstanding anything to the contrary, the Authority shall be responsible for any costs of repairs that exceed the amount of any insurance proceeds payable to Authority by reason of any such damage or destruction.

20.2 Substantial Damage

If any part of Demised Premises, or adjacent facilities directly and substantially affecting the use of Demised Premises, shall be so extensively damaged by fire or other casualty as to render any portion of said Demised Premises untenantable but capable of being repaired, as reasonably determined by Authority, the same shall be repaired to usable condition with due diligence by Authority as hereinafter provided. Without limiting the rights of the Authority pursuant to 20.4 herein, if such repairs have not been commenced by Authority within 90 days of such damage, Company shall have the option to terminate its agreement related to those facilities so damaged. In such case, the rentals payable hereunder with respect to the affected Demised Premises shall be paid up to the time of such damage and shall thereafter be abated equitably in proportion as the part of the area rendered untenantable bears to total Demised Premises until such time as such affected Demised Premises shall be restored adequately for Company's use. Notwithstanding anything to the contrary, the Authority shall be responsible for any costs of repairs that exceed the amount of any insurance proceeds payable to Authority by reason of any such damage or destruction.

20.3 Destruction

A. If any part of Demised Premises, or adjacent facilities directly and substantially affecting the use of Demised Premises, shall be damaged by fire or other casualty, and is so extensively damaged as to render any portion of said Demised Premises not economically feasible to repair, as reasonably determined by Authority, Authority shall notify Company within a period of forty-five (45) days after the date of such damage of its decision whether to reconstruct or replace said space; provided, however, Authority shall be under no obligation to replace or reconstruct such premises. The rentals payable hereunder with respect to affected Demised Premises shall be paid up to the time of such damage and thereafter shall abate until such time as replacement or reconstructed space becomes available for use by Company.

B. In the event Authority elects to reconstruct or replace affected Demised Premises, Authority shall use its best efforts to provide Company with alternate facilities reasonably acceptable to Company to continue its operation while reconstruction or replacement is being completed at a rental rate not to exceed that provided for in this Agreement for comparable space.

C. In the event Authority elects to not reconstruct or replace affected Demised Premises, the agreement for the affected premises shall be terminated and Authority shall meet and consult with Company on ways and means to provide Company with adequate replacement space for affected Demised Premises. In such event, Authority agrees to amend this Agreement to reflect related additions and deletions to Demised Premises.

D. Notwithstanding anything to the contrary, the Authority shall be responsible for any costs of repairs that exceed the amount of any insurance proceeds payable to Authority by reason of any such damage or destruction.

20.4 Damage Caused by Company

In the event that due to the negligence or willful act or omission of Company, its employees, its agents, or licensees, the Demised Premises shall be damaged or destroyed by fire, other casualty or otherwise, there shall be no abatement of rents during the repair or replacement

of said Demised Premises. Notwithstanding anything to the contrary, the Company shall be responsible for any costs of repairs that exceed the amount of any insurance proceeds payable to Authority by reason of any such damage or destruction.

20.5 Authority's Responsibilities

Authority's obligations to repair, reconstruct, or replace affected premises under the provisions of this Article shall in any event be limited to restoring affected Demised Premises to substantially the same condition that existed at the date of damage or destruction, provided that Authority shall in no way be responsible for the restoration or replacement of any equipment, furnishings, property, real improvements, signs, or other items installed and/or owned by Company.

13. Article 26, Americans with Disabilities Act, is hereby deleted in its entirety and replaced with the following:

ARTICLE 26
AMERICANS WITH DISABILITIES ACT

Company will comply with the applicable requirements of the Americans with Disabilities Act; the Florida Americans with Disabilities Accessibility Implementation Act; Florida Building Code, Florida Accessibility Code for Building Construction; and any similar or successor laws, ordinances, rules, standards, codes, guidelines, and regulations and will cooperate with Authority concerning the same subject matter.

14. Article 28, Nondiscrimination, is hereby deleted in its entirety and replaced with the following:

ARTICLE 28
NON-DISCRIMINATION

These provisions apply to all work performed under this Agreement. Failure to comply with the terms of these provisions may be sufficient grounds to:

A. Terminate this Agreement;
B. Seek suspension/debarment of Company; or
C. Take any other action determined to be appropriate by Authority or the FAA.

28.1 Civil Rights – General – 49 USC § 47123

A. Compliance:

Company agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability, be excluded from participating in any activity conducted with or benefitting from Federal assistance. If Company transfers its obligation to another, the transferee is obligated in the same manner as Company.

B. Duration:

This provision obligates the Company for the period during which the property is owned, used or possessed by the Company and the Airport remains obligated to the FAA. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

28.2 Civil Rights – Title VI Assurances

A. Compliance with Non-Discrimination Requirements:

During the performance of this Agreement, Company, for itself, its assignees, successors in interest, subcontractors and consultants agrees as follows:

1. Compliance with Regulations: Company will comply with the Title VI List of Pertinent Non-Discrimination Statutes and Authorities, as they may be amended from time to time, which are herein incorporated by reference and made a part of this Agreement.

2. Non-Discrimination: Company, with regard to the work performed by it during this Agreement, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. Company will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including but not limited to those listed at Section 28.2(B) below, including employment practices when this Agreement covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by Company for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier will be notified by Company of Company's obligations under this Agreement and the Acts and the Regulations relative to non-discrimination on the grounds of race, color, or national origin.

4. Information and Reports: Company will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by Authority or the FAA to be pertinent to ascertain compliance with such Acts, Regulations, and directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, Company will so certify to Authority or the FAA, as appropriate, and will set forth what efforts it has made to obtain the information.

5. Sanctions for Non-compliance: In the event of Company's non-compliance with the non-discrimination provisions of this Agreement, Authority will impose such Agreement sanctions as it or the FAA may determine to be appropriate, including, but not limited to, cancelling, terminating, or suspending this Agreement, in whole or in part.

6. Incorporation of Provisions: Company will include the provisions of paragraphs one through five of this Article in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. Company will take action with respect to any subcontract or procurement as Authority or the FAA may direct as a means of enforcing such provisions including sanctions for non-compliance. Provided, that if Company becomes involved in, or is threatened with litigation by a subcontractor or supplier because of such direction, Company may request Authority to enter into any litigation to protect the interests of Authority. In addition,

Company may request the United States to enter into the litigation to protect the interests of the United States.

B. Title VI List of Pertinent Non-Discrimination Authorities:

During the performance of this Agreement, Company, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities:

1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252) (prohibits discrimination on the basis of race, color, national origin);

2. 49 CFR Part 21 (Non-discrimination In Federally-Assisted Programs of The Department of Transportation—Effectuation of Title VI of The Civil Rights Act of 1964);

3. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601) (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

4. Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended (prohibits discrimination on the basis of disability); and 49 CFR Part 27;

5. The Age Discrimination Act of 1975, as amended (42 U.S.C. § 6101 et seq.) (prohibits discrimination on the basis of age);

6. Airport and Airway Improvement Act of 1982 (49 USC § 471, Section 47123), as amended (prohibits discrimination based on race, creed, color, national origin, or sex);

7. The Civil Rights Restoration Act of 1987 (PL 100-209) (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

8. Titles II and III of the Americans with Disabilities Act of 1990, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations at 49 CFR Parts 37 and 38;

9. The FAA's Non-Discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

10. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations);

11. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, Company must take reasonable steps to ensure that LEP persons have meaningful access to Company's programs (70 Fed. Reg. at 74087 to 74100); and

12. Title IX of the Education Amendments of 1972, as amended, which prohibits Company from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

The Company agrees to comply with pertinent statutes, Executive Orders and such rules as are promulgated to ensure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or disability be excluded from participating in any activity conducted with or benefiting from Federal assistance. If the Company transfers its obligation to another, the transferee is obligated in the same manner as the Company.

This provision obligates the Company for the period during which the property is owned, used or possessed by the Company and the Airport remains obligated to the FAA. This provision is in addition to that required of Title VI of the Civil Rights Act of 1964.

15. Article 42, Attorneys' Fees and Costs, is hereby deleted in its entirety and replaced with the following:

ARTICLE 42

Reserved.

16. Article 44, Payments Notices and Communications, is hereby deleted in its entirety and replaced with the following:

ARTICLE 44

NOTICES AND COMMUNICATIONS

All notices or communications whether to Authority or to the Companies pursuant hereto will be deemed validly given, served, or delivered, upon receipt by the Party by hand delivery, or three (3) days after depositing such notice or communication in a postal receptacle, or two (2) business days after depositing such notice or communication with a reputable overnight courier service, and addressed as follows:

TO Authority:

Hillsborough County Aviation Authority
Tampa International Airport
P. O. Box 22287
Tampa, Florida 33622
Attn: Chief Executive Officer

Or

Hillsborough County Aviation Authority
Tampa International Airport
4160 George J. Bean Parkway
Suite 2400, Administration Building
Tampa, Florida 33607
Attn: Chief Executive Officer

TO Company:

With a Copy to

(MAIL OR HAND DELIVERY)

or to such other address as a Party may designate in writing by notice to the other Party delivered in accordance with the provisions of this Article.

If the Notice is sent through a mail system, a verifiable tracking documentation such as a certified return receipt or overnight mail tracking receipt is encouraged.

17. Article 46, Exclusive Rights, is hereby deleted in its entirety and replaced with the following:

ARTICLE 46
NON-EXCLUSIVE RIGHTS

This Agreement will not be construed to grant or authorize the granting of an exclusive right within the meaning of 49 USC §40103(e) or 49 USC §47107(a), as may be amended from time to time, and related regulations.

18. Article 50, Authority Approvals, is hereby added:

ARTICLE 50
AUTHORITY APPROVALS

Except as otherwise indicated elsewhere in this Agreement, wherever in this Agreement approvals are required to be given or received by Authority, it is understood that the Authority's Chief Executive Officer or designee is hereby empowered to act on behalf of Authority.

19. The attached Reports are hereby added to Exhibit "D":

1. API 570 Report Review & Recommendations, prepared by Currier Engineering Management Consulting, dated July 1, 2019; and

2. TFC Fuel System Hydraulic Analysis Tampa International Airport Fuel Farm Renovations, prepared by Prime Engineering Incorporated, dated September 27, 2013.

The Parties hereby acknowledge and agree that no contamination is disclosed by and no environmental remediation is recommended or required by either of the foregoing reports hereby added to Exhibit "D".

20. Exhibit "E" is hereby deleted in its entirety and replaced with the attached Exhibit "E".

21. Exhibit "F", Standard Procedure S250.06, Contractual Insurance Terms and Conditions, is hereby added to this Agreement.

22. Except as stated herein, all other terms remain in full force and effect and are hereby ratified and confirmed. The Agreement and this Amendment No. 1 represent the entire understanding between the Parties on the issues contained herein, either written or oral, and may be amended only by written instrument signed by both Parties.

ATTEST:

HILLSBOROUGH COUNTY AVIATION AUTHORITY

_____
Lesley "Les" Miller, Jr., Secretary
Address: P. O. Box 22287
Tampa, FL 33622

By:_____
Robert I. Watkins, Chairman
Address: P. O. Box 22287
Tampa, FL 33622

Signed, sealed, and delivered
in the presence of:

_____
Witness Signature

_____
Print Name

LEGAL FORM APPROVED:

By:_____
David Scott Knight
Assistant General Counsel

_____
Witness Signature

_____
Print Name

HILLSBOROUGH COUNTY AVIATION AUTHORITY
STATE OF FLORIDA
COUNTY OF HILLSBOROUGH

The foregoing instrument was acknowledged before me this ____ day of _____, 2019, by Robert I. Watkins in the capacity of Chairman, and by Lesley "Les" Miller, Jr. in the capacity of Secretary, of the Board of Directors, Hillsborough County Aviation Authority, a public body corporate under the laws of the State of Florida, on its behalf. They are personally known to me and they did not take an oath.

(Stamp or seal of Notary)

_____
Signature of Notary

_____
Type or print name of Notary

_____
Date of Commission Expiration (if not on stamp or seal)

SOUTHWEST AIRLINES CO.

Signed in the presence of:

By: _____

Title: _____

_____
Witness

_____
Print Name

_____
Print Name

_____
Print Address

_____
Witness

_____
Print Name

SOUTHWEST AIRLINES CO.
STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 2019, by _____ in the capacity of _____, at SOUTHWEST AIRLINES CO., a Texas corporation, on its behalf. He is (personally known to me / not personally known to me) and has produced the following document of identification _____.

(Stamp or seal of Notary)

_____
Signature of Notary

_____
Type or print name of Notary

_____
Date of Commission Expiration
(if not on stamp or seal)

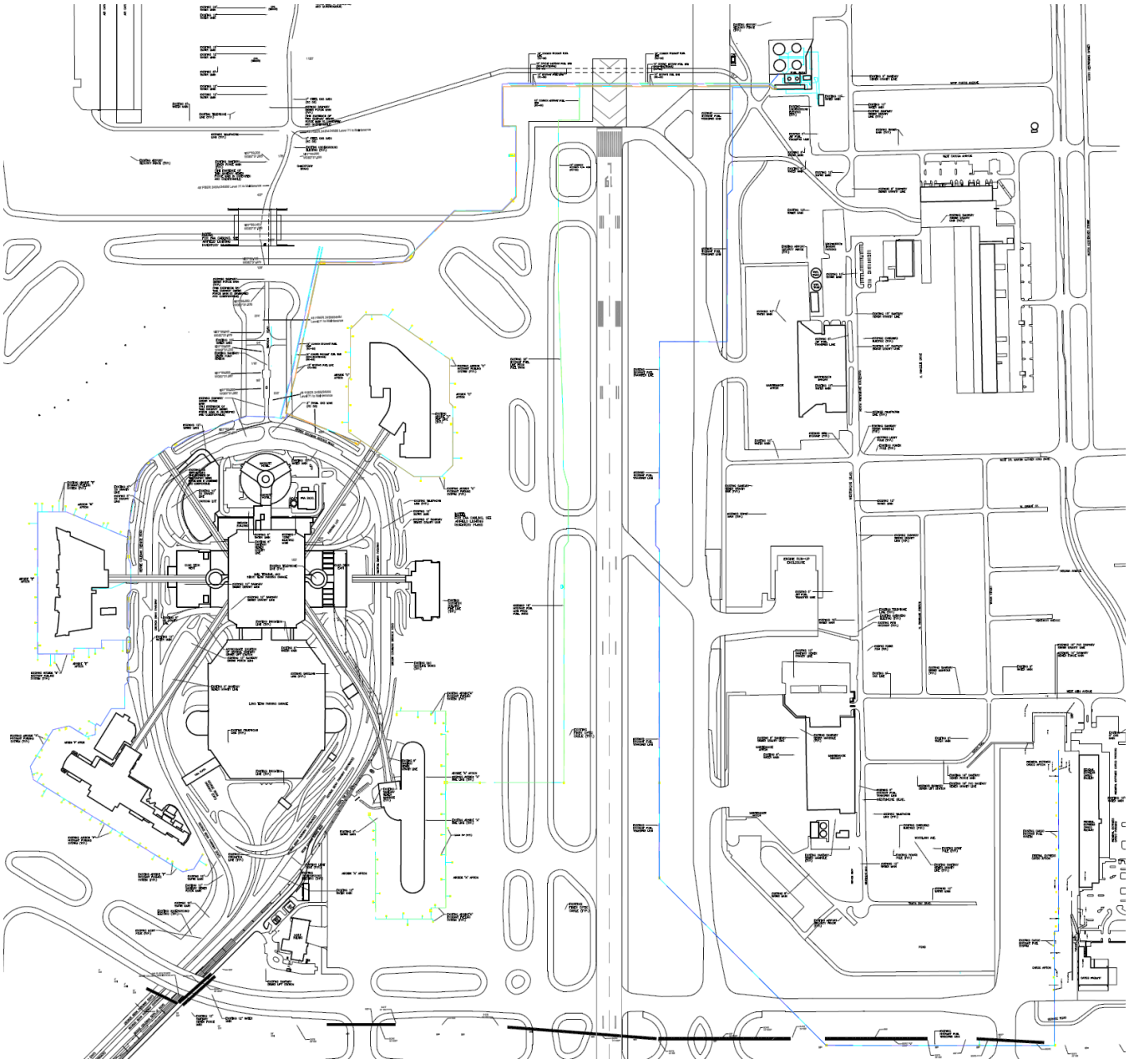

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EXHIBIT B

Map of Fuel Facilities System

Tampa International Airport

OCTOBER 2019

Enlarged Detail of Airside A Piping / Hydrant System

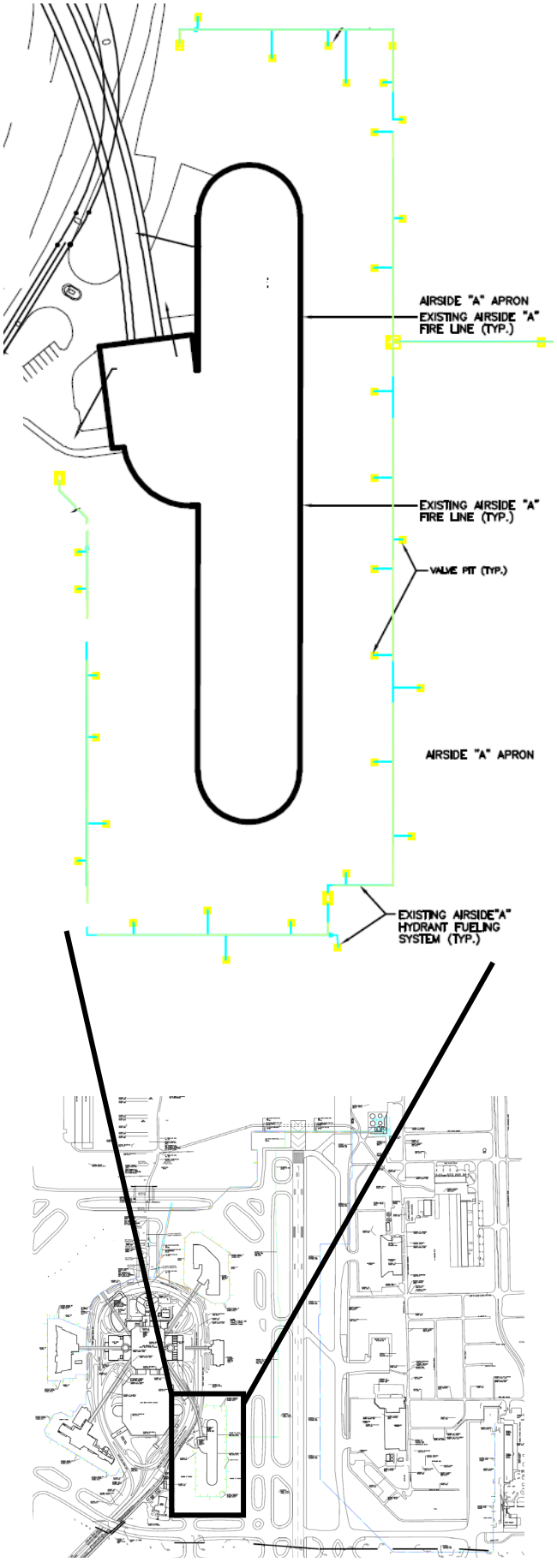


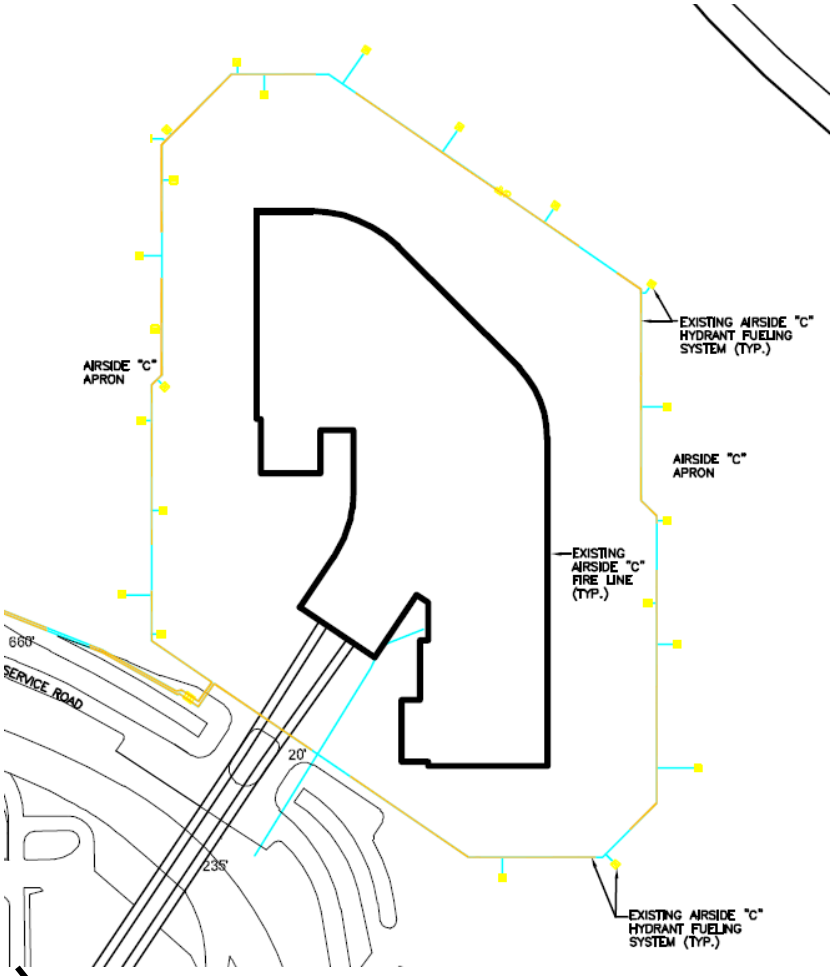
Exhibit B

Map of Fuel Facilities System

Tampa International Airport

October 2019

Enlarged Detail of Airside C Piping / Hydrant System



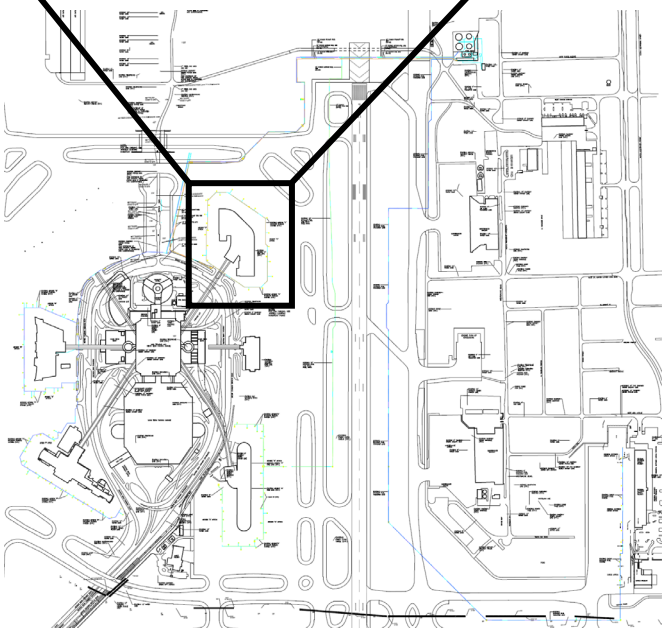


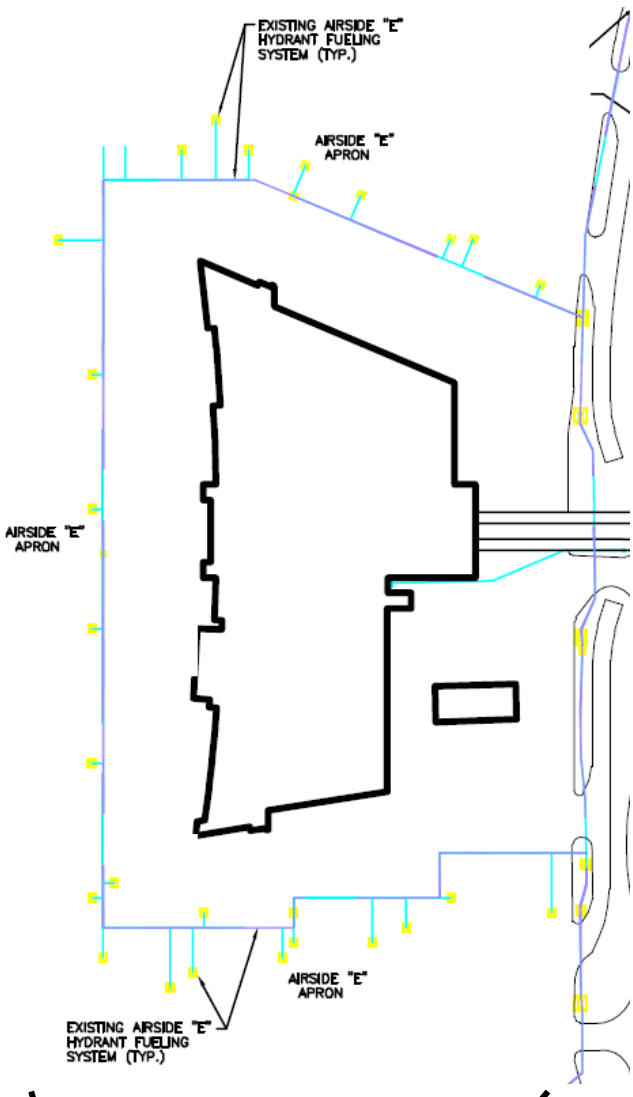
Exhibit B

Map of Fuel Facilities System

Tampa International Airport

October 2019

Enlarged Detail of Airside E Piping / Hydrant System



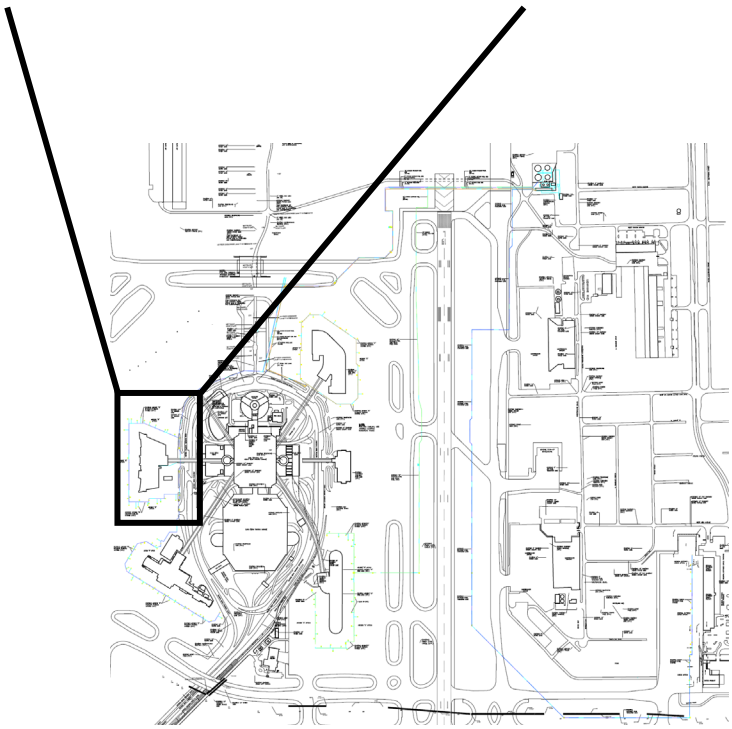


Exhibit B

Map of Fuel Facilities System

Tampa International Airport

October 2019

Enlarged Detail of Airside F Piping / Hydrant System

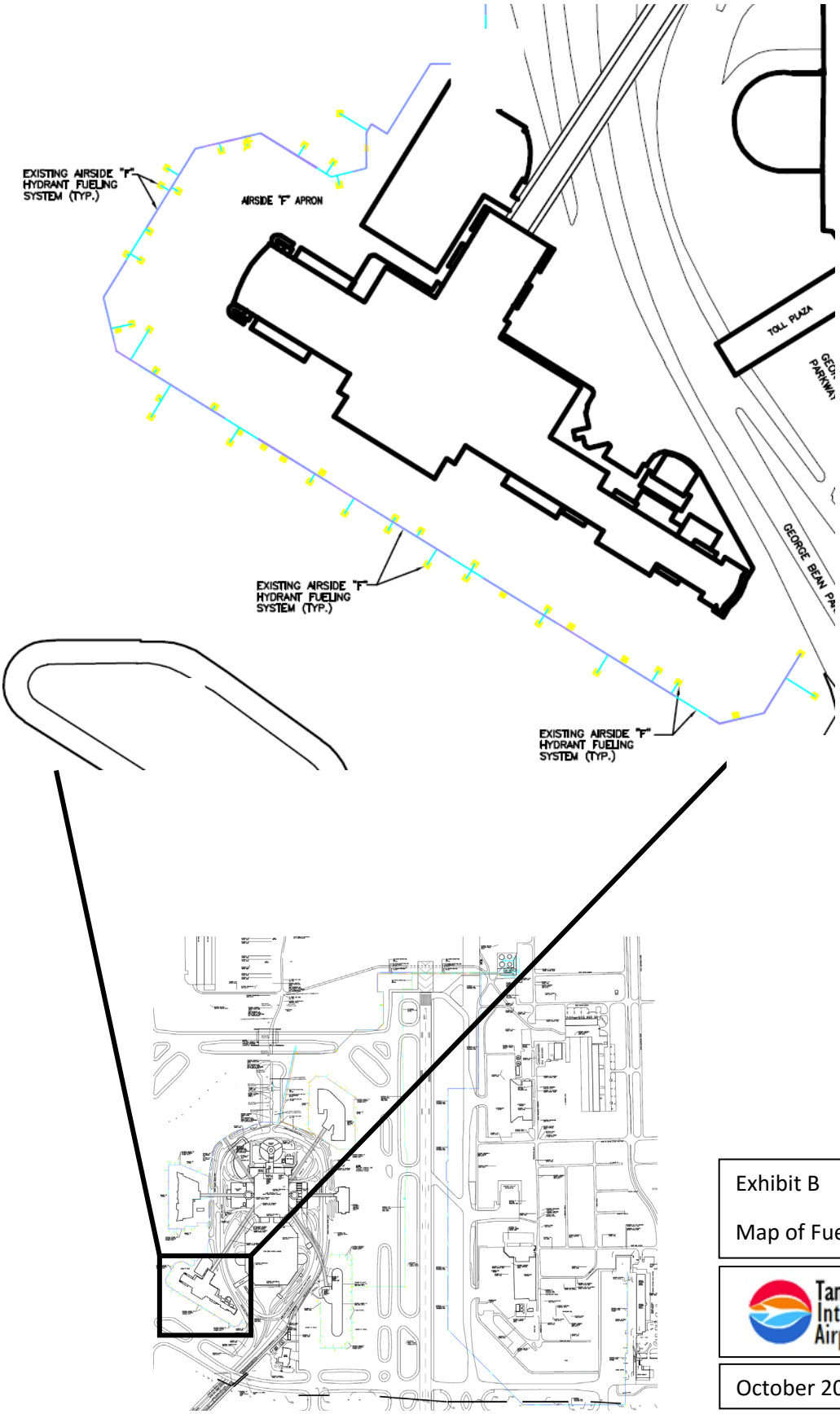


Exhibit B

Map of Fuel Facilities System

Tampa International Airport

October 2019

Enlarged Detail of Federal Express Piping / Hydrant System

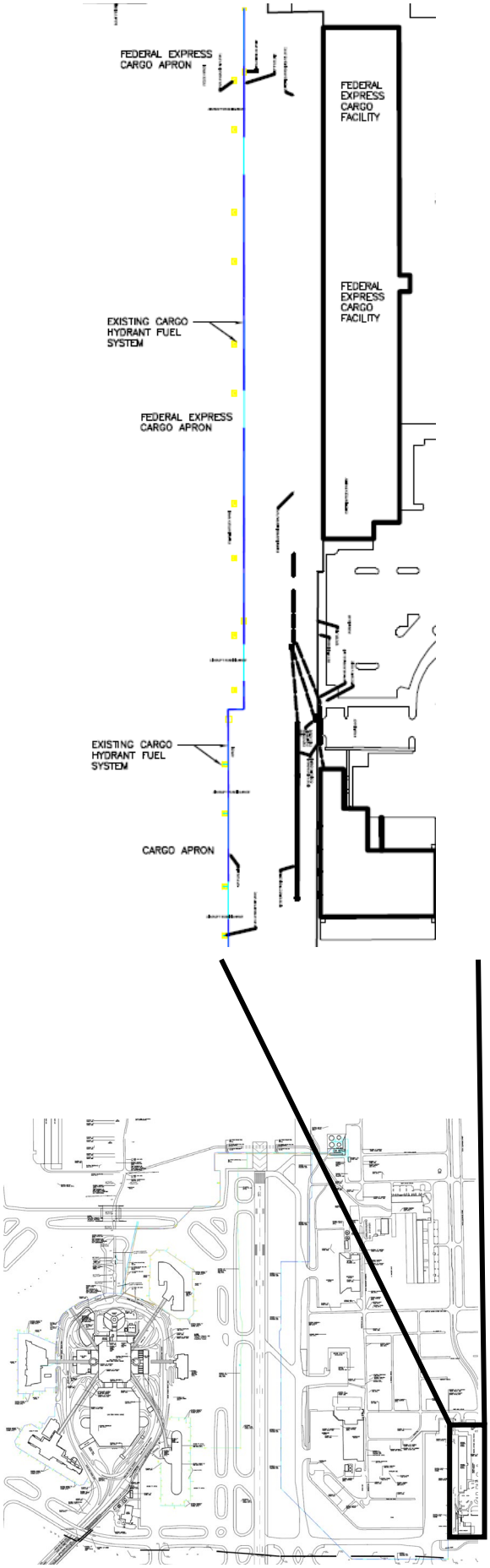


Exhibit B

Map of Fuel Facilities System

Tampa International Airport

October 2019

Sketch & Description
Tampa International Airport
Fuel Tank Farm
Section 5, Township 29 South, Range 18 East
Hillsborough County, Florida

Exhibit B
Legal Description and Sketch
of Fuel Storage Facilities

Fuel Tank Farm: As Written by SurvTech Solutions

A parcel of land lying and being in the Southeast 1/4 of Section 5, Township 29 South, Range 18 East, Hillsborough County, Florida, being more particularly described as follows:

COMMENCE at the Northeast corner of the Southeast 1/4 of Section 5, Township 29 South, Range 18 East, Hillsborough County, Florida, per Certified Corner Records document #104489 having a Northing of 1329012.616 and an Easting of 489126.739, NAD83 2007 adjustment; thence coincident with the East boundary of the Southeast 1/4 of said Section 5, S 01°09'54" W a distance of 32.32 feet; thence departing said East boundary, N 89°13'46" W a distance of 2183.12 feet to the POINT OF BEGINNING; thence S 00°46'14" W a distance of 355.44 feet; thence S 89°13'46" E a distance of 9.13 feet; thence S 00°46'14" W a distance of 34.73 feet; thence N 89°13'46" W a distance of 9.13 feet; thence S 00°46'14" W a distance of 77.53 feet; thence N 89°13'46" W a distance of 5.03 feet; thence S 00°46'14" W a distance of 66.64 feet; thence S 89°13'46" E a distance of 5.03 feet; thence S 00°46'14" W a distance of 317.92 feet; thence N 89°59'23" W a distance of 104.02 feet; thence N 33°36'51" W a distance of 333.98 feet; thence N 01°46'59" E a distance of 98.85 feet; thence N 40°03'50" W a distance of 28.89 feet; thence N 08°01'08" W a distance of 41.51 feet; thence N 03°23'08" E a distance of 30.96 feet; thence S 85°37'48" E a distance of 21.26 feet; thence N 00°26'31" E a distance of 386.72 feet; thence S 89°13'46" E a distance of 295.70 feet to the POINT OF BEGINNING.

Containing an area of 226,076.00 square feet, 5.190 acres, more or less.

Revision: 1. Parcel Size MDR 08/01/19

Stacy L. Brown P.S.M. No. 6516
SurvTech Solutions, Inc. LB No. 7340

Project No.: 20150090
Phase: 3
Drawing Name: 20150090_3SK
Last Field Date: N/A
Field Book/Page: N/A

Drafted By: M. Rook
Date Drafted: 7/1619
Revision Date: N/A
Approved By: S. Brown
Date Approved: 7/29/19

SURVTECH SOLUTIONS, INC. SURVEYORS AND MAPPERS
10220 U.S. Highway 92 East, Tampa, FL 33610
phone: (813)-621-4929, fax: (813)-621-7194, Licensed Business #7340
email: sbrown@survtechsolutions.com http://www.survtechsolutions.com

1.) Not valid without the signature and original raised seal of a Florida Licensed Surveyor and Mapper.
2.) The bearing structure for this survey is based on a Florida West State Plane grid bearing of S 01°09'54" W for the East Boundary of the SE 1/4 of Section 5-29S-18E.
3.) THIS IS NOT A BOUNDARY SURVEY.

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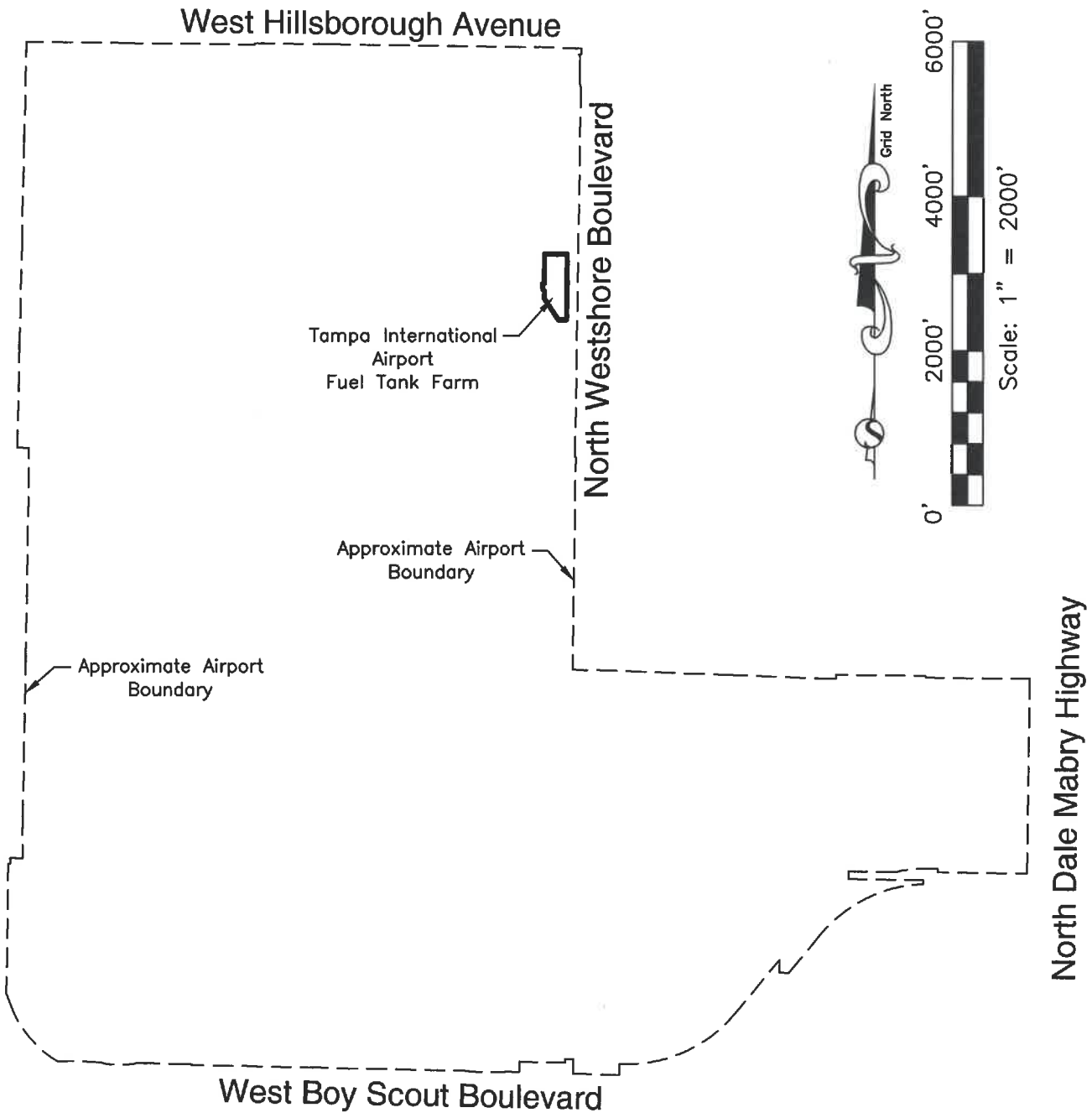
Date Plotted: 8/2/2019 11:51:56 AM By: Micahel D. Rook

Sketch & Description
Tampa International Airport
Fuel Tank Farm
Section 5, Township 29 South, Range 18 East
Hillsborough County, Florida

Exhibit B
Legal Description and Sketch
of Fuel Storage Facilities



PROJECT NO.: 20150090
PHASE: 3
LAST FIELD DATE: N/A

SURVTECH SOLUTIONS, INC. SURVEYORS AND MAPPERS
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Sketch & Description
Tampa International Airport
Fuel Tank Farm
Section 5, Township 29 South, Range 18 East
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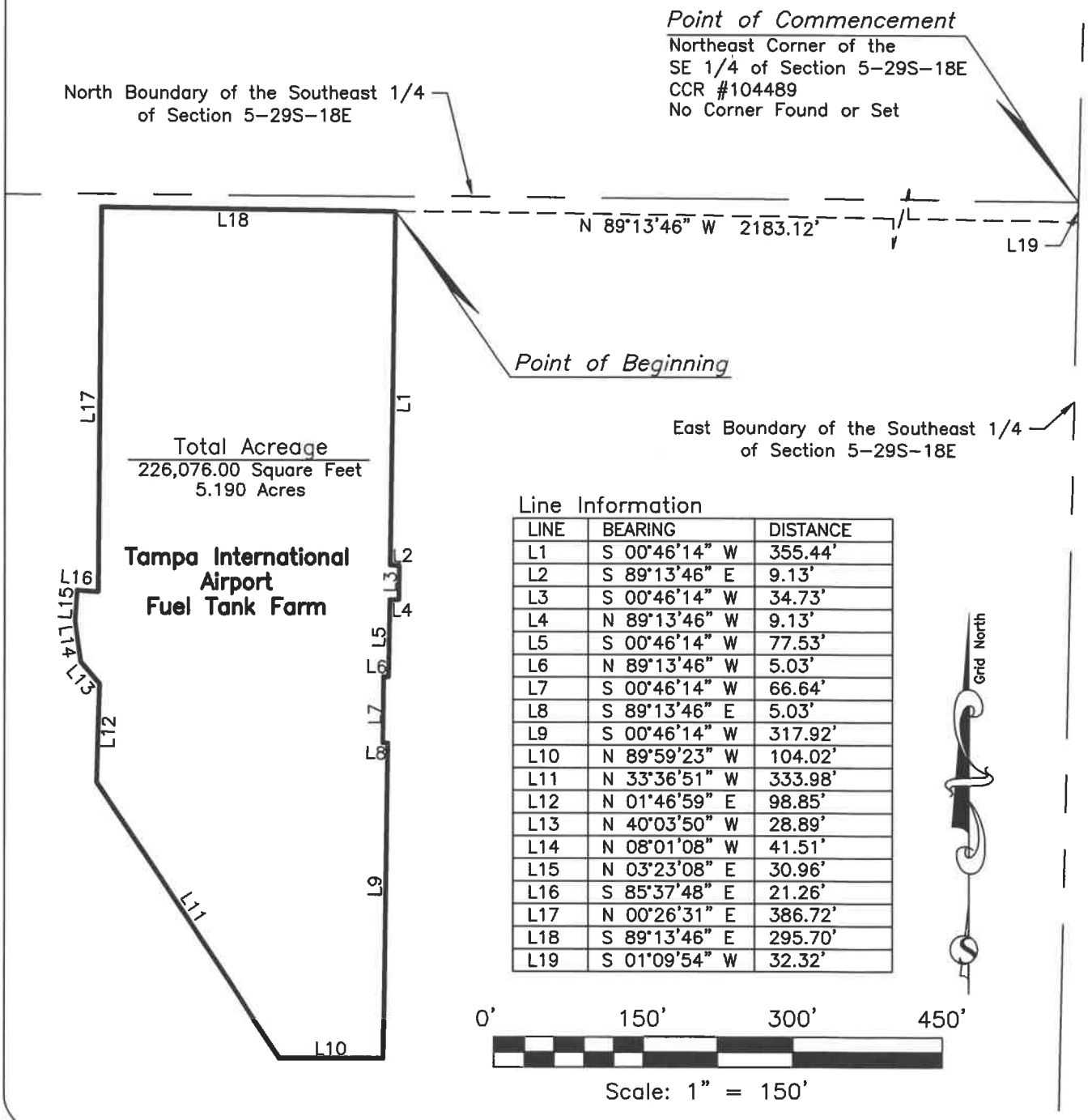
Exhibit B
Legal Description and Sketch
of Fuel Storage Facilities



Line Information

LINE	BEARING	DISTANCE
L1	S 00°46'14" W	355.44'
L2	S 89°13'46" E	9.13'
L3	S 00°46'14" W	34.73'
L4	N 89°13'46" W	9.13'
L5	S 00°46'14" W	77.53'
L6	N 89°13'46" W	5.03'
L7	S 00°46'14" W	66.64'
L8	S 89°13'46" E	5.03'
L9	S 00°46'14" W	317.92'
L10	N 89°59'23" W	104.02'
L11	N 33°36'51" W	333.98'
L12	N 01°46'59" E	98.85'
L13	N 40°03'50" W	28.89'
L14	N 08°01'08" W	41.51'
L15	N 03°23'08" E	30.96'
L16	S 85°37'48" E	21.26'
L17	N 00°26'31" E	386.72'
L18	S 89°13'46" E	295.70'
L19	S 01°09'54" W	32.32'

Scale: 1" = 150'

PROJECT NO.: 20150090
PHASE: 3
LAST FIELD DATE: N/A

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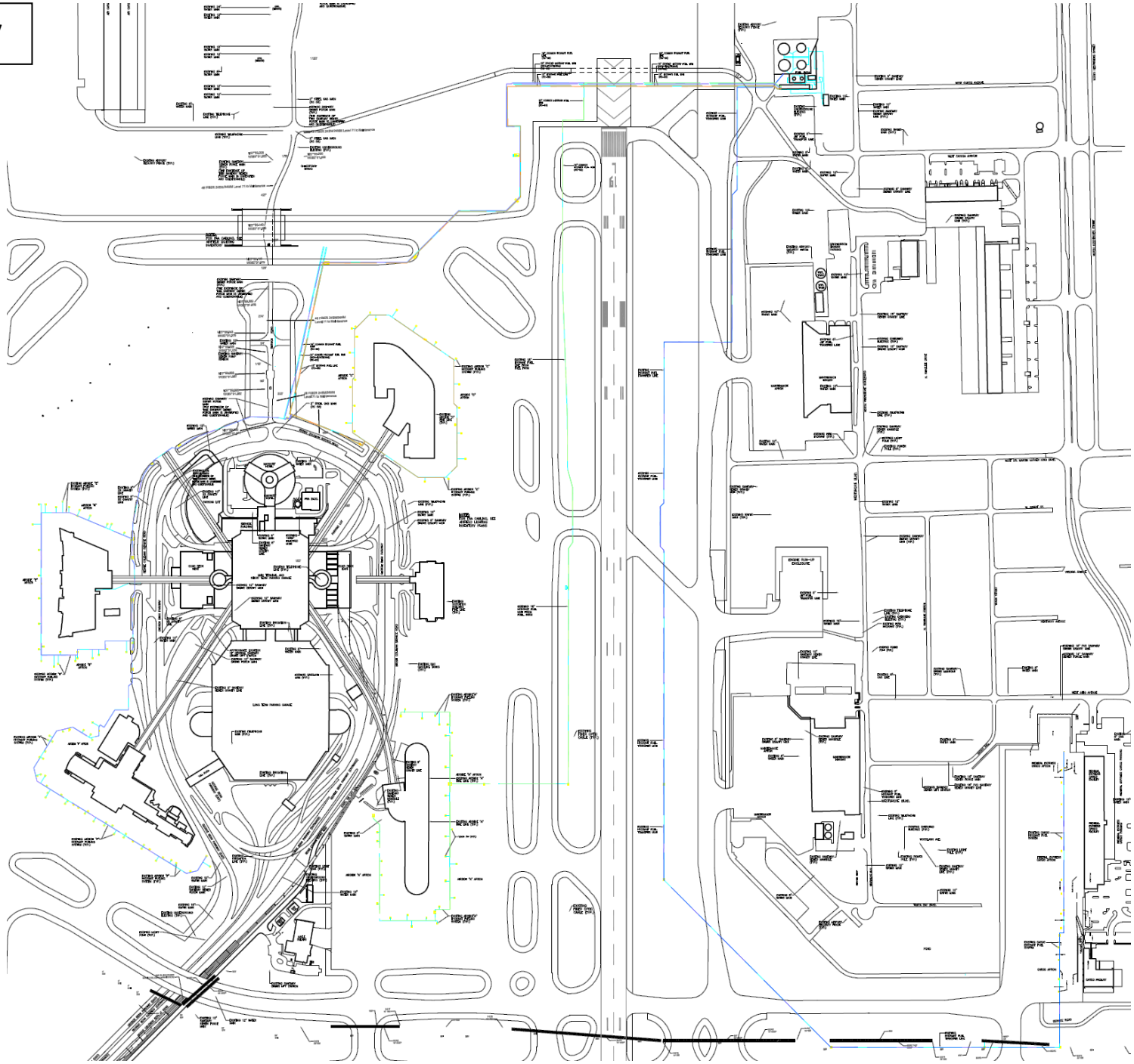
email: sbrown@survtechsolutions.com http://www.survtechsolutions.com

Exhibit C – Pipeline Right of Way

N

October 2019



LEGEND

PIPELINE RUN TO AND AROUND AIRSIDES

Ending Location	Linear Feet
Federal Express	9,860 linear feet
Airside A	8,667 linear feet
Airside C	10,952 linear feet
Airsides E and F	11,923 linear feet
Total	41,402 linear feet

Total Pipeline Right of Way 124,208 square feet calculated as a 3-foot corridor along the 41,402 linear feet of pipeline.

Exhibit D

WHAT IS YOUR
PRIME GOAL?

TFC Fuel System Hydraulic Analysis
Tampa International Airport Fuel Farm Renovations
Tampa Fuel Committee
Tampa, FL
1319-0002.000

Issued For Review – September 27, 2013

Prepared for:

Tampa International Airport

PRIME ENGINEERING INCORPORATED®

PRIME ENGINEERING INCORPORATED

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TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

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Introduction

PRIME ENGINEERING INCORPORATED

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INTRODUCTION

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

Tampa International Airport is planning to gradually increase the number of hydrant fueling carts and trucks servicing aircraft. The requirements for expansion has led the Tampa Fuel Committee (TFC) to modify the existing capacity of their fuel farm to expand supply to the increased number of fuel hydrants while still maintaining day to day operations until new construction has been completed. This study presents hydraulic analysis of modified system and alternatives for pumping capacity and retrofitting the existing aircraft fueling system with a target (14 to 17) new fuel hydrants at a rate of 280 to 350 GPM to service aircraft.

The existing Fuel Farm system at Tampa for all concourses and the south cargo consists of two (2) 25,000bbl Jet-A tanks, two (2) 15,000bbl Jet-A tanks, two (2) 1,500bbl Jet-A tanks, and ten (10) jet fuel pumps (plus one spare diesel driven pump) for a total maximum flow rate of 9,460 GPM which supplies the following systems on site:

1. Concourse A: (30) hydrant valves total (18 gates total).
2. Concourse C: (23) hydrant valves total (16 gates total).
3. Concourse E: (29) hydrant valves total (14 gates total).
4. Concourse F: (43) hydrant valves total (15 gates total).
5. South Cargo: (15) hydrant valves total.

Refer to the attached drawing called *Hydrant Exhibit* which is based on a system map provided by the Tampa International Airport for layout and interconnection data.

DESCRIPTION OF DESIGN SCENARIOS

A hydraulic analysis was performed on the existing Tampa hydrant system, with proposed options to expand the system to supply additional aircraft loading positions with hydrant fueling in the future. These options are based on providing 280-350 GPM at 90psig to each hydrant valve. The hydraulic analysis yields the following results.

1. Case A – Future hydrant demands with control valves at fuel farm: Single 18" and dual 12" fuel supply from Fuel Farm to maximize hydrant points anticipated with the use of flow control valves set at 1,245 GPM downstream of the filter separators.
    a. Scenario: Five (5) new pumps operating seventeen (17) hydrants dispersed evenly throughout the hydrant fueling systems.
2. Case B – Future hydrant demands without control valves at fuel farm: Single 18" and dual 12" fuel supply from Fuel Farm to maximize hydrant points anticipated without the installation of flow control valves downstream of the filter separators.
    a. Scenario: Five (5) new pumps operating seventeen (17) hydrants dispersed evenly throughout the hydrant fueling systems.

The design basis and analysis results for these scenarios are included in the following sections.

Section 1

Assumptions and Initial Data

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ASSUMPTIONS & INITIAL DATA

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

1.0 AIRCRAFT REQUIREMENTS AND DIVERSITY

Analysis is based on providing fueling for a combination of Boeing 737's, 737/800's, and 747's for Concourses A, C, E and F along with cargo aircraft in the South Cargo area. The following provides a basis for analysis for aircraft fueling:

1. Total flow rates from the tank farms divided by the number of hydrants required per aircraft
2. Maintain minimum pressure requirement of 90 psig as measured at the outlet of hydrant valve

The Boeing 747 has two underwing pressure nozzles, one pair per wing. Each nozzle is sized for a maximum loading rate of 500GPM at 35psig (wing pressure). The maximum ground service fueling expectation per Boeing aircraft characteristic data is 65,000 gallon loading. Typical loading rate per nozzle is 280-350 GPM, with one to two nozzles, depending on the hydrant fueling cart or truck capacity.

The Boeing 767 has two underwing pressure nozzles, one pair per wing. Each nozzle is sized for a maximum loading rate of 500GPM at 35psig (wing pressure). The maximum ground service fueling expectation per Boeing aircraft characteristic data is 24,000 gallon loading. Typical loading rate per nozzle is 280-350 GPM, with one to two nozzles, depending on the hydrant fueling cart or truck capacity.

The Boeing 737 and 737/800 has one underwing pressure nozzle located under the left wing. Each nozzle is sized for a maximum loading rate of 500GPM each at 50psig (wing pressure). The maximum ground service fueling expectation per Boeing aircraft characteristic data is 6,875 gallon loading. Typical loading rate per nozzle is 280-350 GPM, with one to two nozzles, depending on the hydrant fueling cart or truck capacity.

1.1 EXISTING FUEL SYSTEM DESCRIPTION

See the *Hydrant Exhibit* for overall fuel system schematic.

The existing fuel system located at the Tampa Fuel Farm consists of two (2) 25,000bbl Jet-A tanks, two (2) 15,000bbl Jet-A tanks, two (2) 1,500bbl Jet-A tanks, and ten (10) jet fuel pumps (8 primary + 2 Air Canada) plus one spare diesel driven pump. The existing ten (10) jet fuel pumps are 125HP Gould 3736 series (4x6-13) centrifugal pumps each with a design point of 1,000 GPM @ 400ft TDH.

This existing fuel system is connected to the following potential system demands:

1. Concourse A: (30) hydrant valves total (18 gates total).
2. Concourse C: (23) hydrant valves total (16 gates total).
3. Concourse E: (29) hydrant valves total (14 gates total).
4. Concourse F: (43) hydrant valves total (15 gates total).
5. South Cargo: (15) hydrant valves total.

These potential system demands have been included in the following analysis as noted below.

ASSUMPTIONS & INITIAL DATA

PRIME ENGINEERING INCORPORATED

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

1. Hydrant Dispensing System

The existing hydrant fueling system services the entire airport, including the four (4) commercial air services concourses and the south cargo complex. Excluding the hydrant risers, the hydrant fueling system has 40,205 feet of below-grade piping ranging from 10 to 20 inches in diameter. There are a total of 140 hydrants connected to the below-grade piping system. The hydrants are four inches in diameter. Each hydrant has a rated capacity of 350 gpm.

Table 1-A documents the connected load to the hydrant pumping system.

Table 1-A: Existing Hydrant Dispensing System

Concourse	Number of Hydrant Connections	Nominal Dispensing Rate at Cart in GPM	Total Max Connected Load in GPM
Airside A	30	280-350	10,500
Airside C	23	280-350	8,050
Airside E	29	280-350	10,150
Airside F	43	280-350	15,050
South Cargo	15	280-350	5,250
Total	140		49,000

The average and peak pumping demands on the fuel farm are controlled by the number of hydrant trucks and carts in services at the airport. Currently there are 13 dispatched hydrant trucks and 15 gate-specific hydrant carts. The number of trucks and carts connected at any one time to the hydrant system varies based on the flight schedule and the size of the aircraft. During Prime Engineering's three (3) day fuel farm site visit in March 2012, the peak fuel dispensing periods at the airport required at most three (3) or four (4) pumps to meet demand.

Using field data, a hydrant fuel system demand calculation is shown in Table 1-B.

Table 1-B: Existing Hydrant Fuel System Demand

Dispensing Carts	Quantity	Nominal Dispensing Rate at Cart in GPM	Total Connected Load in GPM	Usage Diversity	Net Dispensing Demand in GPM
Truck Mounted	13	350	4,550	30%	1,365
Cart Mounted	15	280	4,200	30%	1,260
Totals	28		8,750		2,625
				Average Pumping Design Rate	**2,625**
				Peaking Factor	1.5
				Peak Pumping Design Rate	**3,937**

Using the pumping diversity model shown above, one (1) available connection to the hydrant system places a demand of approximately 94 gpm on the pumping system. Furthermore, comparing the number of currently available connections to the hydrant system to the current fuel farm throughput shows that each hydrant dispensing unit dispenses approximately 13,805 gallons per day.

To support the 5% fuel dispensing growth rate, the airport would need to add dispensing carts as shown in Table 1-C:

Table 1-C: Hydrant Dispensing Cart Additions

Year	Fuel Demand per Day	Fuel Dispensed per Day per Cart	Number of Carts Required	Diversified Pumping Demand GPM	Average Pumping Demand GPM
2012	386,551	13,805	28	94	2,632
2013	405,879	13,805	29	94	2,726
2014	426,173	13,805	30	94	2,820
2015	447,482	13,805	32	94	3,008
2016	469,856	13,805	34	94	3,196
2017	493,348	13,805	36	94	3,384
2018	518,015	13,805	38	94	3,572
2019	543,916	13,805	39	94	3,666
2020	571,112	13,805	41	94	3,854

2. Pumping and Filtering

As noted in Section 1.1.1, to meet the hydrant cart operating pressure requirements, the pumping system capacity has been reduced from the original design capacity. Table 1-D illustrates the three (3) different operating pressures under which the current system is capable of operating, depending on the flow demand on the pump. The current operating pressure of 160 psig is unusually high for a Jet "A" hydrant fueling system. In this report, a dynamic hardy-cross and hydraulic analysis is conducted on the hydrant system to ascertain whether the system pressure can be reduced. A lower operating pressure will lower the dynamic shocks (water hammer) in the system and extend system life.

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ASSUMPTIONS & INITIAL DATA

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

Table 1-D: Existing Pumping and Filter Capacity

Pump Position	Status	Control System	Hp	Voltage/ Phase/ Cycle	Current Operating Capacity GPM @ 160 psig	Stated Design Capacity GPM @ 152 psig	Filter Capacity GPM
Spare	Expansion Slot	N/A	------	480/3/60	------	-----	-----
Spare	Expansion Slot	N/A	------	480/3/60	------	-----	-----
A – 1	Online	Old Air Canada	125	480/3/60	860	1,000	1,245
A – 2	Online	Old Air Canada	125	480/3/60	860	1,000	1,245
9	Diesel-Driven Pump	Manual			860	1,000	1,245
Spare	Expansion Slot	N/A	-----	480/3/60	------	------	-----
Spare	Expansion Slot	N/A	-----	480/3/60	------	------	-----
8	Online	Primary	125	480/3/60	860	1,000	1,245
7	Out for Service	Primary	125	480/3/60	860	1,000	1,245
6	Online	Primary	125	480/3/60	860	1,000	1,245
5	Online	Primary	125	480/3/60	860	1,000	1,245
4	Out for Service	Primary	125	480/3/60	860	1,000	1,245
3	Online	Primary	125	480/3/60	860	1,000	1,245
2	Online	Primary	125	480/3/60	860	1,000	1,245
1	Online	Primary	125	480/3/60	860	1,000	1,245
				Connected Capacity	**9,460**	**11,000**	**13,695**
				Full Buildout Capacity	**11,180**	**16,000**	**17,430**
				Firm Capacity	**8,600**	**9,000**	**11,205**

The average pumping system requirements are analyzed in Table 1-E. The fuel farm normally operates with three (3) pumps at 860 gpm each for a total capacity of +/- 2,500 gpm. Increasing the size of the pumps to match the capacity of the filter vessels would reduce the number of pumps required.

ASSUMPTIONS & INITIAL DATA

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

Table 1-E: Average Pumping Requirements

Year	Fuel Demand per Day	Average Pumping Demand GPM	New Pumping Capacity GPM @ Revised System TBD	Pumps Required to Meet Average Demand
2012	386,551	2,632	1,245	2.11
2013	405,879	2,726	1,245	2.18
2014	426,173	2,820	1,245	2.27
2015	447,482	3,008	1,245	2.41
2016	469,856	3,196	1,245	2.57
2017	493,348	3,384	1,245	2.72
2018	518,015	3,572	1,245	2.87
2019	543,916	3,666	1,245	2.94
2020	571,112	3,854	1,245	3.10

To support the 2020 average pumping demand of 3,854 with a peaking factor of 1.5, the hydrant pumping system will need a firm pumping capacity of 5,540 gpm. As shown in Table 1-F, by sizing new pumps to match the 1,245-gpm capacity of the existing filter/separators, the future hydrant pumping system would have five (5) pumps plus one (1) spare, for a total of six (6) pumps. Currently, the pumping system requires only three (3) pumps with one (1) spare, for a total of four (4) pumps.

Table 4-9
Firm Pumping Requirements

Year	Peak Pumping Demand GPM	New Pumping Capacity GPM @ Revised System TBD	Pumps Required to Meet Peak Demand	Spare Pump	Pumps Required to Firm Pumping Demand
2012	3,937	1,245	3.16	1	4
2013	4,134	1,245	3.32	1	5
2014	4,341	1,245	3.49	1	5
2015	4,558	1,245	3.66	1	5
2016	4,786	1,245	3.84	1	5
2017	5,025	1,245	4.04	1	5
2018	5,276	1,245	4.24	1	6
2019	5,540	1,245	4.45	1	6
2020	5,817	1,245	4.67	1	6

1.2 ASSUMPTIONS AND GENERAL INFORMATION

The following assumptions and general information apply to this study:

1. Hydraulic model created in KYPipe software Pipe2010 Premium Version 5.017b.

2. All data used for the hydraulic model is a compilation of field notes and drawings received from the Tampa Airport.

3. No modification to the existing header systems is anticipated with the exception of modifications shown in the Tampa International Airport Fuel Facility Improvements Construction package.

4. See HYDRAULIC ANALYSIS in Section 3 – Summary of Results for description of system and fluid data used in this analysis.

5. The new hydrant supply pump motor horsepowers will vary depending on whether Case A or Case B is used.

6. Tables are generated based on a total flow rate produced by the Fuel Farm. The total flow rate can be divided by 280 GPM or 350 GPM to obtain the resulting estimated fueling hydrant count.

7. All fueling hydrant counts assume SIMULTANEOUS operation with the Concourses and hydrants listed within the same tables.

Section 2

Modeling Techniques

PRIME ENGINEERING INCORPORATED

2.0 GENERAL INFORMATION

A hydraulic model was created using KYPipe software Pipe2010 Premium Version 5.017b. Pipe2010 allows for modeling a piping system and performing a steady state analysis. The KYPipe model was constructed based on the existing Fuel Farm, pipe segments, hydrants, and valves as well as proposed Fuel Farm piping modifications. The model was analyzed based on the Tampa Fuel Farm and its hydrant fueling system linked to the maximum expected hydrants at Concourses A, C, E, F, and South Cargo. Existing system information was collected from field investigations, as-built documents, and interviews with fuel farm operators.

KYPipe allows modeling of systems with a wide variety of components. Each component is placed in the system at a location called a "node". The software allows the user to enter the unique characteristics of every component of a system. For the model created for this analysis, nodes included tanks, pumps, valves, hydrants, and miscellaneous appurtenances that affect the dynamics of fuel flowing through the system. Characteristics of each node component are based on either actual equipment design data, where available, or typical design data.

The parameters for analyzing potential worst-case steady state conditions of the hydraulic model are:

1. Low level storage tanks at fuel farms
2. Maximum hydrant flow (350 GPM narrow-body and/or 700 GPM wide-body)
3. Balanced locations of active hydrants to produce minimum pressures within the hydrant loop

Hydrants were added from the analysis based on maintaining a minimum of 90 psig at the hydrant valve connection point for optimal fueling requirements stated by the hydrant cart manufacturers. The number of hydrants available can be divided accordingly based on the types of aircraft expected.

2.1 TAMPA FUEL FARM

Prime Engineering conducted an interview with the Fuel Facilities Manager, Enos Sage, for the Tampa Fuel Farm.

The flow rate profile for the Tampa Fuel Farm System averages 2,632 GPM throughout the day.

The typical total daily fuel usage is 386,568 gallons per day.

The fuel header pressure is controlled at 160 psig, which is a result of operating the existing 1,000 GPM pumps at a reduced rate of 860 GPM in order to maintain an operable hydrant system pressure ranging between 140 and 150 psig during operation.

The Tampa Fuel Farm currently appears to be operating at an unusually high pressure for a Jet-A fuel hydrant system. A lower operating pressure will lower the dynamic shocks (water hammer) in the system and extend system life.

2.2 BASIS OF HYDRAULIC ANALYSIS

Hydraulic analysis is based on the following fluid and system data, and is analyzed using KYPipe steady-state simulation software which performs calculations based on the Darcy-Weisbach method.

1. Fluid: Jet A
    a. Name: Jet-A
    b. Specific Gravity: 0.81
    c. Kinematic Viscosity: 2 cSt
    d. Vapor Pressure: <5 mm Hg

2. Minimum Operating Pressure Requirements:
    a. Hydrant valve discharge (at coupling point): 90 psig

3. Maximum Dispensing Flow Rates:
    a. Aircraft Fuel Hydrant: 280-350 GPM per hydrant

4. Pipe Data:
    a. Carbon Steel (ASTM A53 Grade B ERW or API 5L Seamless)
    b. Roughness Coefficient: 0.1500

5. Tampa Fuel Farm Hydrant Existing Pump Data:
    a. Quantity: Ten (10) Pumps Existing. Eight (8) pumps are primary hydrant supply pumps with a normal operation of 7+1 (seven (7) pumps maximum operating per design, with one (1) pump as backup for maintenance, etc). Two (2) pumps are dedicated supply pumps for Air Canada.
    b. Manufacturer: Goulds
    c. Design Point: 1,000 GPM @ 400' TDH
    d. Model: Gould 3736 4x6-13
    e. Motor Data: 125 HP / 3,550 rpm

6. Tampa Fuel Farm Hydrant New Pump Data:
    a. Quantity: Five (5) New Vertical Inline Pumps. Normal operation will be 4+1 (four (4) pumps maximum operating per design, with one (1) pump as backup for maintenance, etc).
    b. Manufacturer: Flowserve
    c. Design Point: 1,245 GPM @ 450' TDH
    d. Model: PVML 35.15.15.30F
    e. Motor Data: 150HP / 3,550 rpm

The existing hydrant valves and pits are comprised of 6" laterals with 6"x4" API 1584 hydrant valves sized for a normal loading rates of 280-350GPM each at 90psig. One (1) hydrant valve will be provided for each narrow-body parking position. Two (2) hydrant valves may be provided for each wide-body loading to provide 560-700 GPM total loading rate, if flight range requires and hydrant cart availability allows.

MODELING TECHNIQUES

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

All cases below include the following common design features:

1. No modifications to hydrant loop piping.
2. System modifications incorporated as shown in the Tampa International Airport Fuel Facility Improvements Construction package
3. Note that the references below are all hydrant points only, meaning a single hydrant pit and cart assembly. If dual-fueling is used, this would account for two hydrant points (for a total flow of 560-700 GPM).

Included in the Attachments are new pump curves to illustrate potential operations and impact of various outside systems. Note that the curves are based on a 1,245 GPM design basis. This requirement has a direct effect on the number of hydrant points that can be supplied at one time. The *Hydrant Exhibit* is an overall map of the entire facility including the Tampa Fuel Farm along with the hydrant loops around the various concourses and is also included in the Attachments.

Section 3

Summary of Results

PRIME ENGINEERING INCORPORATED

SUMMARY OF RESULTS

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

3.0 GENERAL INFORMATION

Two (2) cases were analyzed to determine hydrant loading throughput at the existing concourses. The results in the attached tables indicate the existing infrastructure supplying the Tampa concourses has sufficient capacity to supply the potential hydrant loop demands in the year 2020.

Hydraulic cases were modeled to include the Tampa Fuel Farm and hydrant loops at Concourses A, C, E, F, and South Cargo. The total system flow rates for each case are indicated below.

The Hydraulic Analysis for the Tampa Fuel Farm is based on field data collected by Prime Engineering on March 5, 2012, Records Drawings from Burns and McDonnell dated 1970, and Record Drawings from ECMC Services dated 2009. Hydraulic Analysis for Concourses A, C, E, F, and South Cargo are based on facility maps (CAD) for Existing Aviation Fuel Concourses, provided by the Tampa Airport on August 6, 2013, and Record Drawings from Burns and McDonnell dated 1987.

3.1 SYSTEM LIMITATIONS

Through this analysis, the following existing system limitations have been noted, which could be addressed through the design of the fueling system and/or discussions with the operations and fuel farm operator/owner.

1. Existing Flow Control Valves at Tank Farm

   The existing CLA-VAL flow control valves at the tank farm have set points that could potentially limit the total flow going to the hydrant loops. This could cause a hydraulic imbalance in the system and increase the losses within the system.

   Due to this potential for hydraulic imbalance, Case B removes the need to install the CLA-VALs in the modified pumping system.

3.2 CASE DESCRIPTION & SUMMARY

Following are descriptions of cases to determine the capabilities of the Tampa Fuel Farm and hydrant loops and also adding the expansion of future hydrants. These results are tabulated in the attached tables.

1. CASE A: FUTURE HYDRANT DEMANDS WITH CONTROL VALVES AT FUEL FARM

This case consists of a single 18" and dual 12" supply lines from the Tampa Fuel Farm to points on all Concourses and the South Cargo area while maintaining at least 90 psig downstream of the hydrant valves. Case A includes a 8" Model 40-01/640-01 CLA-VAL installed downstream of each filter separator to prevent excessive flow by limiting flow to 1,245 GPM regardless of changing line pressure.

a. Scenario – Use the four (4) new pumps operating seventeen (17) hydrants dispersed evenly throughout the hydrant fueling systems to operate at 90 psig. The total flow rate that can be supplied to all (17) hydrants while maintaining 90 psig at the hydrant points is 4,900 GPM.

b. From the total flow rate the total number of hydrants that would be able to operate is (17) at 280 GPM each or (14) at 350 GPM each. The system pressure is maintained at 90 psig at the hydrant points with a pressure of 135 psig at the tank farm hydrant supply system.

c. The System Resistance Curve (Attachment 2) shows the effects of the design point as the system demands increase and more pumps are brought online to meet capacity.

d. The pumps required to accomplish this scenario are:

   i. Manufacturer: Goulds

   ii. Design Point: 1,245 GPM @ 400' TDH

   iii. Model: 3910 MX 4x6-11/13

   iv. Motor Data: 150/200 HP / 3,600 rpm

2. CASE B: FUTURE HYDRANT DEMANDS WITHOUT CONTROL VALVES AT FUEL FARM

This case consists of a single 18" and dual 12" supply lines from the Tampa Fuel Farm to points on all Concourses and the South Cargo area while maintaining at least 90 psig downstream of the hydrant valves. Case B does not include a flow control valve downstream of each filter separator which reduces the total dynamic head requirements by decreasing the overall losses in the hydrant supply system.

a. Scenario – Use the four (4) new pumps operating seventeen (17) hydrants dispersed evenly throughout the hydrant fueling systems to operate at 90 psig. The total flow rate that can be supplied to all (17) hydrants while maintaining 90 psig at the hydrant points is 4,900 GPM.

b. From the total flow rate the total number of hydrants that would be able to operate is (17) at 280 GPM each or (14) at 350 GPM each. The system pressure can be maintained at 90 psig at the hydrant points with a pressure of 130 psig at the tank farm hydrant supply system.

c. The pumps required to accomplish this scenario are:

   i. Manufacturer: Goulds

   ii. Design Point: 1,245 GPM @ 390' TDH

   iii. Model: 3910 MX 4x6-11/13

   iv. Motor Data: 150/200 HP / 3,600 rpm

3.3 RESULTS AND RECOMMENDATIONS

It is recommended that CASE A be the design case for the new pumps at the Tampa Fuel Farm. From the analysis of CASE B, the removal of the CLA-VALs has little effect on the rated design point.

SUMMARY OF RESULTS

PRIME ENGINEERING INCORPORATED

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

Table 3-A: New Pump Configuration

Pump Position	Status	Control System	HP (Note 1)	Voltage/ Phase/ Cycle	Operating Capacity GPM @ 160 psig	Filter Capacity GPM
P – 1	Online	H-O-A	150	480/3/60	1,245	1,245
P – 2	Online	H-O-A	150	480/3/60	1,245	1,245
P – 3	Online	H-O-A	150	480/3/60	1,245	1,245
P – 4	Online	H-O-A	150	480/3/60	1,245	1,245
P – 5	Online	H-O-A	150	480/3/60	1,245	1,245
P – 6	Expansion Slot	H-O-A	150	480/3/60	--------	1,245
P – 7	Expansion Slot	H-O-A	150	480/3/60	--------	1,245
P – 8	Expansion Slot	H-O-A	150	480/3/60	--------	1,245
				Connected Capacity	**6,925**	**9,960**
				Full Build-out Capacity	**9,415**	**9,960**
				Near Term Firm Capacity	**4,980**	**4,980**
P – 8	Diesel-Driven Pump	Manual	TBD	N/A	3,600	

Notes:

1. Pumps are to have Variable Speed Drives

ATTACHMENTS

PRIME ENGINEERING INCORPORATED

TAMPA FUEL COMMITTEE
TFC FUEL SYSTEM HYDRAULIC ANALYSIS
TAMPA INTERNATIONAL AIRPORT
1319-0002.000

ATTACHMENTS

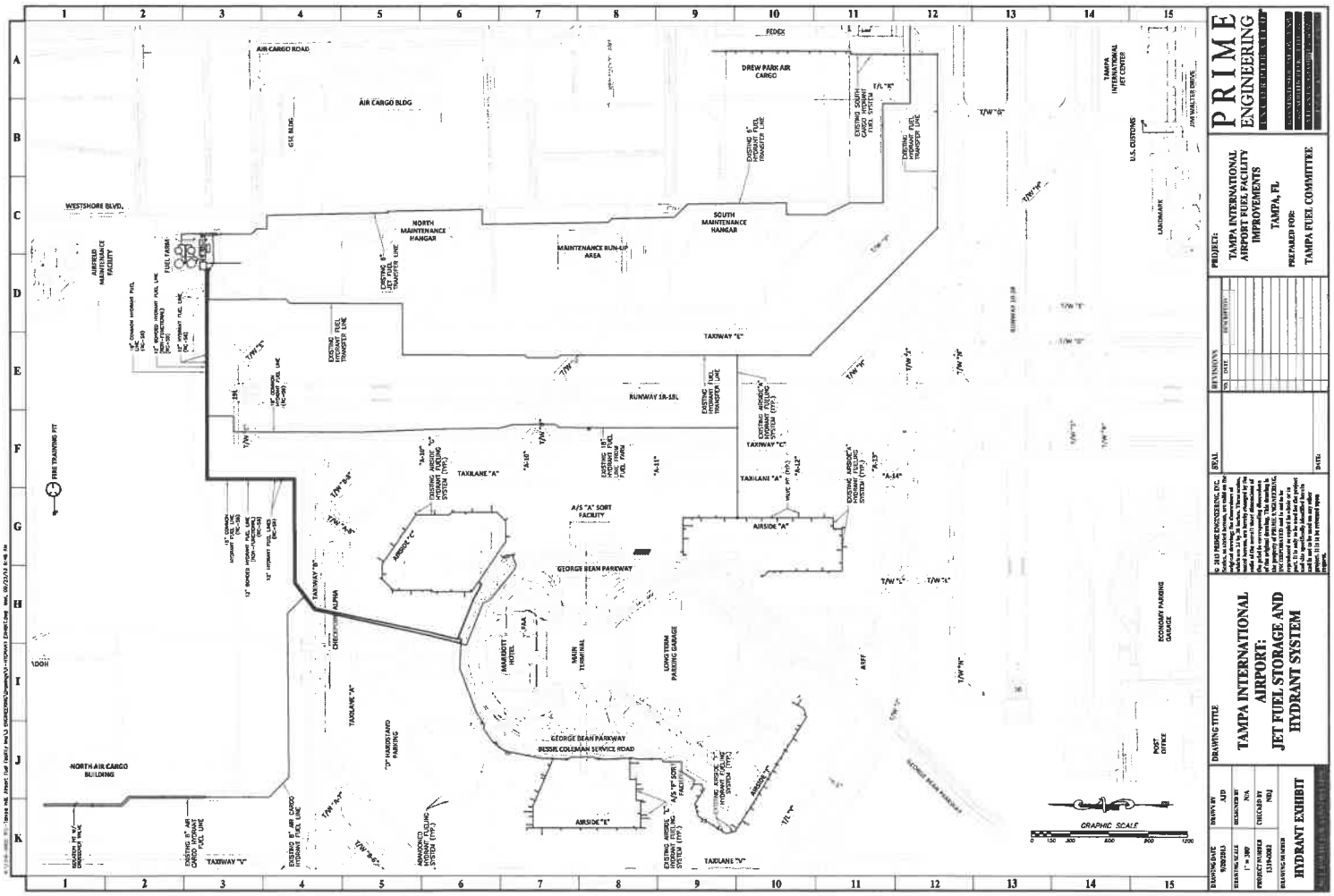
- Hydrant Exhibit: Fueling Hydrant System Map
- System Resistance Curve
- Tampa Fuel Farm Existing Pump Curve – Goulds Pump 3736 4x6-13 / 125HP
- Tampa Fuel Farm New Pump Curve (CASE A) – Flowserve Pump PVML 35.15.15.30F | 150HP
- KYPipe Hydraulic Summary Report – CASE A

Attachment 1

Hydrant Exhibit: Fueling Hydrant System Map

PRIME ENGINEERING INCORPORATED

Exhibit D

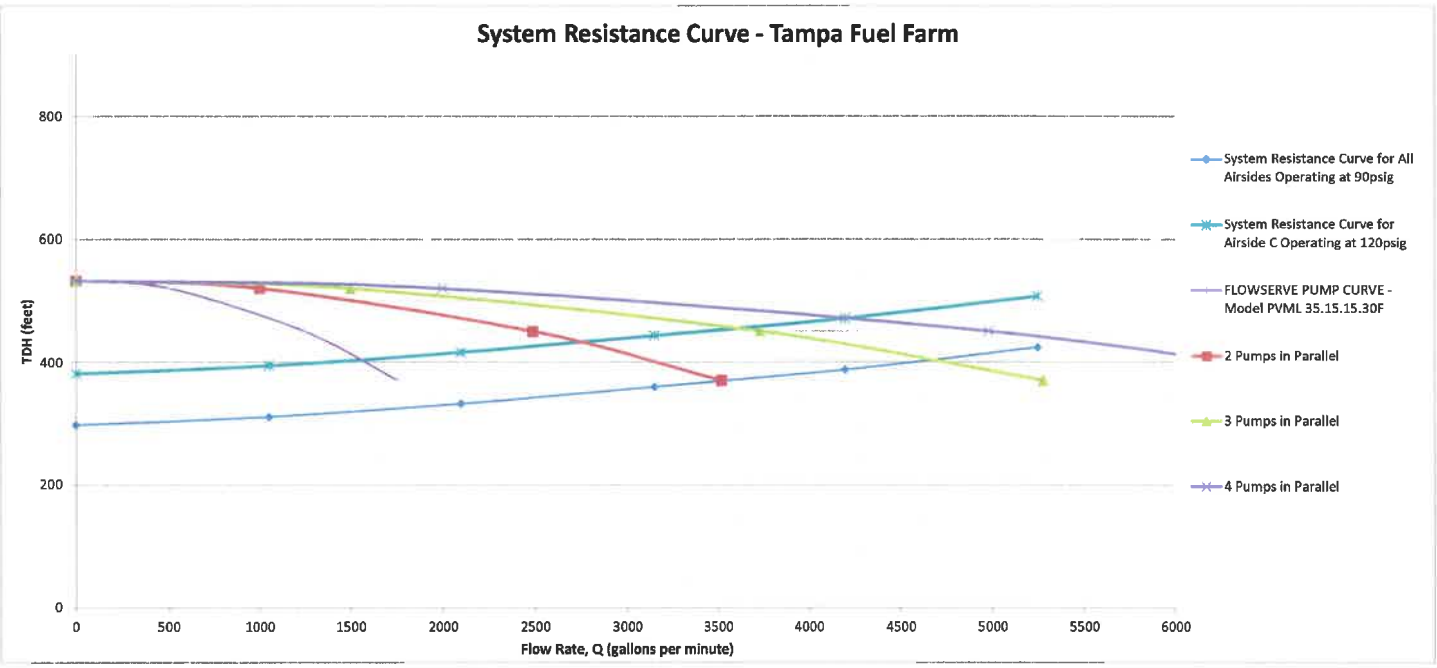

AIR CARGO ROAD
AIR CARGO BLDG
DREW PARK AIR CARGO
FEDEX
WESTSHORE BLVD.
NORTH MAINTENANCE HANGAR
SOUTH MAINTENANCE HANGAR
MAINTENANCE RUN-UP AREA
TAXIWAY "E"
RUNWAY 1R-19L
TAXIWAY "C"
TAXILANE "A"
A/S "A" SORT FACILITY
AIRSIDE "A"
GEORGE BEAN PARKWAY
TAXIWAY "B"
TAXIWAY "A"
TAXILANE "J"
MARRIOTT HOTEL
MAIN TERMINAL
LONG TERM PARKING GARAGE
ECONOMY PARKING GARAGE
GEORGE BEAN PARKWAY
BESSIE COLEMAN SERVICE ROAD
AIRSIDE "E"
A/S "M" SORT FACILITY
TAXILANES "V"
TAXIWAY "V"
NORTH AIR CARGO BUILDING
FIRE TRAINING PIT
TAMPA INTERNATIONAL JET CENTER
U.S. CUSTOMS
POST OFFICE
GRAPHIC SCALE
PRIME ENGINEERING
PROJECT:
TAMPA INTERNATIONAL AIRPORT FUEL FACILITY IMPROVEMENTS
TAMPA, FL
PREPARED FOR:
TAMPA FUEL COMMITTEE
DRAWING TITLE
TAMPA INTERNATIONAL AIRPORT:
JET FUEL STORAGE AND HYDRANT SYSTEM
HYDRANT EXHIBIT

Attachment 2

System Resistance Curve

PRIME ENGINEERING INCORPORATED®

Exhibit D


System Resistance Curve - Tampa Fuel Farm
TDH (feet)
800
600
400
200
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
Flow Rate, Q (gallons per minute)
System Resistance Curve for All Airsides Operating at 90psig
System Resistance Curve for Airside C Operating at 120psig
FLOWSERVE PUMP CURVE - Model PVML 35.15.15.30F
2 Pumps in Parallel
3 Pumps in Parallel
4 Pumps in Parallel

Attachment 3

Existing Tampa Fuel Farm Pump Curve

PRIME ENGINEERING INCORPORATED

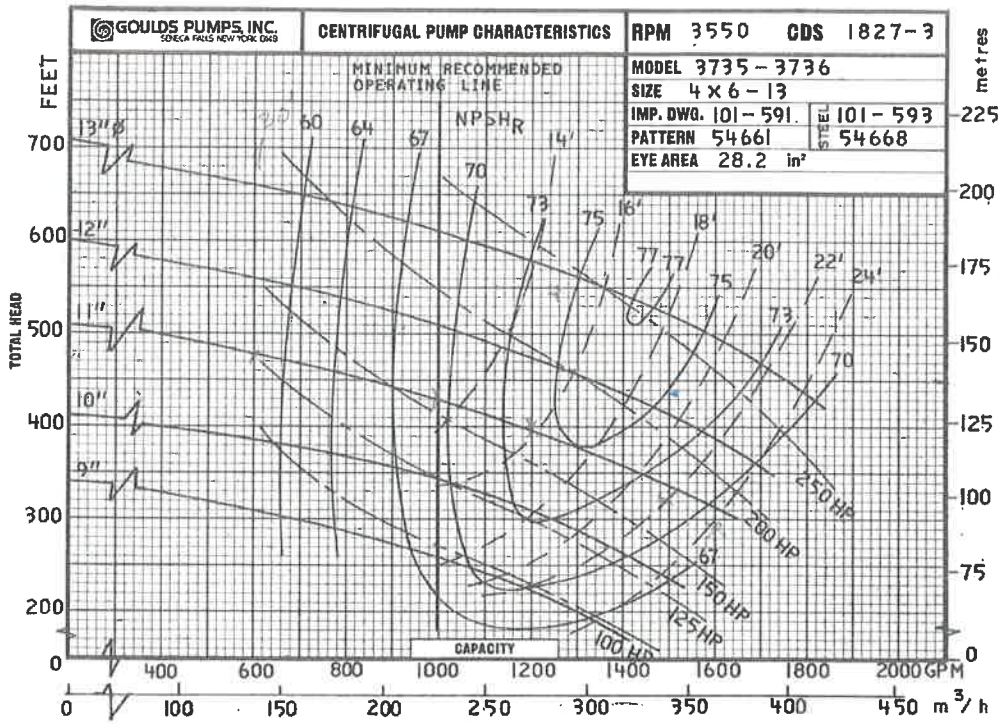
Exhibit D

Customer _____ Inquiry No. _____ Date _____

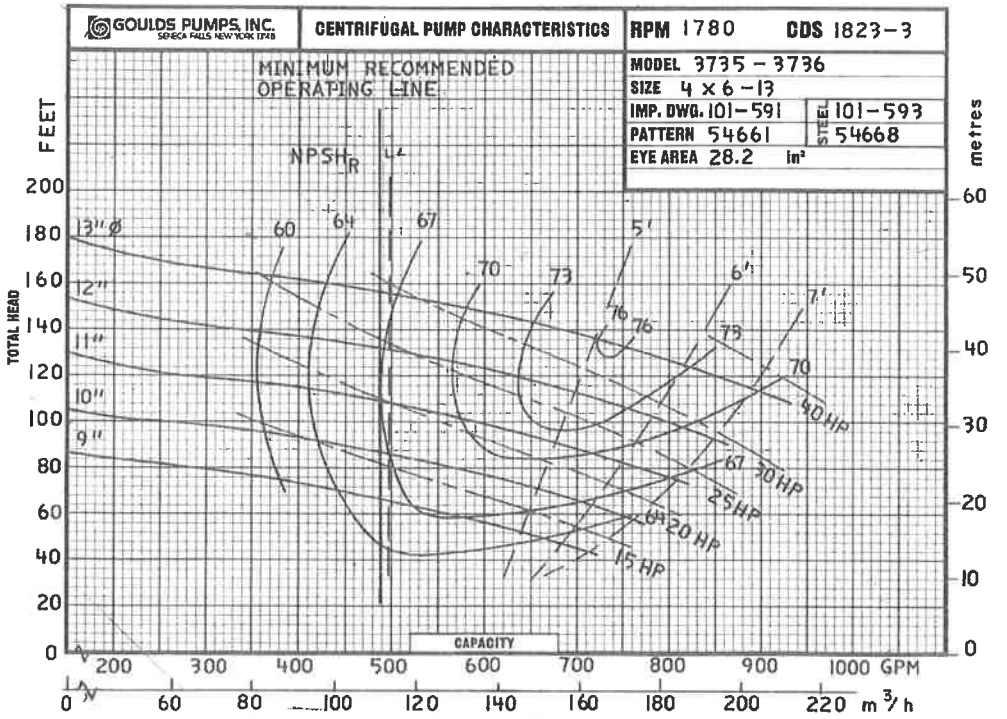
Service _____ Item No. _____ P.O. No. _____ Date _____

F.O. No. _____ ; _____ GPM; _____ TDH; _____ RPM; _____ % Eff.; CDS No. _____

3550 R.P.M.



1780 R.P.M.



Attachment 4

New Tampa Fuel Farm Pump Curve

PRIME ENGINEERING INCORPORATED

Exhibit D

FLOWSERVE

Hydraulic Datasheet

Customer	: Pumping Systems Inc	Pump / Stages	: PVML 35.15.15.30F / 1
Customer reference	:	Based on curve no.	: 50
Item number	: Supply Pumps P1 thru P5	Flowserve reference	: 152981 Version 1
Service	: Jet A Fuel	Date	: September 23, 2013

Operating Conditions

Capacity	: 1245.0 USgpm
Water capacity (CQ=1.00)	: -
Normal capacity	: -
Total Developed Head	: 450.00 ft
Water head (CH=1.00)	: -
NPSH available (NPSHa)	: 49.1 ft
NPSHa less NPSH margin	: -
Maximum suction pressure	: 0.0 psig

Liquid

Liquid type	: Other	
Temperature / Spec. Gravity	: 75 F	/ 0.770
Solid Size - Actual / Limit	: -	/ -
Viscosity / Vapor pressure	: 0.6 cP	/ 7.80 psia

Materials / Specification

Material column code	: S-6
Pump specification	: -

Other Requirements

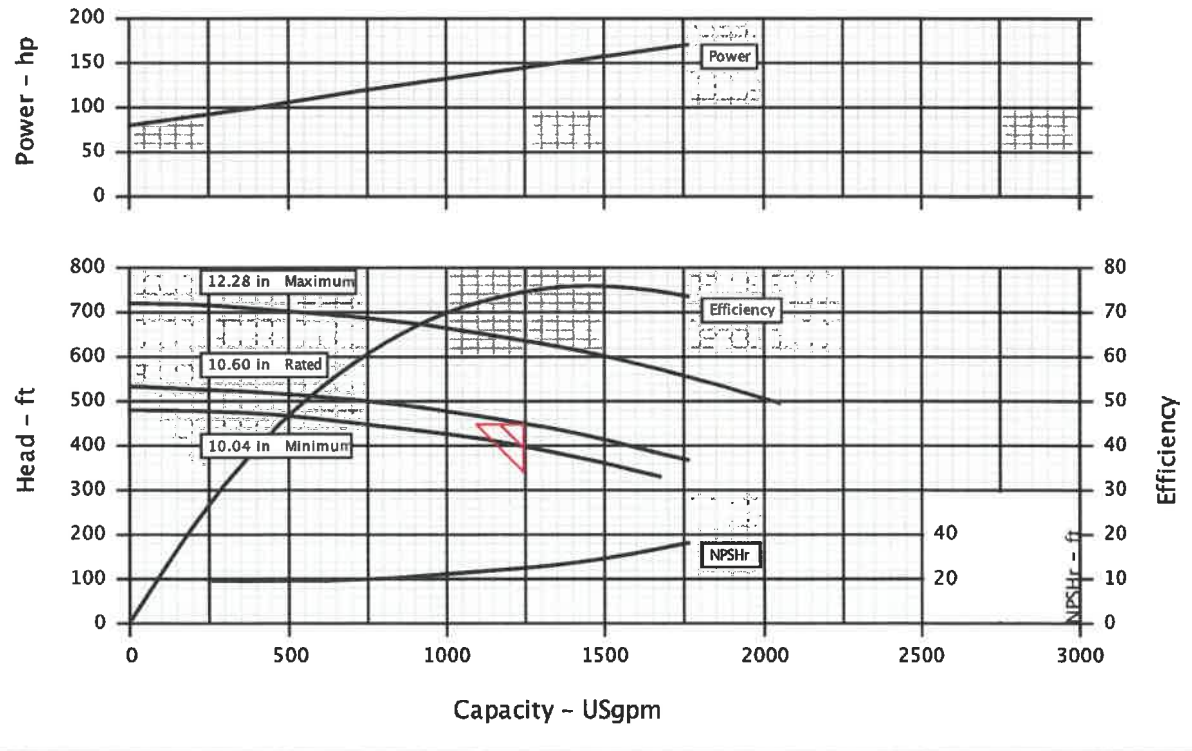
Hydraulic selection : No specification
Construction : No specification
Test tolerance : Hydraulic Institute Level A
Driver Sizing : Max Power(MCSF to EOC)with SF
Seal configuration : Single Seal

Performance

Hydraulic power	: 109 hp
Pump speed	: 3550 rpm
Efficiency (CE=1.00)	: 75.1 %
NPSH required (NPSHr)	: 22.8 ft
Rated power	: 145 hp
Maximum power	: 171 hp
Driver power	: 150 hp / 112 kW
Casing working pressure	: 177.4 psig
(based on shut off and Rated specific gravity @ Cut dia)	
Maximum allowable	: 580.2 psig
Hydrostatic test pressure	: 870.2 psig
Est. rated seal chamb. press.	: -

Impeller diameter	
Rated	: 10.60 in
Maximum	: 12.28 in
Minimum	: 10.04 in
Suction specific speed	: 11090 US units
Minimum continuous flow	: 263.9 USgpm
Maximum head @ rated dia	: 532.16 ft
Flow at BEP	: 1457.8 USgpm
Flow as % of BEP	: 85.4 %
Efficiency at normal flow	: -
Impeller dia ratio (rated/max)	: 86.3 %
Head rise to shut off	: 18.3 %
Total head ratio (rated/max)	: 70.6 %

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS; CAPACITY, HEAD, AND EFFICIENCY.



Attachment 5

KY Pipe Hydraulic Summary Report

PRIME ENGINEERING INCORPORATED

Exhibit D

```
* * * * * * * * * *   K Y P I P E 5   * * * * * * * * *
*                                                       *
*             Pipe Network Modeling Software            *
*                                                       *
*               Copyrighted by KYPIPE LLC               *
*               Version 5 - February 2010               *
*                                                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Sep 25 09:44:24 2013

Master File : c:\users\njoshi\documents\projects\tampa fuel farm\hydraulics\case a - tampa fuel farm 9-17-13.KYP\case a - tampa fuel farm 9-17-13.P2K

```
************************************************
S U M M A R Y   O F   O R I G I N A L   D A T A
************************************************
```

U N I T S   S P E C I F I E D

FLOWRATE .... = gallons/minute
HEAD (HGL) .... = feet
PRESSURE .... = psig

THE SPECIFIC GRAVITY OF THIS LIQUID = 0.8300

R E G U L A T I N G   V A L V E   D A T A

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PRV-1	273.23
RV-2	PRV-1	273.23
RV-3	PRV-1	273.23
RV-4	PRV-1	273.23
RV-5	PRV-1	273.23
RV-6	PRV-1	273.23
RV-7	PRV-1	273.23
RV-8	PRV-1	273.23
RV-9	PRV-1	273.23
RV-10	PRV-1	273.23
RV-11	PRV-1	273.23
RV-12	PRV-1	273.23
RV-13	PRV-1	273.23
RV-14	PRV-1	273.23
RV-15	FCV-1	1245.00
RV-16	FCV-1	1245.00
RV-17	FCV-1	1245.00
RV-18	FCV-1	1245.00

P I P E L I N E   D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	AC-1 Jet-A	J-2	10.00	20.00	120.0000	1.92
P-2	T-2 Jet-A	J-1	20.00	20.00	120.0000	1.92
P-3	J-6	J-2	45.00	20.00	120.0000	1.90
P-4	J-2	AC-2 Jet-A	10.00	20.00	120.0000	1.92
P-5	J-1	J-3	100.00	20.00	120.0000	1.20
P-6	T-1 Jet-A	J-1	15.00	20.00	120.0000	1.92
P-7	J-3	J-4	175.00	20.00	120.0000	2.25

Exhibit D

P-8	T-4 Jet-A	J-3	20.00	20.00	120.0000	1.92
P-9	T-3 Jet-A	J-3	30.00	20.00	120.0000	1.92
P-10	J-5	J-6	130.00	20.00	120.0000	2.25
P-11	J-5	J-14	10.00	20.00	120.0000	0.40
P-12	J-7	J-4	10.00	20.00	120.0000	0.40
P-13	J-7	I-L-133	10.00	8.00	120.0000	0.75
P-14	J-4	I-L-136	10.00	8.00	120.0000	0.75
P-15	J-10	J-7	10.00	20.00	120.0000	0.40
P-16	J-210	I-L-1	10.00	6.00	120.0000	0.00
P-17	J-12	J-10	10.00	20.00	120.0000	0.40
P-18	J-12	I-L-137	8.00	8.00	120.0000	0.75
P-19	J-14	J-12	10.00	20.00	120.0000	0.40
P-20	J-14	I-L-139	10.00	8.00	120.0000	0.75
P-21	O-L-1	I-RV-10	25.62	6.00	120.0000	0.00
P-22	O-L-136	I-P-2 (A)	2.00	6.00	120.0000	0.00
P-23	O-L-133	I-P-1 (A)	1.00	6.00	120.0000	0.00
P-24	O-RV-1	J-75	2.00	6.00	120.0000	0.00
P-25	O-L-137	I-P-4 (A)	2.00	6.00	120.0000	0.00
P-26	O-L-139	I-P-3 (A)	2.00	6.00	120.0000	0.00
P-27	O-RV-2	J-15	2.00	6.00	120.0000	0.00
P-28	O-RV-3	J-76	2.00	6.00	120.0000	0.00
P-29	O-P-3 (A)	I-L-2	4.00	6.00	120.0000	0.00
P-30	O-P-4 (A)	I-L-3	4.00	6.00	120.0000	0.00
P-31	O-RV-4	J-155	9.33	6.00	120.0000	0.00
P-32	O-P-1 (A)	J-291	2.73	6.00	120.0000	0.00
P-33	O-P-2 (A)	J-290	2.67	6.00	120.0000	0.00
P-34	O-RV-5	J-165	5.32	6.00	120.0000	0.00
P-35	J-32	J-26	5.00	18.00	120.0000	0.00
P-36	O-RV-6	J-8	15.60	6.00	120.0000	0.00
P-39	O-RV-7	J-81	5.12	6.00	120.0000	0.00
P-40	O-RV-8	J-80	3.34	6.00	120.0000	0.00
P-41	O-L-2	I-RV-15	2.00	8.00	120.0000	0.00
P-42	O-L-3	I-RV-16	2.00	8.00	120.0000	0.00
P-43	O-RV-9	J-41	4.10	6.00	120.0000	0.00
P-44	O-L-5	I-RV-17	2.00	8.00	120.0000	0.00
P-45	O-L-6	I-RV-18	2.00	8.00	120.0000	0.00
P-46	O-RV-15	I-L-12	2.66	8.00	120.0000	0.00
P-47	O-RV-10	J-72	24.38	6.00	120.0000	0.00
P-48	O-RV-16	I-L-11	2.48	8.00	120.0000	0.00
P-49	O-RV-11	J-237	9.31	6.00	120.0000	0.00
P-50	O-RV-17	I-L-10	5.00	8.00	120.0000	0.00
P-51	O-RV-18	I-L-4	5.00	8.00	120.0000	0.00
P-52	O-L-4	J-289	10.87	12.00	120.0000	1.15
P-53	O-RV-12	J-285	4.08	6.00	120.0000	0.00
P-54	O-RV-13	J-274	5.20	6.00	120.0000	0.00
P-55	O-RV-14	J-259	7.29	6.00	120.0000	0.00
P-56	J-13	J-9	10.00	16.00	120.0000	0.40
P-57	J-9	J-11	10.00	16.00	120.0000	0.40
P-58	J-18	J-11	20.00	16.00	120.0000	2.25
P-59	J-17	J-11	10.00	20.00	120.0000	0.00
P-60	J-19	J-17	10.00	16.00	120.0000	0.40
P-61	O-L-11	J-13	2.52	8.00	120.0000	0.00
P-62	J-20	J-19	10.00	16.00	120.0000	0.40
P-63	O-L-12	J-9	2.34	8.00	120.0000	0.00
P-64	J-21	J-20	10.00	16.00	120.0000	0.40
P-66	J-22	J-21	10.00	16.00	120.0000	0.40
P-67	O-L-10	J-22	10.00	12.00	120.0000	0.00
P-68	J-17	I-L-7	20.00	20.00	120.0000	2.25
P-69	O-L-7	J-32	7.28	20.00	120.0000	0.00
P-70	J-23	J-32	12.72	20.00	120.0000	0.00
P-72	I-L-8	J-18	425.00	12.00	120.0000	0.00
P-73	J-25	O-L-8	1184.07	12.00	120.0000	0.00
P-75-XX	J-25	J-26	22.00	12.00	120.0000	1.67
P-76	J-25	J-283	50.00	12.00	120.0000	0.00
P-77	J-23	J-37	2300.00	18.00	120.0000	0.75
P-79	J-26	J-294	2182.37	18.00	120.0000	0.75
P-80	J-27	J-295	9.03	18.00	120.0000	0.00
P-81	J-27	J-28	560.00	12.00	120.0000	1.15
P-82	J-28	J-123	104.90	12.00	120.0000	7.95
P-83	J-30	J-28	10.00	12.00	120.0000	1.15
P-84	J-30	J-31	1600.00	12.00	120.0000	0.75
P-85	J-31	J-132	133.85	20.00	120.0000	7.95
P-86	J-29	J-33	1200.00	18.00	120.0000	1.90
P-87	J-33	J-200	173.12	14.00	120.0000	7.95
P-88	J-33	J-34	700.00	18.00	120.0000	1.15

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P-89	J-34	J-69	93.41	14.00	120.0000	7.95
P-90	J-24	J-256	100.00	14.00	120.0000	0.00
P-92	J-36	J-38	630.00	12.00	120.0000	0.75
P-93	J-37	J-39	630.00	18.00	120.0000	0.75
P-94	J-38	J-27	1320.00	12.00	120.0000	3.00
P-95	J-39	J-29	1320.00	18.00	120.0000	3.00
P-96	J-42	J-40	78.86	14.00	120.0000	0.00
P-97	I-L-9	J-40	40.00	6.00	120.0000	2.10
P-98	O-L-9	I-RV-9	5.90	6.00	120.0000	0.00
P-99	J-43	J-42	82.89	14.00	120.0000	0.00
P-102	J-44	J-43	49.58	14.00	120.0000	0.00
P-103	J-46	J-59	62.90	14.00	120.0000	0.00
P-104	J-47	J-46	102.23	14.00	120.0000	0.00
P-105	J-48	J-47	66.28	14.00	120.0000	0.00
P-106	J-49	J-48	62.74	14.00	120.0000	0.00
P-107	J-50	J-49	78.83	14.00	120.0000	0.00
P-108	J-51	J-50	65.63	14.00	120.0000	0.00
P-109	J-52	J-51	64.33	14.00	120.0000	0.00
P-110	J-53	J-52	94.78	14.00	120.0000	0.00
P-111	J-54	J-53	79.51	14.00	120.0000	0.00
P-112	J-55	J-54	64.90	14.00	120.0000	0.00
P-113	J-56	J-55	44.40	14.00	120.0000	0.00
P-114	J-57	J-56	33.72	14.00	120.0000	0.00
P-115	J-58	J-57	41.51	14.00	120.0000	0.00
P-116	J-59	J-44	65.91	14.00	120.0000	0.00
P-117	J-60	J-58	54.63	14.00	120.0000	0.00
P-118	J-61	J-60	92.82	14.00	120.0000	0.00
P-119	J-62	J-61	39.18	14.00	120.0000	0.00
P-120	J-63	J-62	55.89	14.00	120.0000	0.00
P-121	J-64	J-63	37.57	14.00	120.0000	0.00
P-122	J-65	J-64	62.85	14.00	120.0000	0.00
P-123	J-66	J-65	49.95	14.00	120.0000	0.00
P-124	J-67	J-66	24.30	14.00	120.0000	0.00
P-125	J-68	J-67	40.64	14.00	120.0000	0.00
P-126	J-69	J-68	109.75	14.00	120.0000	0.00
P-139	J-52	I-L-19	40.00	6.00	120.0000	0.00
P-140	J-53	I-L-20	40.00	6.00	120.0000	0.00
P-146	J-61	J-60	996.03	6.00	120.0000	0.00
P-164	O-L-19	I-RV-8	6.66	6.00	120.0000	0.00
P-165	O-L-20	I-RV-7	4.88	6.00	120.0000	0.00
P-182	J-70	J-98	146.72	12.00	120.0000	0.00
P-183	J-98	J-106	104.95	12.00	120.0000	0.00
P-184	J-99	J-103	103.79	12.00	120.0000	0.00
P-185	J-100	J-129	64.41	12.00	120.0000	0.00
P-186	J-101	J-102	122.34	12.00	120.0000	0.00
P-187	J-102	J-99	103.78	12.00	120.0000	0.00
P-188	J-103	J-104	154.65	12.00	120.0000	0.00
P-189	J-104	J-105	136.04	12.00	120.0000	0.00
P-190	J-105	J-70	83.00	12.00	120.0000	0.00
P-191	J-106	J-107	176.61	12.00	120.0000	0.00
P-193	J-107	J-109	67.51	12.00	120.0000	0.00
P-195	J-109	J-111	140.39	12.00	120.0000	0.00
P-196	J-109	I-L-43	23.47	6.00	120.0000	0.00
P-197	J-111	J-113	123.36	12.00	120.0000	0.00
P-199	J-113	J-115	175.51	12.00	120.0000	0.00
P-201	J-115	J-117	137.51	12.00	120.0000	0.00
P-203	J-117	J-119	112.00	12.00	120.0000	0.00
P-204	J-117	I-L-47	23.90	6.00	120.0000	0.00
P-205	J-119	J-121	124.94	12.00	120.0000	0.00
P-207	J-121	J-30	57.79	12.00	120.0000	0.00
P-209	J-123	J-125	112.08	12.00	120.0000	0.00
P-211	J-125	J-127	90.72	12.00	120.0000	0.00
P-213	J-127	J-100	64.19	12.00	120.0000	0.00
P-216	J-129	J-101	92.80	12.00	120.0000	0.00
P-222	J-104	I-L-59	29.70	6.00	120.0000	0.00
P-231	O-L-43	I-RV-2	26.53	6.00	120.0000	0.00
P-235	O-L-47	I-RV-3	26.10	6.00	120.0000	0.00
P-247	O-L-59	I-RV-1	20.30	6.00	120.0000	0.00
P-248	J-132	J-142	145.14	20.00	120.0000	0.00
P-250	J-142	J-144	56.26	20.00	120.0000	0.00
P-252	J-144	J-145	61.81	20.00	120.0000	0.00
P-254	J-145	J-148	89.18	20.00	120.0000	0.00
P-256	J-148	J-150	73.75	20.00	120.0000	0.00
P-258	J-150	J-152	84.94	20.00	120.0000	0.00
P-260	J-152	J-154	70.98	20.00	120.0000	0.00

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P-261	J-152	I-L-95	22.51	6.00	120.0000	0.00
P-262	J-154	J-156	67.54	20.00	120.0000	0.00
P-264	J-156	J-198	55.58	20.00	120.0000	0.00
P-266	J-158	J-160	73.75	20.00	120.0000	0.00
P-268	J-160	J-162	55.75	20.00	120.0000	0.00
P-270	J-162	J-164	46.94	20.00	120.0000	0.00
P-271	J-162	I-L-101	35.87	6.00	120.0000	0.00
P-272	J-164	J-286	28.97	20.00	120.0000	0.00
P-274	J-166	J-168	55.83	20.00	120.0000	0.00
P-276	J-168	J-170	53.33	20.00	120.0000	0.00
P-278	J-170	J-172	73.47	20.00	120.0000	0.00
P-280	J-172	J-174	39.13	20.00	120.0000	0.00
P-282	J-174	J-176	50.17	20.00	120.0000	0.00
P-284	J-176	J-178	59.01	20.00	120.0000	0.00
P-286	J-178	J-180	64.39	20.00	120.0000	0.00
P-287	J-178	I-L-109	24.24	6.00	120.0000	0.00
P-288	J-180	J-182	72.82	20.00	120.0000	0.00
P-290	J-182	J-184	129.52	20.00	120.0000	0.00
P-292	J-184	J-186	132.60	20.00	120.0000	0.00
P-294	J-186	J-188	81.97	20.00	120.0000	0.00
P-296	J-188	J-190	88.69	20.00	120.0000	0.00
P-298	J-190	J-192	93.86	20.00	120.0000	0.00
P-300	J-192	J-193	114.90	20.00	120.0000	0.00
P-302	J-193	J-196	98.25	20.00	120.0000	0.00
P-304	J-196	J-31	76.29	20.00	120.0000	0.00
P-306	J-198	J-158	34.91	20.00	120.0000	0.00
P-308	J-200	J-202	38.14	14.00	120.0000	0.00
P-310	J-202	J-204	58.86	14.00	120.0000	0.00
P-312	J-204	J-206	51.07	14.00	120.0000	0.00
P-314	J-206	J-208	39.92	14.00	120.0000	0.00
P-316	J-208	J-210	36.11	14.00	120.0000	0.00
P-318	J-210	J-211	55.96	14.00	120.0000	0.00
P-320	J-211	J-214	47.64	14.00	120.0000	0.00
P-322	J-214	J-216	52.22	14.00	120.0000	0.00
P-324	J-216	J-218	50.22	14.00	120.0000	0.00
P-326	J-218	J-220	42.83	14.00	120.0000	0.00
P-328	J-220	J-222	48.74	14.00	120.0000	0.00
P-330	J-222	J-224	26.78	14.00	120.0000	0.00
P-332	J-224	J-226	68.25	14.00	120.0000	0.00
P-334	J-226	J-228	42.94	14.00	120.0000	0.00
P-336	J-228	J-230	67.76	14.00	120.0000	0.00
P-338	J-230	J-232	80.76	14.00	120.0000	0.00
P-340	J-232	J-234	77.27	14.00	120.0000	0.00
P-342	J-234	J-236	69.64	14.00	120.0000	0.00
P-343	J-234	I-L-77	25.62	6.00	120.0000	0.00
P-344	J-236	J-238	53.46	14.00	120.0000	0.00
P-346	J-238	J-240	53.66	14.00	120.0000	0.00
P-348	J-240	J-242	66.02	14.00	120.0000	0.00
P-350	J-242	J-243	52.82	14.00	120.0000	0.00
P-352	J-243	J-246	58.98	14.00	120.0000	0.00
P-354	J-246	J-248	45.42	14.00	120.0000	0.00
P-356	J-248	J-250	45.53	14.00	120.0000	0.00
P-358	J-250	J-252	33.52	14.00	120.0000	0.00
P-360	J-252	J-254	109.69	14.00	120.0000	0.00
P-362	J-254	J-33	152.67	14.00	120.0000	0.00
P-364	J-35	J-268	100.00	12.00	120.0000	0.00
P-365	J-24	I-L-118	9.89	6.00	120.0000	0.00
P-366	J-256	J-260	100.00	12.00	120.0000	0.00
P-368	J-260	J-262	100.00	12.00	120.0000	0.00
P-370	J-262	J-264	100.00	12.00	120.0000	0.00
P-372	J-264	J-266	100.00	12.00	120.0000	0.00
P-374	J-266	J-35	100.00	12.00	120.0000	0.00
P-377	J-268	J-271	100.00	12.00	120.0000	0.00
P-379	J-271	J-273	100.00	12.00	120.0000	0.00
P-380	J-271	I-L-126	15.66	6.00	120.0000	0.00
P-381	J-273	J-275	100.00	12.00	120.0000	0.00
P-383	J-275	J-277	100.00	12.00	120.0000	0.00
P-385	J-277	J-279	100.00	12.00	120.0000	0.00
P-387	J-279	J-281	100.00	12.00	120.0000	0.00
P-389	J-281	J-258	100.00	12.00	120.0000	0.00
P-391	J-258	I-L-132	10.95	6.00	120.0000	0.00
P-403	O-L-77	I-RV-11	15.08	6.00	120.0000	0.00
P-426	O-L-95	I-RV-4	18.16	6.00	120.0000	0.00
P-432	O-L-101	I-RV-5	8.81	6.00	120.0000	0.00
P-440	O-L-109	I-RV-6	10.16	6.00	120.0000	0.00

P-450	O-L-118	I-RV-14	7.82	6.00	120.0000	0.00
P-458	O-L-126	I-RV-13	4.14	6.00	120.0000	0.00
P-464	O-L-132	I-RV-12	9.97	6.00	120.0000	0.00
P-465	J-286	J-166	36.41	20.00	120.0000	0.00
P-466	J-283	J-287	6903.03	12.00	120.0000	0.00
P-467	J-287	J-258	1496.97	12.00	120.0000	0.00
P-468	J-286	J-288	747.82	12.00	120.0000	0.00
P-470	J-289	J-22	9.13	16.00	120.0000	0.00
P-471	J-288	J-287	502.18	12.00	120.0000	0.00
P-472	J-36	J-288	4000.00	12.00	120.0000	0.00
P-473	J-290	I-L-6	1.33	8.00	120.0000	0.00
P-474	J-291	I-L-5	1.27	8.00	120.0000	0.00
P-479	J-294	J-36	117.63	12.00	120.0000	0.00
P-483	J-294	J-296	650.00	12.00	120.0000	0.00
P-484	J-295	J-29	10.97	18.00	120.0000	0.00
P-485	J-296	J-295	1300.00	12.00	120.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE L-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
-30.00	100.00	75.00 (Default)
-50.00	500.00	75.00 (Default)
-65.00	1000.00	75.00 (Default)

THERE IS A DEVICE AT NODE L-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
0.00	0.00	75.00 (Default)
-27.80	1245.00	75.00 (Default)
-111.20	2490.00	75.00 (Default)

THERE IS A DEVICE AT NODE L-3 .....> (ID= 1)

THERE IS A DEVICE AT NODE L-4 DESCRIBED BY THE FOLLOWING DATA: (ID= 6)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
0.00	0.00	75.00 (Default)
-1.00	500.00	75.00 (Default)
-6.40	1245.00	75.00 (Default)
-16.50	2000.00	75.00 (Default)

THERE IS A DEVICE AT NODE L-5 .....> (ID= 1)

THERE IS A DEVICE AT NODE L-6 .....> (ID= 1)

THERE IS A DEVICE AT NODE L-7 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
0.00	0.00	75.00 (Default)
-8.30	1000.00	75.00 (Default)
-33.40	2000.00	75.00 (Default)

THERE IS A DEVICE AT NODE L-8 .....> (ID= 2)

THERE IS A DEVICE AT NODE L-9 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-10 .....> (ID= 6)

THERE IS A DEVICE AT NODE L-11 .....> (ID= 6)

THERE IS A DEVICE AT NODE L-12 .....> (ID= 6)

THERE IS A DEVICE AT NODE L-19 .....> (ID= 3)

Exhibit D

THERE IS A DEVICE AT NODE L-20 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-43 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-47 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-59 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-77 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-95 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-101 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-109 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-118 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-126 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-132 .....> (ID= 3)

THERE IS A DEVICE AT NODE L-133 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
-0.30	1000.00	75.00 (Default)
-1.10	2000.00	75.00 (Default)
-2.50	3000.00	75.00 (Default)

THERE IS A DEVICE AT NODE L-136 .....> (ID= 4)

THERE IS A DEVICE AT NODE L-137 .....> (ID= 4)

THERE IS A DEVICE AT NODE L-139 .....> (ID= 4)

THERE IS A DEVICE AT NODE P-1 (A) DESCRIBED BY THE FOLLOWING DATA: (ID= 5)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
532.10	0.00	0.00
520.00	500.00	47.00
450.00	1245.00	75.10
370.00	1760.00	76.50

THERE IS A DEVICE AT NODE P-2 (A) .....> (ID= 5)

THERE IS A DEVICE AT NODE P-3 (A) .....> (ID= 5)

THERE IS A DEVICE AT NODE P-4 (A) .....> (ID= 5)

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
AC-1 Jet-A		----	24.00	42.00
AC-2 Jet-A		----	24.00	42.00
J-1		0.00	23.00	
J-2		0.00	24.00	
J-3		0.00	23.00	
J-4		0.00	22.00	
J-5		0.00	22.00	
J-6		0.00	23.00	
J-7		0.00	22.00	
J-8		350.00	23.00	
J-9		0.00	22.00	
J-10		0.00	22.00	

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J-11	0.00	22.00
J-12	0.00	22.00
J-13	0.00	22.00
J-14	0.00	22.00
J-15	350.00	23.00
J-17	0.00	22.00
J-18	0.00	22.00
J-19	0.00	22.00
J-20	0.00	22.00
J-21	0.00	22.00
J-22	0.00	22.00
J-23	0.00	0.00
J-24	0.00	18.00
J-25	0.00	22.00
J-26	0.00	22.00
J-27	0.00	18.00
J-28	0.00	18.00
J-29	0.00	18.00
J-30	0.00	18.00
J-31	0.00	18.00
J-32	0.00	22.00
J-33	0.00	18.00
J-34	0.00	18.00
J-35	0.00	18.00
J-36	0.00	18.00
J-37	0.00	18.00
J-38	0.00	18.00
J-39	0.00	18.00
J-40	0.00	18.00
J-41	350.00	23.00
J-42	0.00	18.00
J-43	0.00	18.00
J-44	0.00	18.00
J-46	0.00	18.00
J-47	0.00	18.00
J-48	0.00	18.00
J-49	0.00	18.00
J-50	0.00	18.00
J-51	0.00	18.00
J-52	0.00	18.00
J-53	0.00	18.00
J-54	0.00	18.00
J-55	0.00	18.00
J-56	0.00	18.00
J-57	0.00	18.00
J-58	0.00	18.00
J-59	0.00	18.00
J-60	0.00	18.00
J-61	0.00	18.00
J-62	0.00	18.00
J-63	0.00	18.00
J-64	0.00	18.00
J-65	0.00	18.00
J-66	0.00	18.00
J-67	0.00	18.00
J-68	0.00	18.00
J-69	0.00	18.00
J-70	0.00	18.00
J-72	350.00	23.00
J-75	350.00	23.00
J-76	350.00	23.00
J-80	350.00	23.00
J-81	350.00	23.00
J-98	0.00	18.00
J-99	0.00	18.00
J-100	0.00	18.00
J-101	0.00	18.00
J-102	0.00	18.00
J-103	0.00	18.00
J-104	0.00	18.00
J-105	0.00	18.00
J-106	0.00	18.00
J-107	0.00	18.00
J-109	0.00	18.00
J-111	0.00	18.00

J-113	0.00	18.00
J-115	0.00	18.00
J-117	0.00	18.00
J-119	0.00	18.00
J-121	0.00	18.00
J-123	0.00	18.00
J-125	0.00	18.00
J-127	0.00	18.00
J-129	0.00	18.00
J-132	0.00	18.00
J-142	0.00	18.00
J-144	0.00	18.00
J-145	0.00	18.00
J-148	0.00	18.00
J-150	0.00	18.00
J-152	0.00	18.00
J-154	0.00	18.00
J-155	350.00	23.00
J-156	0.00	18.00
J-158	0.00	18.00
J-160	0.00	18.00
J-162	0.00	18.00
J-164	0.00	18.00
J-165	350.00	23.00
J-166	0.00	18.00
J-168	0.00	18.00
J-170	0.00	18.00
J-172	0.00	18.00
J-174	0.00	18.00
J-176	0.00	18.00
J-178	0.00	18.00
J-180	0.00	18.00
J-182	0.00	18.00
J-184	0.00	18.00
J-186	0.00	18.00
J-188	0.00	18.00
J-190	0.00	18.00
J-192	0.00	18.00
J-193	0.00	18.00
J-196	0.00	18.00
J-198	0.00	18.00
J-200	0.00	18.00
J-202	0.00	18.00
J-204	0.00	18.00
J-206	0.00	18.00
J-208	0.00	18.00
J-210	0.00	18.00
J-211	0.00	18.00
J-214	0.00	18.00
J-216	0.00	18.00
J-218	0.00	18.00
J-220	0.00	18.00
J-222	0.00	18.00
J-224	0.00	18.00
J-226	0.00	18.00
J-228	0.00	18.00
J-230	0.00	18.00
J-232	0.00	18.00
J-234	0.00	18.00
J-236	0.00	18.00
J-237	350.00	23.00
J-238	0.00	18.00
J-240	0.00	18.00
J-242	0.00	18.00
J-243	0.00	18.00
J-246	0.00	18.00
J-248	0.00	18.00
J-250	0.00	18.00
J-252	0.00	18.00
J-254	0.00	18.00
J-256	0.00	18.00
J-258	0.00	18.00
J-259	350.00	23.00
J-260	0.00	18.00
J-262	0.00	18.00

Exhibit D

J-264		0.00	18.00	
J-266		0.00	18.00	
J-268		0.00	18.00	
J-271		0.00	18.00	
J-273		0.00	18.00	
J-274		350.00	23.00	
J-275		0.00	18.00	
J-277		0.00	18.00	
J-279		0.00	18.00	
J-281		0.00	18.00	
J-283		0.00	18.00	
J-285		350.00	23.00	
J-286		0.00	0.00	
J-287		0.00	18.00	
J-288		0.00	0.00	
J-289		0.00	22.00	
J-290		0.00	22.00	
J-291		0.00	22.00	
J-294		0.00	0.00	
J-295		0.00	18.00	
J-296		0.00	0.00	
I-L-1	Hydrant Valv	0.00	0.00	
I-L-2	Filter Separ	0.00	22.00	
I-L-3	Filter Separ	0.00	22.00	
I-L-4	Cla-Val dP	0.00	22.00	
I-L-5	Filter Separ	0.00	22.00	
I-L-6	Filter Separ	0.00	22.00	
I-L-7	Meter	0.00	22.00	
O-L-8	Meter	0.00	22.00	
O-L-9	Hydrant Valv	0.00	23.00	
I-L-10	Cla-Val dP	0.00	22.00	
I-L-11	Cla-Val dP	0.00	0.00	
I-L-12	Cla-Val dP	0.00	0.00	
I-L-19	Hydrant Valv	0.00	23.00	
I-L-20	Hydrant Valv	0.00	23.00	
O-L-43	Hydrant Valv	0.00	23.00	
I-L-47	Hydrant Valv	0.00	23.00	
O-L-59	Hydrant Valv	0.00	23.00	
O-L-77	Hydrant Valv	0.00	23.00	
O-L-95	Hydrant Valv	0.00	23.00	
O-L-101	Hydrant Valv	0.00	23.00	
I-L-109	Hydrant Valv	0.00	23.00	
O-L-118	Hydrant Valv	0.00	23.00	
O-L-126	Hydrant Valv	0.00	23.00	
O-L-132	Hydrant Valv	0.00	23.00	
I-L-133		0.00	22.00	
I-L-136		0.00	22.00	
I-L-137		0.00	22.00	
I-L-139		0.00	22.00	
I-P-1 (A)		0.00	21.00	
I-P-2 (A)		0.00	21.00	
I-P-3 (A)		0.00	21.00	
I-P-4 (A)		0.00	21.00	
O-RV-1	Hydrant Valv	----	23.00	273.23
O-RV-2	Hydrant Valv	----	23.00	273.23
I-RV-3	Hydrant Valv	0.00	23.00	
O-RV-4	Hydrant Valv	----	23.00	273.23
O-RV-5	Hydrant Valv	----	23.00	273.23
I-RV-6	Hydrant Valv	0.00	23.00	
I-RV-7	Hydrant Valv	0.00	23.00	
I-RV-8	Hydrant Valv	0.00	23.00	
O-RV-9	Hydrant Valv	----	23.00	273.23
I-RV-10	Hydrant Valv	0.00	23.00	
O-RV-11	Hydrant Valv	----	23.00	273.23
O-RV-12	Hydrant Valv	----	23.00	273.23
O-RV-13	Hydrant Valv	----	23.00	273.23
O-RV-14	Hydrant Valv	----	23.00	273.23
I-RV-15	6" or 8" Cla	0.00	22.00	
I-RV-16	6" or 8" Cla	0.00	22.00	
I-RV-17	6" or 8" Cla	0.00	22.00	
I-RV-18	6" or 8" Cla	0.00	22.00	
T-1 Jet-A		----	24.00	42.00
T-2 Jet-A		----	24.00	42.00
T-3 Jet-A		----	24.00	42.00
T-4 Jet-A		----	24.00	42.00

Exhibit D

I-RV-1	Hydrant Valv	0.00	23.00	
I-RV-2	Hydrant Valv	0.00	23.00	
I-RV-4	Hydrant Valv	0.00	23.00	
I-RV-5	Hydrant Valv	0.00	23.00	
I-RV-9	Hydrant Valv	0.00	23.00	
I-RV-11	Hydrant Valv	0.00	23.00	
I-RV-12	Hydrant Valv	0.00	23.00	
I-RV-13	Hydrant Valv	0.00	23.00	
I-RV-14	Hydrant Valv	0.00	23.00	
O-L-1	Hydrant Valv	0.00	0.00	
O-L-136		0.00	22.00	
O-L-133		0.00	22.00	
O-L-137		0.00	22.00	
O-L-139		0.00	22.00	
O-RV-3	Hydrant Valv	----	23.00	273.23
O-P-3 (A)		0.00	21.00	
O-P-4 (A)		0.00	21.00	
O-P-1 (A)		0.00	21.00	
O-P-2 (A)		0.00	21.00	
O-RV-6	Hydrant Valv	----	23.00	273.23
O-RV-7	Hydrant Valv	----	23.00	273.23
O-RV-8	Hydrant Valv	----	23.00	273.23
O-L-2	Filter Separ	0.00	22.00	
O-L-3	Filter Separ	0.00	22.00	
O-L-5	Filter Separ	0.00	22.00	
O-L-6	Filter Separ	0.00	22.00	
O-RV-15	6" or 8" Cla	0.00	22.00	
O-RV-10	Hydrant Valv	----	23.00	273.23
O-RV-16	6" or 8" Cla	0.00	22.00	
O-RV-17	6" or 8" Cla	0.00	22.00	
O-RV-18	6" or 8" Cla	0.00	22.00	
O-L-4	Cla-Val dP	0.00	22.00	
O-L-11	Cla-Val dP	0.00	0.00	
O-L-12	Cla-Val dP	0.00	0.00	
O-L-10	Cla-Val dP	0.00	22.00	
O-L-7	Meter	0.00	22.00	
I-L-8	Meter	0.00	22.00	
I-L-9	Hydrant Valv	0.00	23.00	
O-L-19	Hydrant Valv	0.00	23.00	
O-L-20	Hydrant Valv	0.00	23.00	
I-L-43	Hydrant Valv	0.00	23.00	
I-L-59	Hydrant Valv	0.00	23.00	
O-L-47	Hydrant Valv	0.00	23.00	
I-L-95	Hydrant Valv	0.00	23.00	
I-L-101	Hydrant Valv	0.00	23.00	
I-L-77	Hydrant Valv	0.00	23.00	
I-L-118	Hydrant Valv	0.00	23.00	
I-L-126	Hydrant Valv	0.00	23.00	
I-L-132	Hydrant Valv	0.00	23.00	
O-L-109	Hydrant Valv	0.00	23.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 248
NUMBER OF END NODES .....(j) = 231
NUMBER OF PRIMARY LOOPS .....(l) = 12
NUMBER OF SUPPLY NODES .....(f) = 6
NUMBER OF SUPPLY ZONES .....(z) = 1

CURRIER
ENGINEERING MANAGEMENT CONSULTING

July 01, 2019

Ms. Madelyn Tackett
Southwest Airlines

Re: TPA – Tampa International Airport
API 570 Report Review & Recommendations

Dear Ms. Tackett:

In response to your request for our engineering review of the February, 2019 API 570 In-Service Inspection Report written by HMT, we offer the following summary of our review process and our recommendations related to the HMT report.

BACKGROUND

The TPA Jet-A Fuel system is a buried piping system consisting of externally coated and cathodically protected carbon steel pipe. The internal pipe surface is uncoated according to the API 570 report, which was standard practice in the 1960's. We were given the HMT report and asked to provide a draft report of any issues or questions we may identify. In late May, 2019, we provided a draft report to you that outlined several concerns with the HMT report and its findings. Currier & Co (C&C) was then engaged to continue the review of this material and work to validate and/or assess the data – using all means at our disposal – and to then provide final recommendations.

CURRIER & COMPANY INVESTIGATIVE PROCESS

C&C reached out directly to HMT through the technician who wrote the report (the Inspector who performed the onsite examination of the piping at TPA) and this proved to be a productive conversation. We confirmed that HMT performed the previous examination 10 years ago – in the same place on the same pipe as this year's examination. Much of the baseline data for the new report was pulled from the prior report written in 2009 by HMT. This follows industry standard practice for API 570 examination(s) and generally allows for determining a rate at which corrosion is taking place in the piping being examined.

Issues Identified and Findings
The original 1969 12-inch piping is listed as Schedule 30 (wall-thickness = 0.330-inches) in the 2019 HMT report – which is highly unlikely in our experience and we discovered that this supposition originated in the 2009 HMT report as noted above.

Some of the computational and report description 'cell' errors that were identified in the C&C draft report were surprisingly submitted correctly by the inspector to his HMT report reviewer, and so we were surprised to learn that the errors were mistakenly included in the 2019 HMT report (somehow). This was verified by C&C in the inspector's notes but it is not clear why the errors occurred. For example, the report generally refers to all of the pipe as "Line Schedule 40" carbon steel originally installed in 1969. Later in the report, the 18" dia. pipe is stated to be SCH STD (0.375 in.) and the 12" dia. as SCH 30. (0.330 in.).

During our discussions with the inspector, the visual (external) condition of the piping was investigated – something that is difficult to outline and describe in many API 570 written reports – even though photos are provided in the 2019 HMT report. It was the Inspector's opinion that both the 12-inch and the 18-inch pipes appeared to be in very good external (visual) condition. We agree, based on the photos in the HMT report(s); we agree that the external condition shows virtually no degradation of the piping.

However, the (2) two HMT reports (2009 and 2019) call out advanced (substantial) degradation of the 12" pipe (a direct result of their assumption that this was originally Schedule 30 pipe). We were confused by this because substantial external degradation had to be present if this was in fact Schedule 30 pipe. (In our experience, Jet-A lines wear, but do not corrode internally – except within low velocity lines that are not well drained). This is not the case in TPA. Furthermore, corrosion was not found by the Inspector and the Inspector confirmed that both the 12-inch & 18-inch pipes were in the same excavation and directly adjacent to one another. Since the CP report is very good for both the 12-inch and the 18-inch lines, and since the 18-inch line shows little degradation we therefore conclude that the piping was not Schedule 30 to start with.

C&C also visited with the airport farm operator and reached out to the airport engineering team in an effort to obtain documentation on the original installation of the pipe. While drawings were found, the thickness/schedule info for the pipe was not identified on the plans we obtained. The piping thickness would typically be found in the project specifications – which may exist with the original designer, but we are not recommending that they be found at this point.

C&C REPORT FINDINGS

As stated in the HMT inspection report, ultrasonic testing (UT) and visual testing (VT) were performed on two lengths of excavated (buried) Jet-A piping, to include 12 linear feet of 12-inch dia. steel pipe and 12 linear feet of 18-inch dia. steel pipe. Both piping segments chosen were at the location of a welded 90^0 elbow, which is in accordance with best practices.

C&C strongly believes that the original 12-inch diameter piping installed was SCH 20 (0.250-inch wall-thickness). This would equate to a nearly identical lifetime corrosion rate when compared to the 18-inch SCH STD pipe in the same spot and in the same soils. Both are cathodically protected. Since the interior corrosion cannot adequately explain the UT readings in the HMT report, C&C concludes that both the 2009 & 2019 HMT reports incorrectly state the installed thickness of the 12-inch pipe, and in fact this should be identified as SCH 20 (0.250-inch wall).

The HMT pipe analysis found both pipes to be above the Minimum Required Thickness (MRT). In spite of the HMT data as reported, HMT found that both pipes have a remaining 1/2 life of 30+ years. The actual current measured wall thickness for the 18-inch dia. pipe was 0.346 in. (originally 0.375 in.) which is well above the MRT per API 2611 of 0.1859 in. The actual measured wall thickness for the 12-inch dia. pipe was 0.223 in. which is well above the MRT per API 2611 of 0.1317-inches. However, it should be noted that if this pipe was originally installed as SCH 20, as C&C strongly believes, the MRT calculation supports a significantly longer useful life for the 12" pipe meaning far beyond 30 years.

The HMT Corrosion Rate Calculations and Remaining Life Calculations
These HMT calculations for the 12-inch pipe are the reason we evaluated this report in the first place and we find that they are flawed because they are based on an original base metal (wall) thickness of 0.330. We find that the 12-inch piping in question, when LTCR & STCR are re-calculated with the appropriate original thickness of SCH 20 (0.250"), the solved-for values will correspond to the 18-inch HMT findings and we therefore conclude that the 12-inch and 18-inch piping have very long lifespans.

SOIL CORROSIVITY / CATHODIC PROTECTION

Because this Jet-A piping system is cathodically protected, no soil corrosivity analysis is required to be performed as part of the API 570 testing. However, in an effort to give well-researched recommendations, C&C requested the most recent Annual Cathodic Survey from Menzies Aviation. The most recent inspections took place on November 5^{th}-6^{th}, 2019 and a report was received in January of 2019. We have reviewed the annual survey and it did not raise any additional concerns. Based on the performance of the cathodic system evidenced in that report, we are, again, stating our belief that the 12" pipe was originally SCH 20 (0.250-inch wall).

CONCLUSIONS & RECOMMENDATIONS

Based on these findings, we recommend that future API 570 inspections are performed using a 12-inch pipe original wall thickness of SCH 20 (0.250-inch wall). This will provide more accurate calculations and life expectancy calculations for the piping. When all data in the HMT report are adjusted for the accurate original conditions, the life expectancy of the system will automatically be found to be much longer than originally predicted by HMT and the corrosion/degradation rate to be much lower. Based on our first-hand experience, we have no concerns for the longevity of this piping.

C&C does not believe any further testing is required at this time except for routine inspections normally provided by the operator as part of their preventative maintenance protocols.

The next required API 570 test is in 10 years. The consortium/farm operator may choose to have HMT amend their report. HMT may or may not be willing to do this.

As with any representative test, it is not possible to ascertain the actual condition of all of the pipe on the airfield. The API 570 process, in general and in conjunction with a properly maintained cathodic system, has proven over many decades to be a valuable indicator of overall piping system condition.

Feel free to contact either Chris Olson, Jon Currier or me at 813.495.8072 to discuss any questions you may have of this review. Jon's cell is 310-422-8062.

Sincerely,

William H Freeman

William H. Freeman, PE
Currier & Company, Inc.
TPA - API 570 Report Review

Exhibit D

PIPE SYSTEM

API 570 IN-SERVICE INSPECTION REPORT

MENZIES AVIATION

BURIED HYDRANT FUELING PIPING LINES

TAMPA INTERNATIONAL AIRPORT

TAMPA, FL

FEBRUARY 18 - 21, 2019

Prepared by:

HMT Inspection
A Division of HMT LLC
7355 W. Friendly Ave., Suite B
Greensboro, NC 27409-1854
336.315.7908

EXECUTIVE SUMMARY

It is recommended that the owner / user reviews, evaluates, and implements the recommendations set forth in Section 2.0, Inspection Summary, of this report or, the owner / user may determine that no action(s) need be taken prior to continued service and such decision(s) should be documented in the piping historical record file.

It is recommended that the owner / user adheres to the recommendations given herein in Section 2.0 for continued service until such time as tank operating conditions change or another inspection assessment per API 570 guidelines determines that an adjustment in safe operation for this piping should be made.

- It has been determined that, due to the non-hazardous nature of the service Jet-A (Aviation Fuel), this piping circuit is designated Class 3.

- Further Ultrasonic (UT) testing and Visual (VT) inspection of this circuit should be performed within 10 years and no later than February 2029 (ref. API 570 Section 6, Tables 1 and 2).

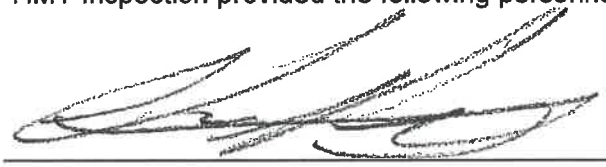
SUMMARY OF RECOMMENDED ACTIONS

No recommended or required actions at this time. This piping circuit is in acceptable condition for continued service under the current operating conditions.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to piping integrity required - Out of compliance with the current API 570 Code. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with the current API 570 Code with **no damage or failure noted.** Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 570 Code - No action required

PERSONNEL

HMT Inspection provided the following personnel:



Christopher Marsh
API 570 Piping Inspector
Certification Number: 23226
Level II Technician

Luch Neang
Technician

TABLE OF CONTENTS

1.0 DESCRIPTION

GENERAL:	LINE / PIPING IDENTIFICATION:	Buried Hydrant Fueling Lines
	OWNER:	Menzies Aviation
	PIPING LOCATION:	Tampa, FL (International Airport)
	TYPE OF FACILITY:	Airport
	DESIGN STANDARD / PIPING SPECIFICATION:	ASME B31.3
	INSTALLER:	No Data Available
	PRODUCT / SERVICE:	Jet-A (Aviation Fuel)
	PIPING CLASSIFICATION:	Class 3
	DESIGN PRESSURE:	No Data Available
	OPERATING PRESSURE:	200 PSIG
	MAXIMUM ALLOWABLE WORKING PRESSURE (MAWP):	257 PSI
	DESIGN TEMPERATURE:	No Data Available
	OPERATING TEMPERATURE:	Ambient
	ALLOWABLE STRESS:	16,000 PSIG
	LONGITUDINAL JOINT EFFECIENCY:	1.0
	CATHODIC PROTECTION & TYPE:	None
	NAMEPLATE PRESENT:	N/A
	INSULATED:	N/A
DIMENSIONS:	OUTSIDE DIAMETER (O.D.):	10.00 inches / 18.00 inches
	CIRCUIT LENGTH (IN FEET):	12.00 feet (Approximate)
GEOMETRY:	SUPPORTS:	None
	MATERIAL OF CONSTRUCTION:	Carbon Steel (Grade Not Known)
	LINE SCHEDULE:	40
DATES:	YEAR OF FABRICATION / CONSTRUCTION:	1969
	YEAR INSTALLED:	1969
	LAST COATED:	No Data Available
	LAST INSPECTION & TYPE:	2009
ACCESS:	LINE ELEVATION:	Underground
	LINE ACCESS:	None
COATINGS / LININGS:	EXTERNAL:	White Paint
	INTERNAL:	None

2.0 INSPECTION SUMMARY

The following is a summary of the significant findings of the inspection (item numbers correspond with the HMT API 570 Checklist).

INSPECTION INTERVAL: It has been determined that, due to the non-hazardous nature of the service Jet-A (Aviation Fuel), this piping circuit is designated Class 3.

Further Ultrasonic (UT) testing and Visual (VT) inspection of this circuit should be performed within 10 years and no later than February 2029 (ref. API 570 Section 6, Tables 1 and 2).

CORROSION RATE DETERMINATION: In accordance with API 570, 4th Edition, Para. 7.1.2, the Long-Term Corrosion Rate (LTCR) was calculated based on random Ultrasonic (UT) thickness measurements throughout the pipeline circuit. LTCR calculations were made on the 12-inch and 18-inch carbon steel lines.

MAWP CALCULATIONS: In accordance with API 570, 4th Edition, Para. 7.5, Maximum Allowable Working Pressure (MAWP) calculations were made on the NPS 12 and NPS 18 carbon steel circuits. Thickness measurement determined that the piping system can maintain the current design operating conditions and may be limited only by the associated valves and flanges.

BACKGROUND:

ITEM P11 / ACTION CODE D: The piping system inspected was the NPS 12 and NPS 18 carbon steel piping which was excavated. This line consists of coated carbon steel piping. All lines are located outdoors were buried underground. Previous inspection found no recordable issues.

ACTION CODE D: The piping joint efficiency used for evaluation was 1.0 and the allowable stress was 16,000 psi. Minimum values based on normal industry practice were used. Maximum Allowable Working Pressure (MAWP) and remaining life calculations were based on these values.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to piping integrity required - Out of compliance with the current API 570 Code. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with the current API 570 Code with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 570 Code - No action required

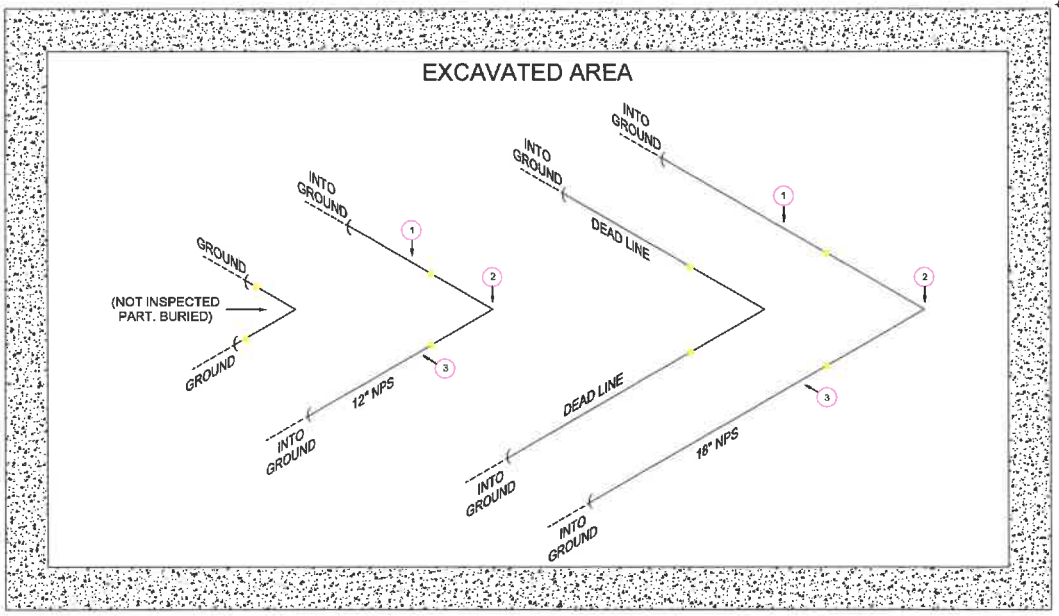
INSPECTION SUMMARY (CONT'D.):

BACKGROUND (CONT'D.):

ITEM P14 / ACTION CODE D: Ultrasonic (UT) thickness readings were taken at various locations throughout the accessible segments (ref. Circuit Dwg.). No readings were sufficiently below nominal thickness to result in a recordable indication requiring repair.

ACTION CODE (AC) DEFINITIONS
Code A: Repairs critical to piping integrity required - Out of compliance with the current API 570 Code. Positive action must be taken prior to continued service.
Code B: Further Engineering evaluation required - Out of compliance with the current API 570 Code with **no damage or failure noted**. Must be assessed (action taken or not taken) and documented prior to continued service.
Code C: No action required - Pertinent findings / suggestions / recommendations only. Monitor for continued deterioration.
Code D: Acceptable - In compliance w/ API 570 Code - No action required

Exhibit D



DRAWING NOT TO SCALE

DESCRIPTION

12" NPS + 10" NPS BURIED PIPING INSIDE AIRPORT PROPERTY. EXCAVATED EXPOSE CARBON STEEL PIPING.

LEGEND

= WELD
= CML LOCATION

HMT INSPECTION
7385 W. FRIENDLY AVE., SUIT B
GREENSPOINT, NC 27409-1854

TITLE: PIPING LAYOUT

OWNER: MENZIES AVIATION

PIPE SYSTEM NO/ SURFACE/HYDRANT FUELING PIPING LINES: JOB NO: 272-73301

DRAWN BY: J. VAZQUEZ

DATE: 12 FEB 2018

4.0 PIPING INSPECTION CHECKLIST

ITEM NO.	DESCRIPTION	INSPECTION COMMENTS
P1	Search for any indication of leakage from process piping.	Acceptable
P2	Search for any indication of leakage from steam tracing	N/A
P3	Search for any indication of leakage from repairs or existing pipe clamps.	N/A
P4	Record / locate all repairs and / or existing pipe clamps.	N/A
P5	Do all piping repairs meet API 570 guidelines?	N/A
P6	Inspect for piping misalignment / restricted movement.	N/A
P7	Inspect for expansion misalignment.	N/A
P8	Inspect for piping dislodged from one (1) or more supports.	N/A
P9	Inspect for deformation of a vessel or tank wall in the vicinity of piping attachments.	N/A
P10	Inspection for piping supports forced out-of-plumb by piping expansion or contraction.	N/A

PIPING INSPECTION CHECKLIST (CONT'D.)

ITEM NO.	DESCRIPTION	INSPECTION COMMENTS
P11	Check records for any excessive replacement or repair of mechanical components connected to the piping.	Reference Section 2.0
P12	Inspect for base plate shifting, concrete cracking and / or shearing of foundation bolts for mechanical equipment which piping is connected to.	N/A
P13	Inspect for defects in flange connections between mechanical equipment and piping.	N/A
P14	Inspect piping circuit for coating failure and corrosion.	Reference Section 2.0
P15	Inspect soil-to-air interface.	Acceptable
P16	Inspect for areas of pipe deformation, bulges or depressions.	Acceptable
P17	Inspect bolting support points under clamps.	N/A
P18	Inspect all thin, small-bore or alloy piping.	N/A
P19	Inspect all threaded piping and threaded connections.	N/A
P20	Inspect insulation for damage and areas of penetrations.	N/A
P21	Inspect insulation interface areas for coating failure, corrosion and / or biological growth.	Acceptable
P22	Inspect for missing areas of insulation or jacket.	N/A
P23	Inspect the sealant for areas of deterioration of missing sealant material.	N/A
P24	Inspect for bulges in the insulation.	N/A
P25	Inspect for areas of insulation banding which may be broken or missing.	N/A
P26	Inspect piping supports for corrosion or coating failure.	N/A

PIPING INSPECTION CHECKLIST (CONT'D.)

ITEM NO.	FOUNDATION	INSPECTION COMMENTS
P27	Inspection piping supports for distortion or damage.	N/A
P28	Inspect for movement or deterioration of concrete footings.	N/A
P29	Inspect for damaged or loose foundation bolts.	N/A
P30	Inspect for excessive overhanging weight.	N/A
P31	Inspect for inadequate or missing piping supports.	N/A
P32	Inspect for loose supports resulting in metal wear.	N/A
P33	Inspect and document any shoe not in contact with its supports.	N/A
P34	Inspect for pipe hanger distortion.	N/A
P35	Inspect spring hangers for lack of tension.	N/A
P36	Inspect for pipe brace distortion or breakage.	N/A
P37	Inspect for loose piping brackets.	N/A
P38	Inspect for restricted operation of pipe rollers or slide plates.	N/A
P39	Inspect for restricted operation of pulleys or pivot points in counter-balanced piping details.	N/A
P40	If piping designated as Class 1 and requires annual pressure testing by U.S. Coast Guard regulations, verify that this has been performed as required.	N/A

5.0 CALCULATION TABLES

MAXIMUM ALLOWABLE WORKING PRESSURE

(ref. API 570, Para. 7.5 & Table 1)

Pipe Classification (ref. API 570, Para. 6.3.4.2, 6.3.4.3, 6.3.4.4, 6.3.4.5)	Class 3
Pipe Description (NPS & Weight)	18 NPS / Standard
Outside Diameter of Pipe (O.D.)	18.000 in.
Allowable Stress	16,000 psi
Longitudinal Weld Joint Efficiency	1.0
Thickness Determined from Inspection	0.346 in.
Observed Corrosion Rate (7.1.2)	0.0023 in. / yr.
Next Planned Inspection	2029
Estimated Metal Loss by Next Planned Inspection	0.023 in.
Maximum Allowable Working Pressure (MAWP)	200 psi
Conclusion (Acceptable / Not Acceptable)	Acceptable

CORROSION RATE CALCULATIONS

Long-Term Corrosion Rate (LTCR) (ref. API 570, Para. 7.1.2)

Initial Thickness (Nominal)	0.375 in.
Actual Minimum Thickness (current)	0.346 in.
Initial Inspection Year or Year of Construction	1969
Current Inspection Year	2019
Long-Term Corrosion Rate (LTCR)	0.0006 in. / yr.

Short-Term Corrosion Rate (STCR) (ref. API 570, Para. 7.1.2)

Previous Thickness	0.369 in.
Actual Minimum Thickness (current)	0.346 in.
Previous Inspection Year	2009
Current Inspection Year	2019
Short-Term Corrosion Rate (STCR)	0.0023 in. / yr.

REMAINING LIFE CALCULATIONS

(ref. API 570, Para. 7.1.2 & API 574, Para. 12.1.4, 12.1.5 & Table 7)

Actual Minimum Thickness	0.346 in.
Minimum Alert Thickness (ref. API 574, Table 7)	0.130 in.
Minimum Required Thickness (ref. API 2611, Annex C)	0.1859
Corrosion Rate	0.0023 in. / yr.
LTCR Remaining ½-Life	30+ Years

5.0 CALCULATION TABLES (CONT'D.)

MAXIMUM ALLOWABLE WORKING PRESSURE

(ref. API 570, Para. 7.5 & Table 1)

Pipe Classification (ref. API 570, Para. 6.3.4.2, 6.3.4.3, 6.3.4.4, 6.3.4.5)	Class 3
Pipe Description (NPS & Weight)	12 NPS / Standard
Outside Diameter of Pipe (O.D.)	12.750 in.
Allowable Stress	16,000 psi
Longitudinal Weld Joint Efficiency	1.0
Thickness Determined from Inspection	0.223 in.
Observed Corrosion Rate (7.1.2)	0.0033 in. / yr.
Next Planned Inspection	2029
Estimated Metal Loss by Next Planned Inspection	0.033 in.
Maximum Allowable Working Pressure (MAWP)	200 psi
Conclusion (Acceptable / Not Acceptable)	Acceptable

CORROSION RATE CALCULATIONS

Long-Term Corrosion Rate (LTCR) (ref. API 570, Para. 7.1.2)

Initial Thickness (Nominal)	0.333 in.
Actual Minimum Thickness (current)	0.223 in.
Initial Inspection Year or Year of Construction	1969
Current Inspection Year	2019
Long-Term Corrosion Rate (LTCR)	0.0022 in. / yr.

Short-Term Corrosion Rate (STCR) (ref. API 570, Para. 7.1.2)

Previous Thickness	0.264 in.
Actual Minimum Thickness (current)	0.231 in.
Previous Inspection Year	2009
Current Inspection Year	2019
Short-Term Corrosion Rate (STCR)	0.0033 in. / yr.

REMAINING LIFE CALCULATIONS

(ref. API 570, Para. 7.1.2 & API 574, Para. 12.1.4, 12.1.5 & Table 7)

Actual Minimum Thickness	0.223 in.
Minimum Alert Thickness (ref. API 574, Table 7)	0.130 in.
Minimum Required Thickness (ref. API 2611, Annex C)	0.1317
Corrosion Rate	0.0033 in. / yr.
LTCR Remaining ½-Life	30+ Years

6.0 TABLES

CML	SIZE	ACTUAL	PREV.	ORIG.	REQ.	ST CORR	LT CORR	REMAINING	NEXT	NEXT
(UT)	NPS, in.	Thk., in.	Thk,. In.	Thk., in.	Thk., in.	Rate	Rate	1/2 LIFE	Inspection	Inspection
		Feb-19	Jan-09	Nov-69					UT, VT, S/A	Inj. Point
1-T	12.00	0.237	0.000	0.333	0.1300	0.0000	0.0020	27.4	10.0	3.0
1-E	12.00	0.241	0.000	0.333	0.1300	0.0000	0.0019	29.7	10.0	3.0
1-B	12.00	0.291	0.000	0.333	0.1300	0.0000	0.0009	94.3	10.0	3.0
1-W	12.00	0.243	0.000	0.333	0.1300	0.0000	0.0018	30.9	10.0	3.0
2-T	12.00	0.237	0.234	0.333	0.1300	0.0000	0.0020	27.4	10.0	3.0
2-O/S	12.00	0.231	0.264	0.333	0.1300	0.0033	0.0021	15.5	10.0	3.0
2-B	12.00	0.223	0.247	0.333	0.1300	0.0024	0.0022	19.6	10.0	3.0
2-I/S	12.00	0.237	0.241	0.333	0.1300	0.0004	0.0020	27.4	10.0	3.0
3-T	12.00	0.235	0.244	0.333	0.1300	0.0009	0.0020	26.4	10.0	3.0
3-N	12.00	0.254	0.216	0.333	0.1300	0.0000	0.0016	38.6	10.0	3.0
3-B	12.00	0.268	0.215	0.333	0.1300	0.0000	0.0013	52.3	10.0	3.0
3-S	12.00	0.258	0.226	0.333	0.1300	0.0000	0.0015	42.0	10.0	3.0
1-T	18.00	0.374	0.000	0.375	0.1300	0.0000	0.0000	6005.3	10.0	3.0
1-E	18.00	0.399	0.000	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
1-B	18.00	0.405	0.000	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
1-W	18.00	0.391	0.000	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
2-T	18.00	0.390	0.381	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
2-O/S	18.00	0.410	0.413	0.375	0.1300	0.0003	0.0000	472.0	10.0	3.0
2-B	18.00	0.389	0.388	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
2-I/S	18.00	0.388	0.386	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
3-T	18.00	0.378	0.371	0.375	0.1300	0.0000	0.0000	No Corrosion	10.0	3.0
3-N	18.00	0.364	0.356	0.375	0.1300	0.0000	0.0002	523.6	10.0	3.0
3-B	18.00	0.346	0.369	0.375	0.1300	0.0023	0.0006	47.5	10.0	3.0
3-W	18.00	0.353	0.375	0.375	0.1300	0.0022	0.0004	51.3	10.0	3.0

CML Description
N = North E = East OR = Extrados
S = South W = West IR = Intrados
T = Top B = Bottom

7.0 NDT INSPECTION

7.1 NDT INSPECTION SCOPE

The following Nondestructive Testing (NDT) was conducted to evaluate the physical characteristics of the pipe:

A) Visual (VT) inspection of areas for the detection of anomalies or significant product side metal loss which may affect the integrity. Performed in accordance with HMT Inspection VT Procedure No. 1611.9, Revision No. 6.

B) Random Ultrasonic (UT) testing. Performed in accordance with HMT Inspection UT Procedure No. 1611.1, Revision No. 8.

8.0 EQUIPMENT

8.1 ULTRASONIC

UT equipment utilized for the inspection was a GE USM Go Plus Flaw Detector (Serial No. 17070016).

Transducer equipment utilized was a BRITEK 7.5 MHz, 0.312 inch dual element.

Calibration block equipment utilized was a 5 step, carbon steel test block (0.100 inch to 0.500 inch).

Echogel 20 was used as couplant.

9.0 WARRANTY

WARRANTY

HMT Inspection, a division of HMT LLC ("HMT"), has evaluated the condition of this tank based on the observations and measurements made by the HMT Piping Inspector and within API 570 guidelines. While our evaluation accurately describes the condition of the tank at the time of inspection, the tank owner / operator must independently assess the inspection information / report provided by HMT and any conclusions reached by the tank owner / operator and any action taken or omitted to be taken are the sole responsibility of the owner / operator. With respect to inspection and testing, HMT warrants only that the services have been performed in accordance with accepted industry practice. If any such services fail to meet the foregoing warranty, HMT shall re-perform the service to the same extent and on the same conditions as the original service.

The preceding paragraph sets forth the exclusive remedy for claims based on failure or of defect in materials or services, whether such claim is made in contract or tort (including negligence) and however instituted, and, upon expiration of the warranty period, all such liability shall terminate. The foregoing warranty is exclusive and in lieu of all other warranties, whether written, oral, implied or statutory. NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE SHALL APPLY, nor shall HMT be liable for any loss or damage whatsoever by reason of its failure to discover, report, repair or modify latent defects or defects inherent in the design of any tank inspected. In no event, whether a result of breach of contract, warranty or tort (including negligence) shall HMT be liable for any consequential or incidental damages including, but not limited to, loss of profit or revenues, loss of use of equipment tested or services by HMT or any associated damage to facilities, down-time costs or claims of other damages.

10.0 PHOTOGRAPHS

12-inch Piping View

18-inch Piping View

Exhibit D

Certificate of Qualification

HMT

INSPECTION

This is to Certify

Christopher C. Marsh

is qualified in accordance with the HMT Procedure for Qualification and Certification of Nondestructive Examination Personnel which is in compliance with the requirements of the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A-2016 ed.

Method	Level	Expiration Date
API 653	No. 26636	11/30/2019
API 510	No. 25450	01/31/2022
API 570	No. 23226	01/31/2020
STI SP001	No. 27911	06/27/2021
UT(t)	II	08/03/2020
MT(y)	II	08/03/2020
PT	II	08/03/2020

Hugh K. Howerton

Hugh K. Howerton
ASNT Level III

December 17, 2018
Date

energy API

AMERICAN PETROLEUM INSTITUTE
INDIVIDUAL CERTIFICATION PROGRAMS

API Individual Certification Programs

certifies that

Christopher Charles Marsh

has met the requirements to be a certified

API-570 Piping Inspector

Certification Number *23226*

Original Certification Date *January 31, 2002*

Current Certification Date *January 31, 2017*

Expiration Date *January 31, 2020*

Tina Briskin
Manager, Individual Certification Programs

ICP

2016-168 | 10M | Printed in the USA |

Exhibit D

Certificate of Qualification

HMT

INSPECTION

This is to Certify

Luch "Lex" Neang

is qualified in accordance with the HMT Procedure for Qualification and Certification of Nondestructive Examination Personnel which is in compliance with the requirements of the American Society for Nondestructive Testing Recommended Practice SNT-TC-1A-2011 ed.

Method	Level	Expiration Date
STI	No. 990322	07/23/2019
MFL	II	05/26/2020
UTt	II	05/27/2020
MTy	II	05/26/2020
LT/BT	II	05/27/2020

Hugh K. Howerton

Hugh K. Howerton
ASNT Level III

July 23, 2015
Date

Tampa International Airport
Use and Lease Agreement For Fuel Facilities and Pipeline
Exhibit E - Fees and Charges for the Fuel Facilities
Effective 10/1/2019

Assumptions:

Calculations do not consider availability of PFC funds.
Calculations do not include annual O&M or Operator Costs.
Rental adjustments due to system improvements or additions will be calculated based on actual project costs and will be implemented when the project is placed in service.

	Square Feet	Monthly	Annual
GROUND RENT FOR DEMISED PREMISES (will increase by 2.15% on October 1, 2020 and each October 1 thereafter during term of this Agreement)			
Unimproved Land at Fuel Storage Facilities @ $0.70 per square foot	226,076	$13,187.77	$158,253.20
Aeronautical Vehicular Pavement at Fuel Storage Facilities @ $.10 per square foot	37,026	$308.55	$3,702.60
Pipeline Right of Way corridor @ $.10 per square foot	124,206	$1,035.05	$12,420.60
TOTAL GROUND RENT FOR DEMISED PREMISES		**$14,531.37**	**$174,376.40**
FUEL STORAGE FACILITIES RENT		**$32,836.90**	**$394,042.82**
EXPANSION OF SYSTEM - EAST CARGO AREA TO EMERY - JULY 2002 TO JUNE 2030			
$3,802,040 final cost amortized 30 years @ 8% (Dated July 2002)		**$27,898.02**	**$334,776.24**
Billed effective July 2002			
EXPANSION OF SYSTEM - EAST CARGO AREA TO FEDERAL EXPRESS - MARCH 2003 TO FEBRUARY 2033			
$613,155 final cost amortized 30 years @ 8% (Dated March 2003)		**$4,499.11**	**$53,989.32**
Billed effective March 2003			
SECONDARY CONTAINMENT FOR FUEL STORAGE TANKS - IMPROVEMENT COSTS SET FORTH IN MEMORANDUM OF UNDERSTANDING FOR SECONDARY CONTAINMENT OF FUEL STORAGE TANKS - DECEMBER 2008 TO DECEMBER 2028			
$4,696,086.84 final cost amortized 20 years @ 7.25% (Dated December 2008)		**$37,116.74**	**$445,400.88**
Billed effective January 1, 2009			
AMENDED MEMORANDUM OF UNDERSTANDING FOR BULK FUEL STORAGE FACILITY UPGRADES - JULY 2014 TO DECEMBER 2036			
$9,759,800 final cost amortized 20 years @ 5.0% (Dated July 2014 as amended)		**$64,777.61**	**$777,331.32**
Billed effective February 2017			
TOTAL OF IMPROVEMENTS PAYMENTS RENT		**$134,291.48**	**$1,611,497.76**
GRAND TOTAL FUEL SYSTEM RATES AND CHARGES		**$181,659.75**	**$2,179,916.98**

STANDARD PROCEDURE Aviation Authority	Number: S250.06 Effective: 05/31/02 Revised: 01/16/19 Page: 1 of 7
Subject: CONTRACTUAL INSURANCE TERMS AND CONDITIONS	

PURPOSE: To establish the insurance terms and conditions associated with contractual insurance requirements. This Standard Procedure is applicable to all companies with Authority contracts. Unless otherwise provided herein, any exceptions to the following conditions or changes to required coverages or coverage limits must have prior written approval from the General Counsel and Executive Vice President of Legal Affairs or designee.

INSURANCE COVERAGE:

A. Procurement of Coverage:

With respect to each of the required coverages, the company will, at the company's expense, procure, maintain and keep in force the amounts and types of insurance conforming to the minimum requirements set forth in the applicable contract. Coverages will be provided by insurance companies eligible to do business in the State of Florida and having an AM Best rating of A- or better and a financial size category of VII or better. Utilization of non-rated companies or companies with AM Best ratings lower than A- or a financial size category lower than VII may be approved on a case by case basis by Risk Management.

B. Term of Coverage:

Except as otherwise specified in the contract, the insurance will commence on or prior to the effective date of the contract and will be maintained in force throughout the duration of the contract. Completed operations coverage may be required to be maintained on specific commercial general liability policies effective on the date of substantial completion or the termination of the contract, whichever is earlier. If a policy is written on a claims made form, the retroactive date must be shown and this date must be before the earlier of the date of the execution of the contract or the beginning of contract work, and the coverage must respond to all claims reported within three years following the period for which coverage is required unless stated otherwise in the contract.

C. Reduction of Aggregate Limits:

If the aggregate limit is exhausted, the company will immediately take all possible steps to have it reinstated. The general liability policies shall include a per policy endorsement

providing that the limits of such insurance specified in the contract shall apply solely to the work under the contract without erosion of such limits by other claims or occurrences.

1. Cancellation Notice

   Each of the insurance policies will be specifically endorsed to require the insurer to provide the Authority with 30 days written notice (or 10 days for non-payment of premium) prior to the cancellation of the policy. The endorsement will specify that such notice will be sent to:

   Hillsborough County Aviation Authority
   Attn.: Chief Executive Officer
   Tampa International Airport
   Post Office Box 22287
   Tampa, Florida 33622

D. No waiver by approval/disapproval:
The Authority accepts no responsibility for determining whether the company's insurance is in full compliance with the insurance required by the contract. Neither the approval by the Authority nor the failure to disapprove the insurance furnished by the company will relieve the company of their full responsibility to provide the insurance required by the contract.

E. Future Modifications – Changes in Circumstances:

1. Changes in Coverages and Required Limits of Insurance
   The coverages and minimum limits of insurance required by the contract are based on circumstances in effect at the inception of the contract. If, in the opinion of the Authority, circumstances merit a change in such coverages or minimum limits of insurance required by the contract, the Authority may change the coverages and minimum limits of insurance required, and the company will, within 60 days of receipt of written notice of a change in the coverages and minimum limits required, comply with such change and provide evidence of such

compliance in the manner required by the contract. Provided, however, that no change in the coverages or minimum limits of insurance required will be made until at least two years after inception of the contract. Subsequent changes in the coverages or minimum limits of insurance will not be made until at least two years after any prior change unless extreme conditions warrant such change and are agreeable to both parties.

If, in the opinion of the Authority, compliance with the insurance requirements is not commercially practicable for the company, at the written request of the company, the Authority may, at its sole discretion and subject to any conditions it deems appropriate, relax or temporarily suspend, in whole or in part, the insurance requirements which would otherwise apply to the company. Any such modification will be subject to the prior written approval of the General Counsel and Executive Vice President of Legal Affairs or designee, and subject to the conditions of such approval.

F. Proof of Insurance – Insurance Certificate:

1. Prior to Work, Use or Occupancy of Authority Premises

The company will not commence work, use or occupy Authority premises in connection with the contract until the required insurance is in force, preliminary evidence of insurance acceptable to the Authority has been provided to the Authority, and the Authority has granted permission to the company to commence work, use or occupy the premises in connection with the contract.

2. Proof of Insurance Coverage

As preliminary evidence of compliance with the insurance required by the contract, the company will furnish the Authority with a certificate(s) of insurance satisfactory to the Authority. This certificate must be signed by an authorized representative of the insurer. If requested by the Authority, the company will, within 15 days after receipt of written request from the Authority, provide the Authority, or make available for review, certificates of insurance, copies of required endorsements and/or a certified complete copy of the policies of

insurance. The company may redact those portions of the insurance policies that are not relevant to the coverage required by the contract. The company will provide the Authority with renewal or replacement evidence of insurance, acceptable to the Authority, prior to expiration or termination of such insurance.

The insurance certificate must:

a. Indicate that, to the extent required by the contract:

   i. the Authority, members of the Authority's governing body, and the Authority's officers, volunteers and employees are included as Additional Insureds on all policies other than workers compensation and professional liability, and

   ii. the insurers for all policies have waived their subrogation rights against the Authority;

b. Indicate that the certificate has been issued in connection with the contract;

c. Indicate the amount of any deductible or self-insured retention applicable to all coverages;

d. Identify the name and address of the certificate holder as:

   Hillsborough County Aviation Authority
   Attn.: Chief Executive Officer
   Tampa International Airport
   Post Office Box 22287
   Tampa, Florida 33622;
   and,

e. Be signed and dated using approved methods by an individual who is an authorized representative of each insurer, whose insurance is the subject of

the certificate and who is authorized by each such insurer to issue the certificate of insurance as modified. Facsimile signatures are acceptable.

G. Deductibles / Self Insurance:

1. All property and builders risk deductibles, as well as all self-insured retentions or any schemes other than a fully insured program, must be approved by the General Counsel and Executive Vice President of Legal Affairs or designee. The company agrees to provide all documentation necessary for the Authority to review the deductible or alternative program.

2. The company will pay on behalf of the Authority, or any member of the Authority's governing body or any officer or employee of the Authority, any deductible or self-insured retention (SIR) which, with respect to the required insurance, is applicable to any claim by or against the Authority, or any member of the Authority's governing body, or any officer or employee of the Authority.

3. The contract by the Authority to allow the use of a deductible or self-insurance program will be subject to periodic review by the Director of Risk and Insurance. If, at any time, the Authority deems that the continued use of a deductible or self-insurance program by the company should not be permitted, the Authority may, upon 60 days written notice to the company, require the company to replace or modify the deductible or self-insurance in a manner satisfactory to the Authority.

4. Any deductible amount or SIR program will be included and clearly described on the certificate prior to any approval by the Authority. This is to include fully insured programs as to a zero deductible per the policy. Authority reserves the right to deny any certificate not in compliance with this requirement.

H. Company’s Insurance Primary:

The company’s required insurance will apply on a primary basis. Any insurance maintained by the Authority will be excess and will not contribute to the insurance provided by or on behalf of the company.

I. Applicable Law:

With respect to any contract entered into by the Authority with a value exceeding $10,000,000, if any required policy is: (i) issued to a policyholder outside of Florida or (ii) contains a "choice of law" or similar provision stating that the law of any state other than Florida shall govern disputes concerning the policy, then such policy must be endorsed so that Florida law (including but not limited to Part II of Chapter 627 of the Florida Statutes) will govern any and all disputes concerning the policy in connection with claims arising out of work performed pursuant to the contract.

J. Waiver of Subrogation:

The company, for itself and on behalf of its insurers, to the fullest extent permitted by law without voiding the insurance required by the contract, waives all rights against the Authority, members of the Authority's governing body and the Authority's officers, volunteers and employees, for damages or loss to the extent covered and paid for by any insurance maintained by the company.

K. Company's Failure to Comply with Insurance Requirements:

1. Authority's Right to Procure Replacement Insurance

If, after the inception of the contract, the company fails to fully comply with the insurance requirements of the contract, in addition to and not in lieu of any other remedy available to the Authority provided by the contract, the Authority may, at its sole discretion, procure and maintain on behalf of the company, insurance which provides, in whole or in part, the required insurance coverage.

2. Replacement Coverage at Sole Expense of Company

The entire cost of any insurance procured by the Authority will be paid by the company. At the option of the Authority, the company will either directly pay the entire cost of the insurance or immediately reimburse the Authority for any costs incurred by the Authority including premium and a 15% administration cost.

a. Company to Remain Fully Liable

Except to the extent any insurance procured by the Authority actually provides the insurance coverage required by the contract, the company will remain fully liable for full compliance with the insurance requirements in the contract.

b. Authority's Right to Terminate, Modify, or Not Procure

Any insurance procured by the Authority is solely for the Authority's benefit and is not intended to replace or supplement any insurance coverage which otherwise would have been maintained by the company. Authority is not obligated to procure any insurance pursuant to these requirements and retains the right, at its sole discretion, to terminate any such insurance which might be procured by the Authority.

APPROVED: Joe Lopano DATE: 01/16/19