

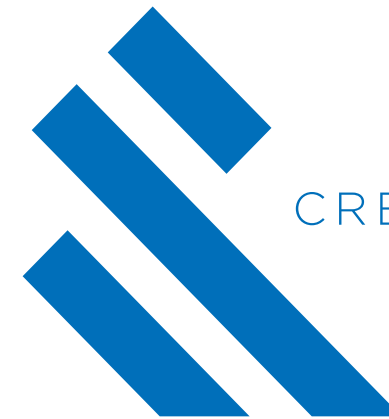
APM CONTROLS ASSESSMENT & CONTROL ROOM RELOCATION

SUBMITTED TO



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CREATE AMAZING.

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ACRONYM DIRECTORY

ACI	Actual Condition Index	IBC	International Building Code
AISC	American Institute of Steel Construction	IECC	International Energy Conservation Code
ALRM	Fire Alarm System	KVA	Kilovolt Amps
APM	Automatic People Mover	kW	Kilowatt
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers	LFSA	Life Safety
ATC	Automatic Train Control	LS	Low Slope
ATP	Automatic Train Protection	MCC	Motor Control Center
ATS	Automatic Transfer Switch	NAC	Notification Appliance Circuit
BMcD	Burns & McDonnell	NEC	National Electrical Code
BOMA	Building Owners and Managers Association	NEMA	National Electrical Manufacturers Association
CC	Central Control	NTWK	Network
CIBSE	Chartered Institution of Building Service Engineers	OEM	Original Equipment Manufacturer
DM	Deferred Maintenance	O&M	Operations & Maintenance
DOOR	Doors	PDS	Power Distribution Systems
DX	Direct Expansion	PM	Preventative Maintenance
EAMS	Enterprise Asset Management System	RAIL	Rail
ELEC	Electrical Systems	ROM	Rough Order of Magnitude
FCI	Facility Condition Index	RPZ	Reduced Pressure Zone
GIS	Geographic Information Systems	SEQ	Station Equipment
HAS	Houston Airport System	STAT	Station
Hz	Hertz	STRL	Structural System

ACRONYM DIRECTORY

SWCH	Switch
TBLK	Track Block
TSA	Transportation Security Administration
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
UPS	Uninterruptible Power Supplies
WEQ	Wayside Equipment

EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

A. BACKGROUND INFORMATION

This report represents the evaluation of individual controls and equipment assets for the Automated People Mover (APM) facilities at George Bush Intercontinental Airport, Houston, TX. The APM facilities originally opened in 1999 with stations located at Terminals B and C. Phase II of the APM expanded the service to Terminal D/E in 2005. Phase III expanded the APM to Terminal A in 2010. The APM was designed to service passengers moving between terminals for all air carriers and is operated on a common use basis with all facilities allocated by the Houston Airport System (HAS). The APM uses Bombardier vehicle and control systems and it is currently operated and maintained by Bombardier.

The assessment and this report serve multiple purposes. The survey and assessment logged control equipment asset information electronically, creating a database of assets. Record drawings, field surveys, and existing asset management systems were used as the basis for data collection.

Burns & McDonnell was tasked with establishing a baseline asset database of equipment and infrastructure which will be utilized and updated when maintaining and renovating the facilities and for capital improvement planning. The database is built for integration with the HAS INFOR-based Enterprise Asset Management System (EAMS) and existing GIS. The database of surveyed assets includes asset information, issues, observations, and deficiencies found during the survey.

B. GOALS AND OBJECTIVES

The goals and objectives of this assessment were to develop a database of APM control equipment assets in terms of condition, effectiveness, and longevity. The specific goals include:

- Develop a database summarizing control equipment.
- Identify system level deferred maintenance. Deferred maintenance includes code compliance issues, deficiencies, modernization, and equipment repair or replacement recommendations.
- Summarize present condition of equipment utilizing an Actual Condition Index (ACI) and Facility Condition Index (FCI) rating. The FCI is calculated as the ratio of deferred maintenance versus complete replacement costs.

- Provide overall observation summaries of the controls including their current maintenance policies and procedures. Provide recommendations for improvements to enhance the service lives of the system assets.

- Quantify useful life expectancy and deferred maintenance costs for each system.

- Develop a system level planning matrix based on priority, near, and long term deferred maintenance and capital improvement recommendations.

- Estimate Rough Order of Magnitude costs for replacement and/or upgrades to systems included in this study. Costs are provided at the system level grouped by planning category.

C. SUMMARY OF RECOMMENDED COSTS

The recommendations to address deferred maintenance are grouped into standard categories described below:

1. **Priority:** Completion recommended in 0-3 years
2. **Near Term:** Completion recommended in 4-7 years
3. **Long Term:** Completion recommended in 8+ years

Systems were ranked into the planning categories described above, based on the actual condition index, facility condition index, and remaining service life as established by the scope of work. The procedures for determining these values are further defined in **Chapter I – Procedures & Methodology**.

Below is a summary of the Deferred Maintenance (DM) Costs and associated Replacement Value (RV) Costs for each Planning Category at the System Level. The total system deferred maintenance costs and total system replacement value costs are based on the assessed systems. All DM and RV costs include indirect costs and consider renovation in an existing facility.

A breakdown of costs by system and planning category is provided below in **Table ES.1**. Additional detail of the costs at the component and asset level is provided in the respective system sections of **Chapter II – System Findings** and in **Appendix C**. The FCI provided below is based on the straight ratio of the

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deferred maintenance versus the replacement value costs at the system level and is not a weighted average at the component level.

System	Planning Category	DM Costs	RV Costs
ATC	Priority	\$2,200,000	\$2,200,000
ATC	Near Term	\$0	\$2,200,000
ATC	Long Term	\$0	\$13,200,000
ATC Total		\$2,200,000	\$17,600,000
RAIL	Priority	\$3,589,310	\$4,577,600
RAIL	Near Term	\$0	\$0
RAIL	Long Term	\$0	\$4,782,384
RAIL Total		\$3,589,310	\$9,359,984
STAT	Priority	\$477,735	\$477,735
STAT	Near Term	\$0	\$38,867
STAT	Long Term	\$0	\$438,867
STAT Total		\$477,735	\$955,469
SEQ	Priority	\$600,000	\$600,000
SEQ	Near Term	\$0	\$0
SEQ	Long Term	\$0	\$300,000
SEQ Total		\$600,000	\$900,000
SWCH	Priority	\$395,434	\$395,434
SWCH	Near Term	\$0	\$0
SWCH	Long Term	\$0	\$3,115,058
SWCH Total		\$395,434	\$3,510,492
WEQ	Priority	\$20,000	\$20,000
WEQ	Near Term	\$0	\$0
WEQ	Long Term	\$0	\$303,273
WEQ Total		\$20,000	\$323,273

System	Planning Category	DM Costs	RV Costs
PDS	Priority	\$800,000	\$800,000
PDS	Near Term	\$0	\$0
PDS	Long Term	\$0	\$6,331,394
PDS Total		\$800,000	\$7,131,394
UPS	Priority	\$50	\$50,000
UPS	Near Term	\$0	\$0
UPS	Long Term	\$0	\$150,000
UPS Total		\$50	\$200,000
ATP	Priority	\$3,500,000	\$3,500,000
ATP	Near Term	\$0	\$0
ATP	Long Term	\$0	\$6,000,000
ATP Total		\$3,500,000	\$9,500,000
ATO	Priority	\$8,000,000	\$8,000,000
ATO	Near Term	\$0	\$0
ATO	Long Term	\$0	\$100,000
ATO Total		\$8,000,000	\$8,100,000
CC	Priority	\$7,130,000	\$7,130,000
CC	Near Term	\$0	\$0
CC	Long Term	\$0	\$0
STRL Total		\$7,130,000	\$7,130,000
NTWK	Priority	\$200,000	\$200,000
NTWK	Near Term	\$0	\$0
NTWK	Long Term	\$0	\$0
Total APM Controls		\$22,523,219	\$54,450,628

Table ES.1 System & Planning Costs Breakdown

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D. SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS BY SYSTEM

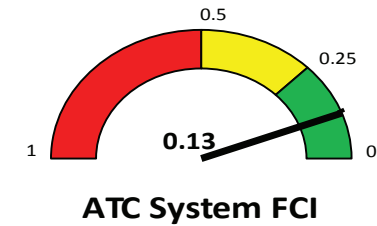
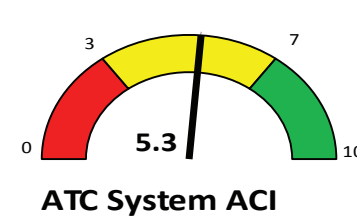
The observations and recommendations noted below are based on the findings at the time of the condition assessment. The planning category ranking of the items is based on the methodology and approach described above and in detail in **Chapter II – System Findings**.

Many issues and deficiencies have been placed in a planning category based on remaining service life as well as the functional and operational criticality of the asset. Issues and deficiencies that are minor in nature are listed as priority items even if there is a low risk of failure and do not immediately impact the functionality or operations of the overall system or facility. The issues/deficiencies will have actionable work orders associated with them and could be addressed as stakeholders input, budget, and requirements determine. By the definition of deferred maintenance, if these items are addressed they can bring the asset to a like new condition and therefore extend the overall service life of the system. Not addressing these issues may cause further deterioration and/or reduced service life of the asset.

All priority items are recommended to be addressed with the next 0-3 years. While a majority of the assets that fall in the near and long term planning categories are based on remaining service life, they could be addressed sooner if HAS stakeholders deem appropriate and budget is available. Some equipment can be run to failure with little impact to facilities, while others should be considered for replacement prior to exceeding typical service life. It is recommended, at a minimum, updating the condition assessment every 3-5 years for all issues and deficiencies not addressed. This will determine if full replacement or repair is warranted at that time.

At the beginning of each system summary section there are graphs provided that depicts the average **Actual Condition Index (ACI)** and the **Facility Condition Index (FCI)** at the system level. It is important to note that these are based on the average ACI and FCI of each component for each system.

1. AUTOMATIC TRAIN CONTROL (ATC)



The vehicle ATC components are functioning properly and show no issues upon visual review. The vehicle coupler assemblies are worn and complicate re-connection of the power supply between each vehicle.

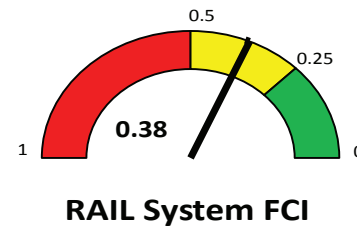
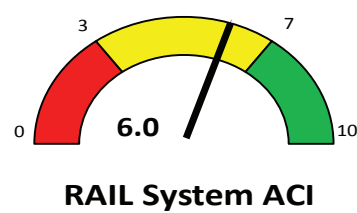
High frequency vehicle errors needing troubleshooting were noted for battery charger, crossover graphic, HVAC, service brake, dynamic brake, and door lock failure. Errors were also reported for loss of track signal, and no response from vehicle radio.

The ATC components for two vehicles will exceed their remaining service life in 5 years. The ATC components for twelve vehicles will exceed their service life within 10 years.

Some vehicle preventative maintenance tasks are not being performed at the prescribed frequencies, which should be corrected.

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2. RAIL (RAIL)

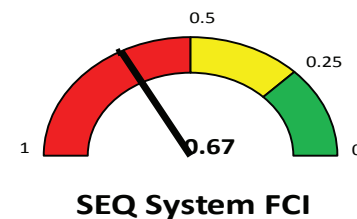
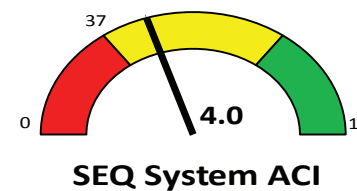
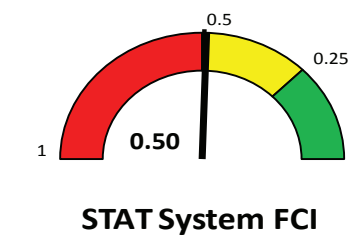
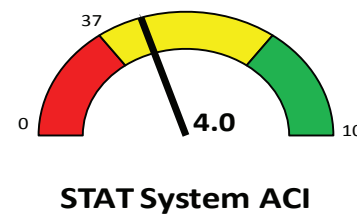


Phase 1 (Terminal B ↔ C) RAIL components are inferior to more recent installations.

Oil residue has accumulated on power/signal rail covers where vehicles frequently queue and stop (station and maintenance areas). The current cleaning procedure is not sufficient. Oil residue should be removed from the rail covers.

Phase I Rail components will exceed their remaining service life within the next five years.

3. STATION (STAT) & STATION EQUIPMENT (SEQ)



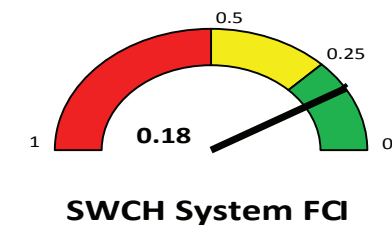
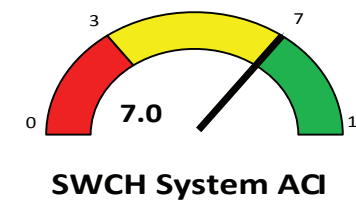
Station doors, graphic information signs, communications cabinets and PA system are in good working order. Portions of the CCTV system are obsolete, but it appears that plans are underway to replace and expand the CCTV system.

Preventive maintenance for stations has not been performed at prescribed frequencies. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life.

High frequency station errors needing troubleshooting were reported for PA failure, unscheduled station door, and doors did not open.

Phase 1 (Terminal B ↔ C) STAT components will exceed their (calculated) Remaining Service Life within the next five (5) years.

4. SWITCH (SWCH)



Insufficient clearance was observed between multiple switches and the adjacent fixed rails. Rail gap discrepancies create issues during periods of extreme temperature due to thermal expansion of the rail material and should be rectified.

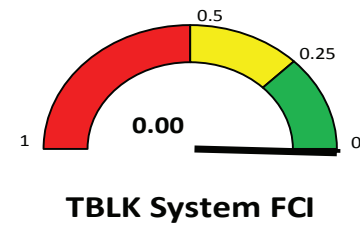
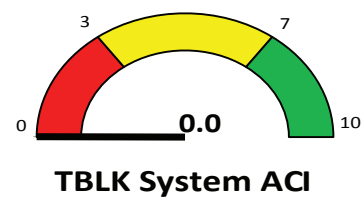
Preventive maintenance for switches has not been performed at prescribed frequencies. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life.

High frequency switch errors needing troubleshooting were observed for SW logic fluid level and where a switch failed to respond.

Phase 1 (Terminal B ↔ C) SWCH components will exceed their (calculated) Remaining Service Life within the next five (5) years.

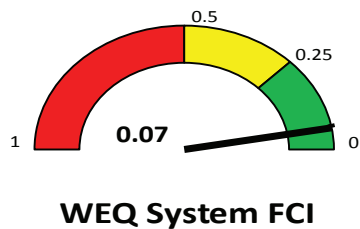
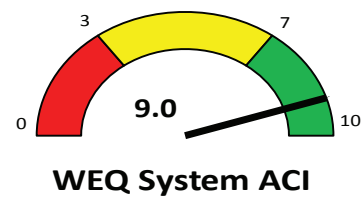
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5. TRACK BLOCK (TBLK)



Equipment on the south guideway near the maintenance area connection is in poor condition. Rail components between SW41 and SW42 are wearing on a unique bias. TBLK 228 and TBLK 230 appear to be misaligned from settlement or other structural issues. Cross-reference recent APM structural inspection to identify the exact cause of the misaligned track blocks on the south guideway near the maintenance area connection. Reference data set comments for TBLK 228 and TBLK 230.

6. WAYSIDE EQUIPMENT (WEQ)



All WEQ components are functioning properly and show no visual issues. WEQ devices are typically located at or near terminal stations and are less exposed to environmental deterioration.

Guideway preventive maintenance tasks haven't been performed at the prescribed frequency. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and

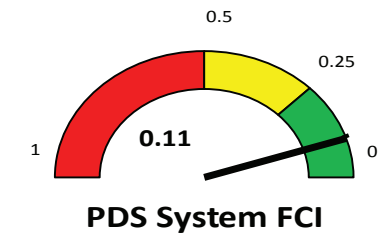
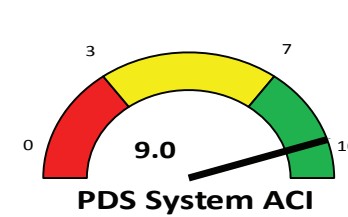
useful life.

High frequency wayside equipment errors needing troubleshooting were noted for VTE Rollback and Brush Count Wrong.

Phase 1 (Terminal B ↔ C) WEQ components will exceed their (calculated) Remaining Service Life within the next five (5) years.

Phase 2 (Terminal B ↔ C) and Phase 3 (Terminal A ↔ B) WEQ components will exceed their (calculated) Remaining Service Life within the next ten (10) years.

7. POWER DISTRIBUTION SYSTEM (PDS)



PDS equipment which isolates the south guideway near Terminal D is not functioning properly. The malfunction prevents lock out tag out of the area, thus the exact malfunction cannot be safely identified. Bombardier reports the issue must be rectified by a Bombardier employee who was on extended medical leave during the time of the assessment.

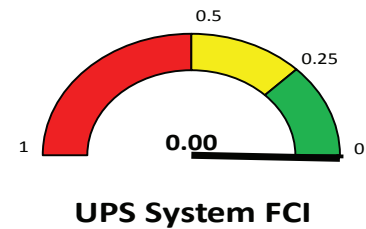
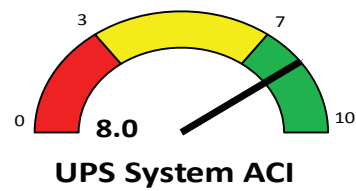
All assessed PDS equipment is in good working order and still has many years of design life remaining.

Preventive maintenance for the power distribution system has not been performed as prescribed for the monthly task. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life.

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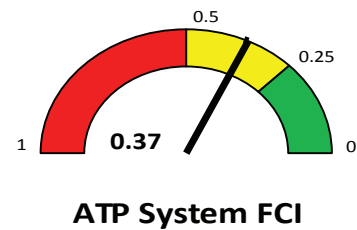
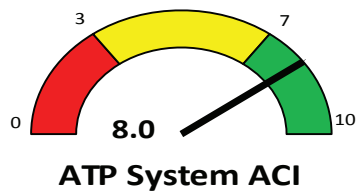
High frequency errors needing troubleshooting were noted for harmonic filter not operating and harmonic filter fault.

8. UNINTERRUPTIBLE POWER SUPPLIES (UPS)



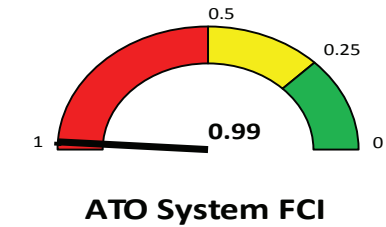
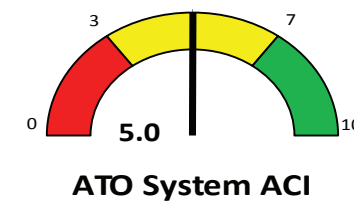
The uninterruptible power supplies are generally in good condition. They have install dates varying from 2004 to 2015. The oldest unit could be approaching its time to be replaced while others are brand new. The maintenance facility UPS is experiencing a high frequency of errors.

9. AUTOMATIC TRAIN PROTECTION (ATP)



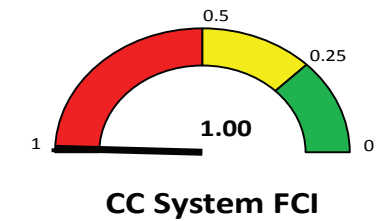
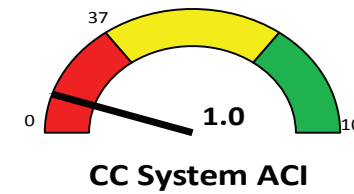
Automatic train protection equipment is of different ages corresponding to the three phases of APM build out. Although some of the equipment has reached its design life, it is all in good working order. Some of the automatic train protection equipment will need replacement when Central Control is moved in order to maintain compatibility.

10. AUTOMATIC TRAIN OPERATION (ATO)



Automatic train operation equipment is of many different ages corresponding to the three phases of APM build out. Although some of the equipment has reached its design life, it is all in good working order. Some of the automatic train operation equipment will need replacement when Central Control is moved in order to maintain compatibility.

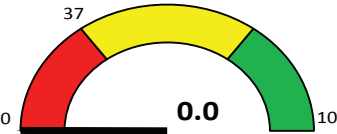
11. CENTRAL CONTROL (CC)



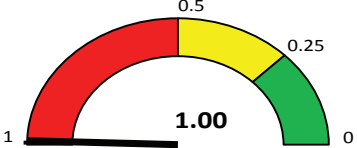
The central control equipment is in good working order, but most of it has reached its design life. Central Control will probably be moved in the next few years, due to the remodeling of Terminal B. In order to move Central Control the existing equipment will need to remain in use while equipment for the new Central Control is installed and tested. Therefore, new central control equipment will be required. This new set of central control equipment will need to be of a new generation due to obsolescence of the existing equipment.

EXECUTIVE SUMMARY

12. NETWORK (NTWK)



NTWK System ACI



NTWK System FCI

The fiber optic network connection cabinets assessed are in good working order, but has exceeded its useful service life and is in need of replacement.

CHAPTER I PROCEDURES



CHAPTER I - PROCEDURES

A. GENERAL PROCEDURE

The survey process began by compiling an electronic database with current drawings from GIS and existing record documents; 100% of the representative assets were surveyed. The existing facility drawings were used to determine equipment to survey as part of the Automatic People Mover (APM) and create an electronic database. All assets surveyed were documented utilizing DoForms tablet based application. The data collected was preserved in the electronic database for future use in the Houston Airport System (HAS) INFOR-based Enterprise Asset Management System (EAMS). Where equipment nameplates or equipment labels were not present, the asset was added to the database and assigned a name based on the nearby equipment naming conventions or the surveyor's judgment of an appropriate name.

Review of the assets and APM facilities was conducted during the month of April 2015 to the extent reasonably possible. The evaluation consisted of a visual inspection of the various assets, review of record drawings, and interviews with maintenance personnel.

Assets and conditions were assessed by a team of Burns & McDonnell engineers and subconsultants to determine and document nameplate information, location, and age, condition, and risk effect where applicable. Additional descriptions and comments were added for any other notes or details.

HAS and Bombardier escorts were utilized and any safety or security issues were discussed on a daily basis. The results of this sampling of assets were used to develop the recommendations and ranking of systems by planning categories described above.

The survey team conducted interviews with HAS and Bombardier staff familiar with the facilities. These interviews provided an overall system summary, as well as shed light on known existing issues and challenges. Existing maintenance schedules and logs were reviewed when available. Building systems specifications and operating manuals were requested and reviewed when available. Construction documents were available on a limited basis to the survey teams on-site.

All assets surveyed were added to a database and were documented as the nameplate indicated. Where equipment nameplates or equipment labels were not present, the asset was added to the database and assigned a name based on the nearby equipment naming conventions or the surveyor's judgment of an appropriate name.

For each asset, the following information was collected:

- Equipment Name
- Equipment Number
- Manufacturer
- Model Number
- Serial Number
- Installation Date
- Capacity
- Floor
- Room
- Condition
- Service Status
- Location
- Equipment Type
- Description
- Additional Comments and Observations

After all available nameplate information was entered; a description of the asset was included along with any additional comments regarding the specific piece of equipment. In addition to the nameplate data collected, digital photographs were taken of each asset or deficiency. The floor, room, and location listed for each asset were intended to guide a user to within the approximate area where that

CHAPTER I - PROCEDURES

asset was found during the survey. Finally, the life expectancy, deferred maintenance, and replacement cost of each piece of equipment were estimated.

location listed for each asset were intended to guide a user to within the approximate area where that asset was found during the survey. Finally, the life expectancy, deferred maintenance, and replacement cost of each piece of equipment were estimated.

B. DEFERRED MAINTENANCE AND REPLACEMENT COSTS

The estimated value of deferred maintenance and the current replacement costs, at the “system” hierarchy level was based on the 100% sampling. The deferred maintenance value is based on present day costs to address deficiencies and/or code compliance and bring the system back to its original condition. Deferred maintenance does not include the costs for future scheduled preventative maintenance measures.

An estimated replacement and deferred maintenance cost was obtained for each asset and recorded in the assessment database. The replacement cost was based on various resources including equipment vendors, estimating publications such as RS Means, and prior project experiences. The deferred maintenance costs were based on the actual issue or deficiency and in some cases were based on a pro-rated value of the actual replacement costs based on the remaining life.

If the asset had no issues, deficiencies, or code compliance to address, the deferred maintenance costs were zero, even if the ACI was less than 10. If the asset was near the end or beyond its useful service life, the deferred maintenance costs were equal to the replacement value costs.

C. REMAINING SERVICE LIFE

Remaining Service Life values are not equal for similar APM components. Similar APM components share common service life values; however equipment age varies according to the following installation phases.

APM Equipment	Installation (Yr.)
Terminal B ↔ C	Phase 1 (1999)
Terminal C ↔ D, Maintenance Area	Phase 2 (2005)
Terminal A ↔ B, Maintenance Area (Expansion)	Phase 3 (2010)

Table 1.1 Equipment Installation Dates

Recommended service life values are provided for each APM component in **Appendix A**. Standard reference documents do not apply to APM controls, given the specialized nature of the industry. Recommended service life values are based on the professional judgment of APM installation and maintenance specialists.

Service life references are provided in **Appendix A** of this report.

D. ASSET DEFICIENCIES

If it was determined by the surveying engineer that an asset had a deficiency, the deficiency was entered into the database and tied to that specific asset. Digital photographs were taken to highlight the deficiencies location with regards to the asset. A general description of the deficiency was entered, and any proposed solutions or additional comments were added so that the maintenance staff would be able to resolve the issues as quickly as possible.

Deficiencies discovered for the surveyed systems included in the scope of the project are provided in this report and as part of the database. Additionally, any violation of the prevailing building code that became obvious was noted in the report. Violations of current building codes were documented whether they were a part of the scope of the project or not wherever they were encountered.

E. DETERMINING CONDITION

A condition was assessed for each asset and/or system identified under the scope of the project. The surveyor’s assessment of condition was based on a number of factors such as the age of the asset, risk of failure, and visible or audible problems. Visual inspection was only performed on the outside of the

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equipment. No physical or destructive testing was conducted. Further testing may help better identify which assets beyond their designed life expectancy are at a greater risk of failure. The equipment was rated based on the following criteria:

Rating	Descriptive Criteria
10	Fully operational asset, fully meets mission requirements, like new asset, 20+ years remaining service life.
7	Fully operational asset, fully meets mission requirements, 10+ years remaining service life except for specific components as may be identified.
5	Fully operational asset, meets minimum mission requirements, 5+ years remaining service life except for specific components as may be identified.
3	Reduced operability and/or degraded mission capability, and/or less than three years remaining service life for identified conditions, and/or near-term obsolescences of key system components or repair parts may impact maintainability.
0	Non-operational, and/or the asset does not meet mission requirements, and/or current design needs are not met by this asset's basis of design, and/or the asset cannot be adequately maintained due to obsolescence of key system components or repair parts.

Table 1.2 Equipment Rating Criteria

Using the criteria above, it was assumed each rating descriptive criteria was an 'and/or' statement. For example:

- If asset is fully operational, meets mission requirements but has 3 years or less remaining service life it would receive a rating of 3.
- If typical service life of a new asset is only 5 years and it is brand new, the ACI is a 5; new asset with 10 years typical service life would receive an ACI of 7, etc.
- If typical service life is less than 20 years, it can never receive an ACI of 10
- If asset is fully operational, meets mission requirements has 20+ years remaining service life but has some components that need replaced it would receive an ACI of 7.

Years of remaining service life was the starting point for ACI calculations, and the ACI value could only go down based on overall condition. An item in perfect condition with 12 years remaining service life could

not be extended from an ACI of 7 to an ACI of 10 because it did not meet the minimum requirement of having 20+ years of remaining service life.

F. AREAS SURVEYED

This assessment of the APM control systems included the following:

Automatic Train Control (ATC)

Rail (RAIL)

Station (STAT) & Station Equipment (SEQ)

Switch (SWCH)

Track Block (TBLK)

Wayside Equipment (WEQ)

Power Distribution System (PDS)

Uninterruptable Power Supplies (UPS)

Automatic Train Protection (ATP)

Central Control (CC)

Network (NTWK)

G. ESTIMATING

The APM control cost estimate was calculated using IAH quantity take-offs and Logplan's APM unit cost database, which is based upon historical and recent (Bombardier) installation cost information. Replacement unit costs are provided for each APM component in Appendix B.

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The Rough Order of Magnitude (ROM) cost estimates were developed utilizing in-house estimating historical information and databases, and local pricing information. These should be used for general planning purposes only. Due to the level of information available and the preliminary nature of these estimated costs, ROM estimate accuracy is anticipated to be +/- 40%.

Cost estimates are based on specialized databases for different industries including Aviation. Labor productivity (man-hours) for the different tasks is derived from construction experience in the different trades.

Replacement costs for assets not specifically identified in cost estimating systems were derived through comparison to similar assemblies as well as verification with manufacturers and suppliers. These costs are inclusive of ancillary tasks and costs associated with the demolition and replacement.

Deferred maintenance and replacement value ROM estimates were utilized for the FCI ratio. These include both direct and indirect costs. Indirect costs (design engineering, engineering services during construction, permits, topographic services, inspections, third party services, general conditions, contingency, etc.) associated with the full system wide replacement value this work are included as 47% of the direct costs. Direct costs include labor, material and ancillary costs associated with the repair/replacement within the existing facility. No costs for environmental remediation were included.

Full extent of work required and actual costs will be dependent upon the timing and completed design of the modifications. Costs are shown in 2015 dollars. No escalation has been added for projecting estimated costs to future project dates.

H. METHODOLOGY AND APPROACH

Visual assessments were completed from ground accessible areas, on the APM guideway, and in locked mechanical/electrical rooms on both levels of the stations.

Interviews were conducted with the O&M staff during the assessment process to gather more intimate, day to day knowledge of the facilities. O&M staff provided information regarding installation dates, renovation dates, perceived causes of component decay and rough maintenance schedules. Staff input was entered on an asset by asset basis, where applicable.

CHAPTER II SYSTEM FINDINGS & RECOMMENDATIONS



CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

Information gathered to develop the assessment of this facility is summarized below at the system, component and sub-component level. The asset description, function, condition, and recommendations are presented as a summary at the component level.

Detailed ACI, FCI, Remaining Service Life, issues and recommendations information about each component surveyed is found in the tables presented in the **Appendix B**. The information below describes the components assessed, their function, overall condition, observations, issues, deferred maintenance and O&M recommendations.

The APM was installed in three phases, thus Remaining Service Life is not equal for all similar components. APM equipment for each installation phase is shown below in **Table 2.1**.

APM Equipment	Installation (Yr.)
Terminal B ↔ C	Phase 1 (1999)
Terminal C ↔ D, Maintenance Area	Phase 2 (2005)
Terminal A ↔ B, Maintenance Area (Expansion)	Phase 3 (2010)

Table 2.1 APM Installation Dates

A. AUTOMATIC TRAIN CONTROL (ATC)

1. ASSET DESCRIPTION

Automatic Train Control (ATC) refers to the control systems onboard each APM vehicle. Vehicle ATC consists of three separate subsystems which control door function (ATC1), brake and propulsion (ATC2) and safety (ATC3). The following components and sub-components have been assessed and identified with an ATC system QR label.

System	Comp.	Sub-Comp.	Description
ATC			Automatic Train Control
ATC	XXXX		Vehicle ATC
ATC	XXXX	XXXX	Vehicle ATC1: Door
ATC	XXXX	XXXX	Vehicle ATC2: Brake & Propulsion
ATC	XXXX	XXXX	Vehicle ATC3: Safety

Table 2.2 ATC System QR Label

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

Vehicle ATC components are functioning properly and show no issues upon visual inspection. Vehicle coupler assemblies are worn and complicate re-connection of the power supply between each vehicle.

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Vehicle preventive maintenance tasks that have not been performed at the prescribed frequency are shown in **Table 2.3**. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life. For more detail on these see **Appendix D**, Preventative Maintenance Performance Frequency.

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

Type	Task	Interval
Vehicle	100	2 Days
Vehicle	200	1 Week
Vehicle	300	1 Month
Vehicle	400	3 Months

Table 2.3 Vehicle PMs Not Performed at Prescribed Frequencies

High frequency vehicle errors are summarized in **Table 2.4**. These high frequency errors require troubleshooting by Bombardier. Specific attention is required for Car 15 Vehicle ATC2 (Brake & Propulsion) and the cause of HVAC faults needs to be determined prior to the upcoming high demand (summer) season. For more detail on these errors see the Central Control Log Analysis, **Appendix E**.

Location	High Frequency Error
Car 4	Battery_Charger_Failure
Car 12	Battery_Charger_Failure
Car 3	Crossover_Graphic_Tx_Fail
Car 7	Crossover_Graphic_Tx_Fail
Car 8	Crossover_Graphic_Tx_Fail
Car 7	Loss_Of_Track_Signal
Car 4	HVAC_Failure
Car 10	HVAC_Failure
Car 11	HVAC_Failure
Car 13	HVAC_Failure
Car 16	HVAC_Failure
Car 8	No_Response_From_Veh_Radio
Car 15	Service_Brake_Fail
Car 15	Dynamic_Brakes_Failure
Car 8	Door_Lock_Failure

Table 2.4 High Frequency Vehicle Errors

Vehicle wash preventive maintenance is not being performed at the prescribed frequency as shown in **Table 2.5**.

Type	Task	Interval
Vehicle Wash	7200	1 Week
Vehicle Wash	7300	1 Month

Table 2.5 Vehicle Wash PMs Not Performed at Prescribed Frequencies

Daily preventive maintenance for the vehicle wash (task 7100) is no longer being performed. Research should be performed to verify that this maintenance is no longer needed. Weekly washing of the vehicles (task 7201) is no longer being performed. This is because the vehicle wash needs parts that are no longer available.

Near Term

The following ATC components will exceed their (calculated) Remaining Service Life within the next five (5) years:

- Car #1
- Car #2

Long Term

The following ATC components will not exceed their (calculated) Remaining Service Life within in the next ten years:

- | | |
|--------|---------|
| Car #3 | Car #8 |
| Car #4 | Car #9 |
| Car #5 | Car #10 |
| Car #6 | Car #11 |
| Car #7 | Car #12 |

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

4. OPERATION MAINTENANCE RECOMMENDATIONS

- a) Verify replacement ATC components are readily available, given that the (calculated) Remaining Service Life will expire for most of the vehicle fleet within the next five years.
- b) A coupler gauge should be utilized when connecting vehicle power supplies. Side to side motion should be avoided when disconnecting vehicle power supplies.
- c) The preventive maintenance program used for the IAH APM vehicle fleet is time-based, meaning that maintenance is performed in intervals of days, weeks, months and years. A time-based program uses the fleet average rate of mileage accumulation to determine the time intervals needed for preventive maintenance. Time-based preventive maintenance is convenient because it allows for steady scheduling of work in the shop. A prerequisite for a time-based preventive maintenance program is that vehicles in the fleet must be accumulating mileage evenly, because ultimately the driver for maintenance of nearly all vehicle components is miles traveled rather than the passage of time. If the vehicle preventive maintenance program is time-based and the fleet is not accumulating mileage evenly, then some cars are getting too much maintenance, while others get too little. If cars are getting too much maintenance then labor and parts are being wasted. If cars are getting too little maintenance then failures can occur that reduce system availability, and useful life of the vehicles can be reduced. Mileage records have been analyzed for the APM fleet at IAH as shown in **Table 2.6**. The analysis was performed on a full year of data (calendar year 2014) to discount the inevitable short-term variation in mileage accumulation that all fleets have. The fleet average for 2014 was 124 miles/day/vehicle, but within the fleet there was wide variation. Over the course of 2014, car 9 averaged only 62 miles/day (half of the fleet average), while car 15 averaged 161 miles/day (30% above the fleet average). Car 15 has added miles 2.6 times faster than car 9, which is a massive difference, especially over an entire year. Over the year, car 9 gained about 22,000 miles, while car 15 gained nearly 59,000. The standard deviation for the average miles/day/vehicle is 28, so Car 9 and 15 really aren't outliers, but rather the whole fleet is highly erratic in mileage accumulation.

Vehicle	2014 Accumulation	Average Miles/Day
Car 1	37,162	102
Car 2	35,906	98
Car 3	51,693	142
Car 4	50,386	138
Car 5	51,764	142
Car 6	25,597	70
Car 7	48,333	133
Car 8	47,873	132
Car 9	22,465	62
Car 10	36,254	100
Car 11	53,095	146
Car 12	49,911	137
Car 13	49,439	135
Car 14	51,614	142
Car 15	58,786	161
Car 16	53,575	147

Table 2.6 Mileage Accumulation per Vehicle

Such uneven accumulation of mileage makes a time-based preventive maintenance program severely dysfunctional. Efforts could be made to even out mileage accumulation, but that often proves problematic and unreliable. The most effective and reliable way to address this problem would be to convert the vehicle preventive maintenance program to a mileage-based system. Using mileage-based maintenance, which is the true driver of wear and tear for the vehicles, the best fleet performance will be achieved.

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

B. RAIL (RAIL)

1. ASSET DESCRIPTION

Rail (RAIL) components transmit power and communication signals to and from APM vehicles. The following components have been assessed and identified with a RAIL system QR label.

System	Comp.	Sub-Comp.	Description
RAIL			Rail
RAIL	POWR		Power Rail
RAIL	SGNL		Signal Rail

Table 2.7 RAIL System QR Label

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

Phase 1 (Terminal B ↔ C) RAIL components are inferior to more recent installations.

Oil residue has accumulated on power/signal rail covers at where vehicles frequently queue and stop (station and maintenance areas). The current cleaning procedure is not sufficient.

Components located on the south guideway (B) near Terminal D were not assessed. Access was not available, because power could not be isolated to make the area safe for inspection. Non-assessed items are included in the data set; however ACI information is not populated. Non-assessed items are indicated in the data summary table with a bar code format of "I.B.APM.xxx.??"

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Remove oil residue from rail covers to reduce potential fire hazard.

Near Term

Phase 1 (Terminal B ↔ C) RAIL components will exceed their (calculated) Remaining Service Life within the next five (5) years.

Long Term

Phase 2 (Terminal B ↔ C) and Phase 3 (Terminal A ↔ B) RAIL components will not exceed their (cal-culated) Remaining Service Life within in the next ten (10) years.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Bio-degradable locomotive soap successfully removes oil deposits at other APM installations.

C. STATION (STAT) & STATION EQUIPMENT (SEQ)

1. ASSET DESCRIPTION

Station (STAT) covers station doors and graphics signs. Station Equipment (SEQ) covers equipment communications, the public address system and CCTV. The following components have been assessed and identified with a STAT or SEQ system QR label.

System	Comp.	Sub-Comp.	Description
STAT			Station
STAT	DOOR		Station Doors
STAT	SIGN		Graphic Sign (Internal)
SEQ			Station Equipment
SEQ	PAC		PA Cabinet
SEQ	COMC		Communications Cabinet
SEQ	XXXX		Station CCTV Cabinet

Table 2.8 STAT System QR Label

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

Station doors, graphic information signs, communications cabinets and PA system are in good working order. Portions of the CCTV system are obsolete, but it appears that plans are underway to replace and expand the CCTV system.

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Preventive maintenance for stations that has not been performed at prescribed frequencies is shown in **Table 2.9**. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life. For more detail on these see **Appendix D**.

Type	Task	Interval
Station	4300	1 Month
Station	4400	3 Months

Table 2.9 Station PMs Not Performed at Prescribed Frequencies

Station preventive maintenance no longer being performed is shown in **Table 2.10**. Research should be done to verify that these tasks are no longer needed.

Type	Task	Interval
Station	4100	1 Day
Station	4200	1 Week
Station	4500	6 Months

Table 2.10 Station PMs No Longer Performed

High frequency station errors are shown in **Table 2.11**. These high frequency errors require

troubleshooting by Bombardier. Mechanical issues were not observed for the station doors. Physical position and sensor state should be noted following each station door error to identify the root cause of malfunction. For more detail on these see the Central Control Log Analysis, **Appendix E**.

Location	High Frequency Error
North A	Unscheduled_Stn_Door
North D	Unscheduled_Stn_Door
South A	Unscheduled_Stn_Door
South D	Unscheduled_Stn_Door
North A	PA_Failure
North D	PA_Failure
South D	PA_Failure
Zone 1	PA_Failure
Zone 3	PA_Failure
North C Berth 2	Doors_Did_Not_Open
South A Berth 2	Doors_Did_Not_Open
South C Berth 1	Doors_Did_Not_Open

Table 2.11 High Frequency Station Errors

Near Term

Phase 1 (Terminal B ↔ C) STAT components will exceed their (calculated) Remaining Service Life within the next five years.

Long Term

Phase 2 (Terminal B ↔ C) and Phase 3 (Terminal A ↔ B) STAT components will exceed their (calculated) Remaining Service Life within in the next ten years.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

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D. SWITCH (SWCH)

1. ASSET DESCRIPTION

Switch (SWCH) components allow transfer of APM vehicles between guideways. The following components have been assessed and identified with a SWCH system QR label.

System	Comp.	Sub-Comp.	Description
SWCH			Switch
SWCH	HYD		Hydraulics
SWCH	MECH		Mechanical/Moving
SWCH	SLCC		Relay Logic/Control

Table 2.12 SWCH System QR Label

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

Insufficient clearance was observed between multiple switches and the adjacent fixed rails. Rail gap discrepancies create issues during extreme periods of extreme temperature due to thermal expansion of the rail material.

Components located on the South Guideway (B) near Terminal D were not assessed. Access was not available, because power could not be isolated to make the area safe for inspection. Non-assessed items are included in the data set, however ACI information is not populated. Non-assessed items are indicated in the data summary table with a bar code format of "I.B.APM.xxx.??"

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Rectify rail gap deficiencies noted at:

- o SW11
- o SW14
- o SW22
- o SW24

Switch preventive maintenance not being performed at the prescribed frequency is shown in **Table 2.13**. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life. For more detail see **Appendix D**.

Type	Task	Interval
Switch	1200	1 Week
Switch	1300	1 Month
Switch	1400	3 Months
Switch	1500	6 Months

Table 2.13 Switch PMs Not Performed at Prescribed Frequencies

High frequency switch errors are shown in **Table 2.14**. These high frequency errors require troubleshooting by Bombardier. Hydraulic leaks were not observed during the wayside assessment. Increase hydraulic cabinet inspections during extreme temperatures and verify all fluid sensors are functioning properly. For more detail on these see the Central Control Log Analysis, **Appendix E**.

Location	High Frequency Error
Switch 11	SW_Logic_Fluid_Level
Switch 12	SW_Logic_Fluid_Level
Switch 34	Switch_Failed_To_Respond

Table 2.14 High Frequency Switch Errors

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Near Term

Phase 1 (Terminal B ↔ C) SWCH mechanical and hydraulic components will exceed their (calculated) Remaining Service Life within the next five years.

Long Term

Phase 2 (Terminal B ↔ C) SWCH mechanical and hydraulic components will exceed their (calculated) Remaining Service Life within in the next ten years.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Rail fit must be calculated at the time of installation based on the current ambient temperature and anticipated extreme temperatures.

E. TRACK BLOCK (TBLK)

1. ASSET DESCRIPTION

Track Block (TBLK) refers to the running surfaces that physically align APM vehicles while in motion. The guideway support structure is not included in this assessment however, the structure was recently assessed by a separate structural consultant. Each Track Block has been assessed and identified with a TBLK QR label. **Appendix A** contains additional detail including service life and unit cost assumptions.

2. CONDITION SUMMARY

Equipment on the south guideway near the maintenance area connection is in poor condition. Rail components between SW41 and SW42 are wearing on a consistent unique bias. TBLK 228 and TBLK 230 appear to be misaligned from settlement or other structural issues.

Components located on the south guideway (B) near Terminal D were not assessed. Access was not available, because power could not be isolated to make the area safe for inspection. Non-assessed

items are included in the data set, however ACI information is not populated. Non-assessed items are indicated in the data summary table with a bar code format of "I.B.APM.xxx.?"

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Cross-reference recent APM structural inspection to identify the exact cause of the misaligned track blocks on the South guide way near the maintenance area connection. Reference data set comments for TBLK 228 and TBLK 230.

Further investigation of track block misalignment is recommended if issue is not identified in the recent structural assesment of guideway by others.

Near Term

None.

Long Term

None.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Temporarily remedy track block misalignment by adjusting rail position with shims beneath rail tree supports. Consult Bombardier engineering before shims are installed.

F. WAYSIDE EQUIPMENT (WEQ)

1. ASSET DESCRIPTION

Wayside Equipment (WEQ) consists of guideway control devices, including sensors, antennas, and status indicators. The following components and sub-components have been assessed and identified

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with a WEQ system QR label.

System	Comp.	Sub-Comp.	Description
WEQ			Wayside Equipment
WEQ	GSC		Guideway Switches Controls
WEQ	GSC	TSI	Traffic Signal Indicators
WEQ	TRPS		Trip Stop
WEQ	RPI		Rail Power Indicators
WEQ	ANTP		Antennas per Sta Platform
WEQ	ANTP	PSTP	Program Stop
WEQ	XXXX		Brush Counters
WEQ	XXXX		Flat Tire Indicator

Table 2.15 WEQ System QR Label

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

All WEQ components are functioning properly and show no visual issues. WEQ devices are typically located at or near terminal stations and are less exposed to environmental deterioration.

Components located on the South Guideway (B) near Terminal D were not assessed. Access was not available, because power could not be isolated to make the area safe for inspection. Non-assessed items are included in the data set however, ACI information is not populated. Non-assessed items are indicated in the data summary table with a bar code format of "I.B.APM.xxx.??"

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Guideway preventive maintenance tasks that haven't been performed at the prescribed frequency are shown in **Table 2.16**. Preventive maintenance needs to be performed at prescribed

frequencies to preserve performance and useful life. For more detail see **Appendix D**.

Type	Task	Interval
Guideway	2300	1 Month
Guideway	2500	6 Months

Table 2.16 Guideway PMs Not Performed at Prescribed Frequencies

Triennial guideway preventive maintenance (task 2801) is no longer being performed. Further investigation should be done to verify that this work is not needed.

High frequency wayside equipment errors are shown in **Table 2.17**. These high frequency errors require troubleshooting by Bombardier. The interaction of the Terminal D North brush counter and Car #11 yields significantly more errors than other brush counter / car combinations. For more detail on these see the Central Control Log Analysis, **Appendix E**.

Location	High Frequency Error
D245	VTE_Rollback
North D	Brush_Count_Wrong
Train 211	Brush_Count_Wrong

Table 2.17 High Frequency Wayside Equipment Errors

Near Term

Phase 1 (Terminal B ↔ C) brush counters and flat tire indicators will exceed their (calculated) Remaining Service Life within the next five years.

Long Term

Phase 2 (Terminal B ↔ C) brush counters will exceed their (calculated) Remaining Service Life within in the next ten years.

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4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

G. POWER DISTRIBUTION SYSTEM (PDS)

1. ASSET DESCRIPTION

The Power Distribution System (PDS) transforms and distributes electrical power to the APM guideway. Convenience outlet and lighting power distribution is not part of the APM PDS. The following components and sub-components have been assessed and identified with a PDS system QR label.

System	Comp.	Sub-Comp.	Description
PDS			Power Distribution System
PDS	15KV	15SG	15Kv Switchgear
PDS	15KV	15DS	15Kv Motor Operated Disconnect Switches
PDS	XFMR		12.47 Kv-600v Transformer
PDS	LV		Substation 600v Equipment
PDS	LV	HARF	Harmonic Filters
PDS	LV	PFCC	Power Factor Correction Capacitors
PDS	GRND		Ground Switches
PDS	XXXX		PDS PLCs

Table 2.18 PDS System QR Label

Reference **Appendix A** for detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

PDS equipment which isolates the South Guideway near Terminal D is not functioning properly. The

malfunction prevents lock out tag out of the area, thus the exact malfunction cannot be safely identified. Bombardier reports the issue must be rectified by a Bombardier employee who is on extended medical leave.

All assessed PDS equipment is in good working order and still has many years of design life remaining.

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Rectify PDS isolation issue preventing safe assessment of the South guideway near Terminal D.

Preventive maintenance for the power distribution system has not been performed as prescribed for the monthly task, as shown in **Table 2.19**. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life. For more detail on these see the preventive maintenance **Appendix D**.

Type	Task	Interval
PDS	3300	1 Month

Table 2.19 PDS PMs Not Performed at Prescribed Frequency

The harmonic filters are showing high occurrences of faults, as shown in **Table 2.20**. These high frequency errors require troubleshooting by Bombardier. The cause of PDS harmonic filter faults is not apparent via visual inspection. Specialized equipment and training are required to identify the cause of harmonic filter issues and any potential implications to APM operations. For more detail on these see the Central Control Log Analysis, **Appendix E**.

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Location	High Frequency Error
1 North	Harm_Filt_Not_Operating
1 South	Harm_Filt_Not_Operating
2 North	Harm_Filt_Not_Operating
2 South	Harm_Filt_Not_Operating
3 North	Harmonic_Filter_Fault
3 South	Harmonic_Filter_Fault

Table 2.20 PDS High Frequency Faults

Near Term

None.

Long Term

None.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Evaluate alternative options to rectify PDS isolation issue and schedule remaining assessment activities.

H. UNINTERRUPTABLE POWER SUPPLIES (UPS)

1. ASSET DESCRIPTION

Uninterruptable Power Supplies (UPS) are in place to support the APM operation if electrical power is lost. The uninterruptable power supply for each station was assessed and identified with a UPS QR label. Reference **Appendix A** for detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

The uninterruptible power supplies are generally in good condition. They have install dates varying from 2004 to 2015, so the oldest unit could be approaching its time to be replaced while others are brand new.

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

The UPS at ATO D needs to have the air filter replaced.

Daily UPS preventive maintenance (task 3100) is no longer being performed. Research should be done to establish that this work is not needed.

The maintenance facility UPS is experiencing a high frequency of errors as shown in **Table 2.21**. These high frequency errors require troubleshooting by Bombardier. The maintenance facility UPS has a relatively high frequency of "UPS_Load_On_Bypass" and "UPS_Not_Normal" errors. Verify the maintenance facility UPS is dedicated to APM controls and is not utilized for auxiliary functions, i.e. administrative workstations, internet devices, coffee makers, etc. For more detail on these see the Central Control Log Analysis, **Appendix E**.

Location	High Frequency Error
Maint. Facility	UPS_Alarm

Table 2.21 UPS High Frequency Errors

Near Term

None.

Long Term

None.

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

I. AUTOMATIC TRAIN PROTECTION (ATP)

1. ASSET DESCRIPTION

Automatic Train Protection (ATP) monitors the status of the APM system to ensure conditions are safe before authorizing movement of trains. The following components have been assessed and identified with an ATP system QR label.

System	Comp.	Sub-Comp.	Description
ATP			Automatic Train Protection
ATP	COMC		CityFlo 550 Computer Cab
ATP	ELMC		CityFlo 550 Element Cab, Region B
ATP	TRMC		CityFlo 550 Termination Cab
ATP	TRC		Tx/Rx Cabinet
ATP	TRTC		Tx/Rx Termination Cabinet
ATP	XXXX		CityFlo 550 CPU

Table 2.22 ATP System QR Label

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

Automatic train protection equipment is of different ages corresponding to the three phases of APM build out. Although some of the equipment has reached its design life, it is all in good working order. Some of the automatic train protection equipment will need replacement when central control is

moved in order to maintain compatibility.

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

CityFlo 550 Element Cab and Computer Cab equipment have exceeded their service life and should be replaced.

Near Term

None.

Long Term

The remaining equipment has 10+ years of remaining service life. No issues were observed.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

J. AUTOMATIC TRAIN OPERATION (ATO)

1. ASSET DESCRIPTION

The Automatic Train Operation (ATO) system is focused on station controls. The following components and sub-components have been assessed and identified with an ATO system QR label.

System	Comp.	Sub-Comp.	Description
ATO			Automatic Train Operation
ATO	ATO		ATO Cabinet
ATO	ATOT		ATO Terminal Cabinet

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

Table 2.23 ATO System QR Label

Appendix A contains detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

Automatic train operation equipment is of different ages corresponding to the three phases of APM build out. Although some of the equipment has reached its design life, it is all in good working order. Some of the automatic train operation equipment will need replacement when central control is moved in order to maintain compatibility.

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

The ATO cabinets have exceeded their service life and should be replaced.

Near Term

None.

Long Term

None.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

K. CENTRAL CONTROL (CC)

1. ASSET DESCRIPTION

APM personnel can monitor, supervise and control the APM from Central Control (CC). The following components and sub-components have been assessed and identified with a CC system QR label.

System	Comp.	Sub-Comp.	Description
CC			Central Control
CC	CCCB		Central Computer Cab
CC	CCCB	OHMN	Overhead Monitor CPU w/ VGA Booster
CC	OHD		Overhead Displays
CC	CTCN		Central Console
CC	MMIP		MMI Panel
CC	MNCM		Maintenance Computer
CC	XXXX		CityFlo 550 Monitoring System
CC	XXXX		Communications Cabinet
CC	XXXX		Central CCTV cabinet

Table 2.24 CC System QR Label

Reference **Appendix A** for detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

The central control equipment is in good working order, but most of it has reached its design life. Central control will possibly be moved in the next few years, due to remodeling of Terminal B. In order to move central control the existing equipment will need to remain in use while equipment for the new central control is installed and tested. New central control equipment would be required. This new set of central control equipment will need to be of a new generation due to obsolescence of the existing equipment.

CHAPTER II - SYSTEM FINDINGS & RECOMMENDATIONS

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

Central Control equipment has exceeded its useful service life and should be replaced when it is relocated. Preventive maintenance in central control that has not been performed at the prescribed frequency is shown in **Table 2.25**. Preventive maintenance needs to be performed at prescribed frequencies to preserve performance and useful life. For more detail on these see the preventive maintenance **Appendix D**.

Type	Task	Interval
Central Control	5200	1 Week
Central Control	5300	1 Month
Central Control	5400	3 Months

Table 2.25 Central Control PMs Not Performed at Prescribed Frequency

Near Term

None.

Long Term

None.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

L. NETWORK (NTWK)

1. ASSET DESCRIPTION

The Network (NTWK) system covers the fiber optic network used for communication between elements of the APM. The following component has been assessed and identified with a NTWK system

QR label.

System	Comp.	Sub-Comp.	Description
NTWK			Network
NTWK	FONC		Fiber Optic Network Connections

Table 2.26 NTWK System QR Label

Reference **Appendix A** for detailed assessment information including QR label location, service life and unit cost assumptions.

2. CONDITION SUMMARY

The fiber optic network connections are in good working order, but have exceed the recommended service life. Fiber optic network connections will need to be reconfigured and should be replaced (with current technology) as part of the proposed central control relocation project

3. DEFERRED MAINTENANCE OBSERVATIONS & RECOMMENDATIONS

Priority

NTWK fiber optic network connections have exceeded their (calculated) Remaining Service Life.

Near Term

None.

Long Term

None.

4. OPERATIONS & MAINTENANCE RECOMMENDATIONS

Equipment deficiencies were not observed during the assessment. HAS/Bombardier preventive maintenance records comply with O&M recommendations.

APPENDIX A
SERVICE LIFE REFERENCES



APPENDIX A - SERVICE LIFE REFERENCE

System	Comp.	Sub-Comp.	Description	QR Location	Service Life (Yr.)	Replacement Cost (Typ.)	
WEQ			Wayside Equipment				
WEQ	GSC		Guideway Switches Controls	N/A	N/A	N/A	
WEQ	GSC	TSI	Traffic Signal Indicators	Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	30	\$ 5,000	Ea.
WEQ	TRPS		Trip Stop	Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	30	\$ 5,000	Ea.
WEQ	RPI		Rail Power Indicators	Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	30	\$ 5,000	Ea.
WEQ	ANTP		Antennas per Sta Platform	Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	30	\$ 5,000	Ea.
WEQ	ANTP	PSTP	Program Stop	Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	30	\$ 34	Ft.
WEQ	XXXX		Brush Counters	Wayside, brush counter location, emergency egress tread, vertical surface, towards catwalk.	20	\$ 5,000	Ea.
WEQ	XXXX		Flat Tire Indicator	Wayside, Terminal B, station wall, exterior, vertical surface, adjacent Bombardier access door.	20	\$ 5,000	Ea.
PDS			Power Distribution System				
PDS	15KV	15SG	15Kv Switchgear	On Component / Enclosure	50	\$ 350,000	Ea.
PDS	15KV	15DS	15Kv Motor Operated Disconnect Switches	On Component / Enclosure	50	\$ 25,000	Ea.
PDS	XFMR		12.47 Kv-600v Transformer	On Component / Enclosure	50	\$ 500,000	Ea.
PDS	LV		Substation 600v Equipment	On Component / Enclosure	50	\$ 300,000	Ea.
PDS	LV	HARF	Harmonic Filters	On Component / Enclosure	50	\$ 100,000	Ea.
PDS	LV	PFCC	Power Factor Correction Capacitors	On Component / Enclosure	50	\$ 100,000	Ea.
PDS	GRND		Ground Switches	Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	30	\$ 29,522	Ea.
PDS	XXXX		PDS PLCs	On Component / Enclosure	20	\$ 200,000	Ea.
UPS			Uninterruptable Power Supplies				
				On Component / Enclosure	20	\$ 50,000	Ea.
ATP			Automatic Train Protection				
ATP	COMC		CityFlo 550 Computer Cab	On Component / Enclosure	15	\$ 2,000,000	Ea.
ATP	ELMC		CityFlo 550 Element Cab, Region B	On Component / Enclosure	15	\$ 1,000,000	Ea.
ATP	TRMC		CityFlo 550 Termination Cab	On Component / Enclosure	50	\$ 250,000	Ea.
ATP	TRC		Tx/Rx Cabinet	On Component / Enclosure	30	\$ 500,000	Ea.
ATP	TRTC		Tx/Rx Termination Cabinet	On Component / Enclosure	50	\$ 250,000	Ea.
ATP	XXXX		CityFlo 550 CPU	On Component / Enclosure	15	\$ 2,000,000	Ea.
ATO			Automatic Train Operation				
ATO	ATO		ATO Cabinet	On Component / Enclosure	15	\$ 1,000,000	Ea.
ATO	ATOT		ATO Terminal Cabinet	On Component / Enclosure	50	\$ 25,000	Ea.
CC			Central Control				
CC	CCCB		Central Computer Cab	On Component / Enclosure	15	\$ 2,000,000	Ea.
CC	CCCB	OHMN	Overhead Monitor CPU w/ VGA Booster	On Component / Enclosure	15	\$ 1,000,000	Ea.
CC	OHD		Overhead Displays	On Component / Enclosure	5	\$ 10,000	Ea.
CC	CTCN		Central Console	On Component / Enclosure	15	\$ 500,000	Ea.
CC	MMIP		MMI Panel	On Component / Enclosure	15	\$ 200,000	Ea.
CC	MNCM		Maintenance Computer	On Component / Enclosure	20	\$ 50,000	Ea.
CC	XXXX		CityFlo 550 Monitoring System	On Component / Enclosure	15	\$ 250,000	Ea.
CC	XXXX		Communications Cabinet	On Component / Enclosure	20	\$ 100,000	Ea.
CC	XXXX		Central CCTV cabinet	On Component / Enclosure	10	\$ 500,000	Ea.
NTWK			Network				
NTWK	FONC		Fiber Optic Network Connections	On Component / Enclosure	15	\$ 100,000	Ea.

APPENDIX A - SERVICE LIFE REFERENCE

System	Comp.	Sub-Comp.	Description	QR Location	Service Life (Yr.)	Replacement Cost (Typ.)	
WEQ							
Wayside Equipment							
WEQ	GSC		Guideway Switches Controls	N/A	N/A	N/A	
WEQ	GSC	TSI	Traffic Signal Indicators	Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	30	\$ 5,000	Ea.
WEQ	TRPS		Trip Stop	Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	30	\$ 5,000	Ea.
WEQ	RPI		Rail Power Indicators	Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	30	\$ 5,000	Ea.
WEQ	ANTP		Antennas per Sta Platform	Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	30	\$ 5,000	Ea.
WEQ	ANTP	PSTP	Program Stop	Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	30	\$ 34	Ft.
WEQ	XXXX		Brush Counters	Wayside, brush counter location, emergency egress tread, vertical surface, towards catwalk.	20	\$ 5,000	Ea.
WEQ	XXXX		Flat Tire Indicator	Wayside, Terminal B, station wall, exterior, vertical surface, adjacent Bombardier access door.	20	\$ 5,000	Ea.
PDS							
Power Distribution System							
PDS	15KV	15SG	15Kv Switchgear	On Component / Enclosure	50	\$ 350,000	Ea.
PDS	15KV	15DS	15Kv Motor Operated Disconnect Switches	On Component / Enclosure	50	\$ 25,000	Ea.
PDS	XFMR		12.47 Kv-600v Transformer	On Component / Enclosure	50	\$ 500,000	Ea.
PDS	LV		Substation 600v Equipment	On Component / Enclosure	50	\$ 300,000	Ea.
PDS	LV	HARF	Harmonic Filters	On Component / Enclosure	50	\$ 100,000	Ea.
PDS	LV	PFCC	Power Factor Correction Capacitors	On Component / Enclosure	50	\$ 100,000	Ea.
PDS	GRND		Ground Switches	Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	30	\$ 29,522	Ea.
PDS	XXXX		PDS PLCs	On Component / Enclosure	20	\$ 200,000	Ea.
UPS							
Uninterruptable Power Supplies							
				On Component / Enclosure	20	\$ 50,000	Ea.
ATP							
Automatic Train Protection							
ATP	COMC		CityFlo 550 Computer Cab	On Component / Enclosure	15	\$ 2,000,000	Ea.
ATP	ELMC		CityFlo 550 Element Cab, Region B	On Component / Enclosure	15	\$ 1,000,000	Ea.
ATP	TRMC		CityFlo 550 Termination Cab	On Component / Enclosure	50	\$ 250,000	Ea.
ATP	TRC		Tx/Rx Cabinet	On Component / Enclosure	30	\$ 500,000	Ea.
ATP	TRTC		Tx/Rx Termination Cabinet	On Component / Enclosure	50	\$ 250,000	Ea.
ATP	XXXX		CityFlo 550 CPU	On Component / Enclosure	15	\$ 2,000,000	Ea.
ATO							
Automatic Train Operation							
ATO	ATO		ATO Cabinet	On Component / Enclosure	15	\$ 1,000,000	Ea.
ATO	ATOT		ATO Terminal Cabinet	On Component / Enclosure	50	\$ 25,000	Ea.
CC							
Central Control							
CC	CCCB		Central Computer Cab	On Component / Enclosure	15	\$ 2,000,000	Ea.
CC	CCCB	OHMN	Overhead Monitor CPU w/ VGA Booster	On Component / Enclosure	15	\$ 1,000,000	Ea.
CC	OHD		Overhead Displays	On Component / Enclosure	5	\$ 10,000	Ea.
CC	CTCN		Central Console	On Component / Enclosure	15	\$ 500,000	Ea.
CC	MMIP		MMI Panel	On Component / Enclosure	15	\$ 200,000	Ea.
CC	MNCM		Maintenance Computer	On Component / Enclosure	20	\$ 50,000	Ea.
CC	XXXX		CityFlo 550 Monitoring System	On Component / Enclosure	15	\$ 250,000	Ea.
CC	XXXX		Communications Cabinet	On Component / Enclosure	20	\$ 100,000	Ea.
CC	XXXX		Central CCTV cabinet	On Component / Enclosure	10	\$ 500,000	Ea.
NTWK							
Network							
NTWK	FONC		Fiber Optic Network Connections	On Component / Enclosure	15	\$ 100,000	Ea.

APPENDIX B
ASSET SUMMARY TABLES



APPENDIX B - ASSET SUMMARY TABLES - ATC

System_List	System	Component	Component_Description	Sub_Component_List	SubComponent	Sub_Component_Description	BarCode	Manufacturer	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintNeed	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0084	Bombardier	Automatic Train Control	1999	20	4	400,000	Ref. "Comments" section	400,000	1	3	Near end of service life	Vehicle #1.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	Replace	Priority
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0085	Bombardier	Automatic Train Control	1999	20	4	400,000	Ref. "Comments" section	400,000	1	3	Near end of service life	Vehicle #1.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	Replace	Priority
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0086	Bombardier	Automatic Train Control	1999	20	4	300,000	Ref. "Comments" section	300,000	1	3	Near end of service life	Vehicle #1.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	Replace	Priority
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0088	Bombardier	Automatic Train Control	1999	20	4	400,000	Ref. "Comments" section	400,000	1	3	Near end of service life	Vehicle #2.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	Replace	Priority
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0089	Bombardier	Automatic Train Control	1999	20	4	400,000	Ref. "Comments" section	400,000	1	3	Near end of service life	Vehicle #2.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	Replace	Priority
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0090	Bombardier	Automatic Train Control	1999	20	4	300,000	Ref. "Comments" section	300,000	1	3	Near end of service life	Vehicle #2.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	Replace	Priority
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0076	Bombardier	Automatic Train Control	2002	20	7	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #4.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Near Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0077	Bombardier	Automatic Train Control	2002	20	7	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #4.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Near Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0078	Bombardier	Automatic Train Control	2002	20	7	300,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #4.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Near Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0056	Bombardier	Automatic Train Control	2002	20	7	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #8.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Near Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0057	Bombardier	Automatic Train Control	2002	20	7	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #8.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Near Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0058	Bombardier	Automatic Train Control	2002	20	7	300,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #8.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Near Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0083	Bombardier	Automatic Train Control	1999	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #1.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0087	Bombardier	Automatic Train Control	1999	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #2.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0103	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #3.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0075	Bombardier	Automatic Train Control	2002	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #4.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0079	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #5.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0067	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #6.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0107	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #7.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0055	Bombardier	Automatic Train Control	2002	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #8.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0099	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #9.QR Loc. = N/A	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - ATC

System_List	System	Component	Component_Descriptio	Sub_Compo	SubCompon	Sub_Compo	BarCode	Manufactur	SysFunction	YrInstalled	DesignLife	RemainingY	ReplaceCos	MaintNeede	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning
				ent_List	ent	ent_Descri		er	n			ears	t	d							Category
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0095	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #10.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0051	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #11.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0063	Bombardier	Automatic Train Control	2004	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #12.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0071	Bombardier	Automatic Train Control	2011	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #13.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0059	Bombardier	Automatic Train Control	2011	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #14.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0011	Bombardier	Automatic Train Control	2011	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #15.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	N/A	N/A	N/A	I.B.APM.ATC 0091	Bombardier	Automatic Train Control	2011	N/A	N/A	N/A	Ref. "Comments" section	N/A	N/A	N/A	No issue.	Vehicle #16.QR Loc. = N/A	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0104	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #3.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0105	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #3.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0106	Bombardier	Automatic Train Control	2004	20	9	300,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #3.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0080	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #5.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0081	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #5.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0082	Bombardier	Automatic Train Control	2004	20	9	300,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #5.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0068	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #6.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0069	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #6.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0070	Bombardier	Automatic Train Control	2004	20	9	300,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #6.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0108	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #7.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0109	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #7.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC3: Safety	XXXX	Vehicle ATC3: Safety	I.B.APM.ATC 0110	Bombardier	Automatic Train Control	2004	20	9	300,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #7.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC1: Door	XXXX	Vehicle ATC1: Door	I.B.APM.ATC 0100	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #9.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term
Automatic Train Control	ATC	XXXX	Vehicle ATC	Vehicle ATC2: Brake & Propulsion	XXXX	Vehicle ATC2: Brake & Propulsion	I.B.APM.ATC 0101	Bombardier	Automatic Train Control	2004	20	9	400,000	Ref. "Comments" section	0	0	5	No issue.	Vehicle #9.QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - ATC

System_List	SystemC	Component	Component_Description	Sub_Component_List	SubComponent	Sub_Component_Description	BarcodeM	Manufacturer	SysFunction	YrInstalledD	DesignLifeR	RemainingY	ReplaceCos	MaintNeede	MaintCostF	CI	ACIC	CommentsD	Description	RecommendationsP	Planning Category
Automatic Train Control	ATC	XXXXV	Vehicle ATC	Vehicle ATC3: Safety	XXXXV	Vehicle ATC3: Safety	I.B.APM.ATC 0094	Bombardier	Automatic Train Control	20112	01	6	300,000	Ref. "Comments" section	007N			No issue.	Vehicle #16 QR Loc. = Vehicle, manual operation control panel, interior, access key required.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0041	N/A	1111	1155	122A	Bombardier	1C43805G01	Rail	1999	20	4	17,567	17,567	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0043	N/A	1155	1238	122B	Bombardier	1C43805G01	Rail	1999	20	4	33,138	33,138	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0009	N/A	1238	1352.5	124	Bombardier	1C43805G01	Rail	1999	20	4	45,715	45,715	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0008	N/A	1352.5	1402.5	125	Bombardier	1C43805G01	Rail	1999	20	4	19,963	19,963	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0018	N/A	1402.5	1655	126	Bombardier	1C43805G01	Rail	1999	20	4	100,812	100,812	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0007	A1	1655	2049	128	Bombardier	1C43805G01	Rail	1999	20	4	157,306	157,306	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0004	A2	2049	2412	130	Bombardier	1C43805G01	Rail	1999	20	4	144,929	144,929	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0016	N/A	2412	2779	132	Bombardier	1C43805G01	Rail	1999	20	4	146,527	146,527	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0013	N/A	2779	3084	134	Bombardier	1C43805G01	Rail	1999	20	4	121,773	121,773	1	3	Rail ends damaged at power rail isolation gap.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace damaged rail ends. Verify vehicle shoe interface (fit, seating, alignment, etc.) after rail end replacement.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0003	N/A	3084	3172	136	Bombardier	1C43805G01	Rail	1999	20	4	35,134	35,134	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0081	N/A	1111	1155	222A	Bombardier	1C43805G01	Rail	1999	20	4	17,567	17,567	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0083	N/A	1155	1199	222B	Bombardier	1C43805G01	Rail	1999	20	4	17,567	17,567	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0085	N/A	1199	1370	224	Bombardier	1C43805G01	Rail	1999	20	4	68,273	68,273	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0087	N/A	1370	1545	226	Bombardier	1C43805G01	Rail	1999	20	4	69,870	69,870	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0089	B1	1545	1789	228	Bombardier	1C43805G01	Rail	1999	20	4	97,418	97,418	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0091	N/A	1789	2101	230	Bombardier	1C43805G01	Rail	1999	20	4	124,568	124,568	1	3	Inconsistent wear (accelerated on upper portion) of power rail surfaces near pivot switch SW41.	2 Pics @ SW41. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Verify alignment of guideway with respect to other track blocks. Cross-reference with structural assessment findings (by others).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0093	B2	2101	2470	232	Bombardier	1C43805G01	Rail	1999	20	4	147,325	147,325	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0095	B3	2470	2740	234	Bombardier	1C43805G01	Rail	1999	20	4	107,799	107,799	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0097	B3, B4	2740	3088	236	Bombardier	1C43805G01	Rail	1999	20	4	138,941	138,941	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0099	N/A	3088	3176	238	Bombardier	1C43805G01	Rail	1999	20	4	35,134	35,134	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	B8	11092.91	11210.12	245A	Bombardier	1C43805G01	Rail	1999	20	4	46,797	46,797	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0039	N/A	TBD	TBD	120	Bombardier	1C43805G01	Rail	1999	20	4	80,649	80,649	1	3	Near end of service life	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0079	N/A	TBD	TBD	220	Bombardier	1C43805G01	Rail	1999	20	4	80,649	80,649	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0042	N/A	1111	1155	122A	Bombardier	1C43805G06	Rail	1999	20	4	15,924	15,924	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0044	N/A	1155	1238	122B	Bombardier	1C43805G06	Rail	1999	20	4	30,039	30,039	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0010	N/A	1238	1352.5	124	Bombardier	1C43805G06	Rail	1999	20	4	41,439	41,439	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0020	N/A	1352.5	1402.5	125	Bombardier	1C43805G06	Rail	1999	20	4	18,096	18,096	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0019	N/A	1402.5	1655	126	Bombardier	1C43805G06	Rail	1999	20	4	91,382	91,382	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0008	A1	1655	2049	128	Bombardier	1C43805G06	Rail	1999	20	4	142,593	142,593	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0005	A2	2049	2412	130	Bombardier	1C43805G06	Rail	1999	20	4	131,373	131,373	1	3	Excessive wear at expansion joint.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace worn rail surfaces. Verify vehicle shoe interface (fit, seating, alignment, etc.) after expansion joint repair.	Priority

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0017	N/A	2412	2779	132	Bombardier	1C43805G06	Rail	1999	20	4	132,821	132,821	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0014	N/A	2779	3084	134	Bombardier	1C43805G06	Rail	1999	20	4	110,383	110,383	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0015	N/A	3084	3172	136	Bombardier	1C43805G06	Rail	1999	20	4	31,848	31,848	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0082	N/A	1111	1155	222A	Bombardier	1C43805G06	Rail	1999	20	4	15,924	15,924	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0084	N/A	1155	1199	222B	Bombardier	1C43805G06	Rail	1999	20	4	15,924	15,924	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0086	N/A	1199	1370	224	Bombardier	1C43805G06	Rail	1999	20	4	61,887	61,887	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0088	N/A	1370	1545	226	Bombardier	1C43805G06	Rail	1999	20	4	63,334	63,334	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0090	B1	1545	1789	228	Bombardier	1C43805G06	Rail	1999	20	4	88,306	88,306	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0092	N/A	1789	2101	230	Bombardier	1C43805G06	Rail	1999	20	4	112,916	112,916	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0094	B2	2101	2470	232	Bombardier	1C43805G06	Rail	1999	20	4	133,545	133,545	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAI L0096	B3	2470	2740	234	Bombardier	1C43805G06	Rail	1999	20	4	97,716	97,716	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0098	B3, B4	2740	3088	236	Bombardier	1C43805G06	Rail	1999	20	4	125,945	125,945	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0100	N/A	3088	3176	238	Bombardier	1C43805G06	Rail	1999	20	4	31,848	31,848	1	3	Oil residue on power / signal rail cover. Near end of service life	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard). Replace	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	B8	11092.91	11210.12	245A	Bombardier	1C43805G06	Rail	1999	20	4	42,420	42,420	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0040	N/A	TBD	TBD	120	Bombardier	1C43805G06	Rail	1999	20	4	73,106	73,106	1	3	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0080	N/A	TBD	TBD	220	Bombardier	1C43805G06	Rail	1999	20	4	73,106	73,106	1	3	Galvanic corrosion (spotting) of rail surfaces.	Galvanic corrosion results from electrical contact between dissimilar metals in an electrolyte solution (water). Galvanic corrosion is inevitable for any exterior APM. Local weather conditions (i.e. high precipitation and humidity) accelerate galvanic corrosion. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Replace corroded rail section(s). Note, Phase 1 (Term. B/C) rail sections will exceed recommended service life within the next (5) years.	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0059	N/A	200.983	546.983	140	Bombardier	1C43805G01	Rail	2005	20	10	138,142	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0057	A3	546.983	891.983	142	Bombardier	1C43805G01	Rail	2005	20	10	137,743	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0055	A4	891.983	1235.32	144	Bombardier	1C43805G01	Rail	2005	20	10	137,079	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0053	N/A	1235.32	1380.33	145	Bombardier	1C43805G01	Rail	2005	20	10	57,896	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0051	N/A	1380.33	1530.29	146	Bombardier	1C43805G01	Rail	2005	20	10	59,872	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0049	N/A	1530.29	1706.59	148	Bombardier	1C43805G01	Rail	2005	20	10	70,389	3,519	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0047	N/A	1706.59	1761.59	149	Bombardier	1C43805G01	Rail	2005	20	10	21,959	1,098	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0045	N/A	1761.59	1788.82	150	Bombardier	1C43805G01	Rail	2005	20	10	10,872	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	B6	10214.96	10560.96	242	Bombardier	1C43805G01	Rail	2005	20	10	138,142	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	B7	10560.96	10821.91	244	Bombardier	1C43805G01	Rail	2005	20	10	104,186	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	10821.91	11092.91	245	Bombardier	1C43805G01	Rail	2005	20	10	108,198	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	11210.12	11441.48	246	Bombardier	1C43805G01	Rail	2005	20	10	92,372	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	11441.48	11543.54	248	Bombardier	1C43805G01	Rail	2005	20	10	40,748	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

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System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	11543.54	11645.54	249	Bombardier	1C43805G01	Rail	2005	20	10	40,724	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	11645.54	11713.54	250	Bombardier	1C43805G01	Rail	2005	20	10	27,149	1,357	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	11713.54	11768.54	251	Bombardier	1C43805G01	Rail	2005	20	10	21,959	1,098	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	11768.54	11795.54	252	Bombardier	1C43805G01	Rail	2005	20	10	10,780	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	14037	14081	1C11	Bombardier	1C43805G01	Rail	2005	20	10	17,567	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	14081	14123	1C12	Bombardier	1C43805G01	Rail	2005	20	10	16,769	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	14123	14166.43	1C13	Bombardier	1C43805G01	Rail	2005	20	10	17,340	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	14166.43	14222	1C14	Bombardier	1C43805G01	Rail	2005	20	10	22,187	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	TBD	14222	14320.63	1C15	Bombardier	1C43805G01	Rail	2005	20	10	39,379	1,969	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	15037	15112.67	1C25	Bombardier	1C43805G01	Rail	2005	20	10	30,212	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	15112.67	15177.071	1C24	Bombardier	1C43805G01	Rail	2005	20	10	25,712	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	15177.071	15217.071	1C23	Bombardier	1C43805G01	Rail	2005	20	10	15,970	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	15267.071	15430.197	1C21	Bombardier	1C43805G01	Rail	2005	20	10	65,129	3,256	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	20087.66	20212.002	1C31	Bombardier	1C43805G01	Rail	2005	20	10	49,644	2,482	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N1	21051.33	21171.66	1C41	Bombardier	1C43805G01	Rail	2005	20	10	48,042	2,402	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0021	TBD	TBD	TBD	104	Bombardier	1C43805G01	Rail	2010	20	15	25,153	0	0	7	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0023	TBD	TBD	TBD	106A	Bombardier	1C43805G01	Rail	2010	20	15	20,362	1,018	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0025	TBD	TBD	TBD	106B	Bombardier	1C43805G01	Rail	2010	20	15	32,340	1,617	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0027	TBD	TBD	TBD	108	Bombardier	1C43805G01	Rail	2010	20	15	71,866	0	0	7	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0029	TBD	TBD	TBD	110	Bombardier	1C43805G01	Rail	2010	20	15	25,952	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0031	TBD	TBD	TBD	112	Bombardier	1C43805G01	Rail	2010	20	15	83,045	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

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System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0033	TBD	TBD	TBD	114	Bombardier	1C43805G01	Rail	2010	20	15	77,455	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0035	TBD	TBD	TBD	116	Bombardier	1C43805G01	Rail	2010	20	15	112,989	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0037	TBD	TBD	TBD	118	Bombardier	1C43805G01	Rail	2010	20	15	79,052	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0061	N/A	3172	200.983	138	Bombardier	1C43805G01	Rail	2005	20	10	130,157	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0063	TBD	TBD	TBD	204	Bombardier	1C43805G01	Rail	2010	20	15	25,952	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0065	TBD	TBD	TBD	206A	Bombardier	1C43805G01	Rail	2010	20	15	19,563	978	0.05	7	Oil resedue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil resedue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0067	TBD	TBD	TBD	206B	Bombardier	1C43805G01	Rail	2010	20	15	30,743	1,537	0.05	7	Oil resedue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil resedue from rail covers (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0069	TBD	TBD	TBD	208	Bombardier	1C43805G01	Rail	2010	20	15	44,717	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0071	TBD	TBD	TBD	210	Bombardier	1C43805G01	Rail	2010	20	15	99,015	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0073	TBD	TBD	TBD	214	Bombardier	1C43805G01	Rail	2010	20	15	75,060	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0075	TBD	TBD	TBD	216	Bombardier	1C43805G01	Rail	2010	20	15	92,228	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL0077	TBD	TBD	TBD	218	Bombardier	1C43805G01	Rail	2010	20	15	114,586	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	B5	3176	10214.96	240	Bombardier	1C43805G01	Rail	2005	20	10	135,347	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	TBD	TBD	TBD	1C16	Bombardier	1C43805G01	Rail	2010	20	15	49,508	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	TBD	TBD	TBD	1C17	Bombardier	1C43805G01	Rail	2010	20	15	49,508	2,475	0.05	7	Oil resedue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	TBD	TBD	1C18	Bombardier	1C43805G01	Rail	2010	20	15	49,508	2,475	0.05	7	Oil resedue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	15217.071	15267.071	1C22	Bombardier	1C43805G01	Rail	2005	20	10	19,963	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	POWR	Power Rail	I.B.APM.RAIL??	N/A	21015.33	21075.33	1C42	Bombardier	1C43805G01	Rail	2005	20	10	23,955	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0060	N/A	200.983	546.983	140	Bombardier	1C43805G06	Rail	2005	20	10	125,221	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0058	A3	546.983	891.983	142	Bombardier	1C43805G06	Rail	2005	20	10	124,859	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0056	A4	891.983	1235.32	144	Bombardier	1C43805G06	Rail	2005	20	10	124,257	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0054	N/A	1235.32	1380.33	145	Bombardier	1C43805G06	Rail	2005	20	10	52,481	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0052	N/A	1380.33	1530.29	146	Bombardier	1C43805G06	Rail	2005	20	10	54,272	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0050	N/A	1530.29	1706.59	148	Bombardier	1C43805G06	Rail	2005	20	10	63,805	3,190	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0048	N/A	1706.59	1761.59	149	Bombardier	1C43805G06	Rail	2005	20	10	19,905	995	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0046	N/A	1761.59	1788.82	150	Bombardier	1C43805G06	Rail	2005	20	10	9,855	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	B6	10214.96	10560.96	242	Bombardier	1C43805G06	Rail	2005	20	10	125,221	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	B7	10560.96	10821.91	244	Bombardier	1C43805G06	Rail	2005	20	10	94,441	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	10821.91	11092.91	245	Bombardier	1C43805G06	Rail	2005	20	10	98,078	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	11210.12	11441.48	246	Bombardier	1C43805G06	Rail	2005	20	10	83,732	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	11441.48	11543.54	248	Bombardier	1C43805G06	Rail	2005	20	10	36,937	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	11543.54	11645.54	249	Bombardier	1C43805G06	Rail	2005	20	10	36,915	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	11645.54	11713.54	250	Bombardier	1C43805G06	Rail	2005	20	10	24,610	1,230	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	11713.54	11768.54	251	Bombardier	1C43805G06	Rail	2005	20	10	19,905	995	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	11768.54	11795.54	252	Bombardier	1C43805G06	Rail	2005	20	10	9,772	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	14037	14081	1C11	Bombardier	1C43805G06	Rail	2005	20	10	15,924	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	14081	14123	1C12	Bombardier	1C43805G06	Rail	2005	20	10	15,200	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	14123	14166.43	1C13	Bombardier	1C43805G06	Rail	2005	20	10	15,718	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	14166.43	14222	1C14	Bombardier	1C43805G06	Rail	2005	20	10	20,111	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	TBD	14222	14320.63	1C15	Bombardier	1C43805G06	Rail	2005	20	10	35,695	1,785	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	15037	15112.67	1C25	Bombardier	1C43805G06	Rail	2005	20	10	27,386	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	15112.67	15177.071	1C24	Bombardier	1C43805G06	Rail	2005	20	10	23,307	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	15177.071	15217.071	1C23	Bombardier	1C43805G06	Rail	2005	20	10	14,476	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	15267.071	15430.197	1C21	Bombardier	1C43805G06	Rail	2005	20	10	59,037	2,952	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	20087.66	20212.002	1C31	Bombardier	1C43805G06	Rail	2005	20	10	45,001	2,250	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N1	21051.33	21171.66	1C41	Bombardier	1C43805G06	Rail	2005	20	10	43,549	2,177	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axles while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0022	TBD	TBD	TBD	104	Bombardier	1C43805G06	Rail	2010	20	15	22,800	0	0	7	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0024	TBD	TBD	TBD	106A	Bombardier	1C43805G06	Rail	2010	20	15	18,457	923	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0026	TBD	TBD	TBD	106B	Bombardier	1C43805G06	Rail	2010	20	15	29,315	1,466	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0028	TBD	TBD	TBD	108	Bombardier	1C43805G06	Rail	2010	20	15	65,144	0	0	7	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0030	TBD	TBD	TBD	110	Bombardier	1C43805G06	Rail	2010	20	15	23,524	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0032	TBD	TBD	TBD	112	Bombardier	1C43805G06	Rail	2010	20	15	75,277	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0034	TBD	TBD	TBD	114	Bombardier	1C43805G06	Rail	2010	20	15	70,211	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0036	TBD	TBD	TBD	116	Bombardier	1C43805G06	Rail	2010	20	15	102,421	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0038	TBD	TBD	TBD	118	Bombardier	1C43805G06	Rail	2010	20	15	71,658	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0062	N/A	3172	200.983	138	Bombardier	1C43805G06	Rail	2005	20	10	117,983	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0064	TBD	TBD	TBD	204	Bombardier	1C43805G06	Rail	2010	20	15	23,524	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0066	TBD	TBD	TBD	206A	Bombardier	1C43805G06	Rail	2010	20	15	17,734	887	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0068	TBD	TBD	TBD	206B	Bombardier	1C43805G06	Rail	2010	20	15	27,867	1,393	0.05	7	Oil residue on power / signal rail cover.	Location beneath vehicle axle while stopped at station. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue from rail covers (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0070	TBD	TBD	TBD	208	Bombardier	1C43805G06	Rail	2010	20	15	40,534	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0072	TBD	TBD	TBD	210	Bombardier	1C43805G06	Rail	2010	20	15	89,754	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0074	TBD	TBD	TBD	214	Bombardier	1C43805G06	Rail	2010	20	15	68,039	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0076	TBD	TBD	TBD	216	Bombardier	1C43805G06	Rail	2010	20	15	83,601	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL0078	TBD	TBD	TBD	218	Bombardier	1C43805G06	Rail	2010	20	15	103,868	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	B5	3176	10214.96	240	Bombardier	1C43805G06	Rail	2005	20	10	122,688	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - RAIL

System_List	System	Component	Component_Description	BarCode	Alignment	Start_Sta	End_Sta	Track_Block_Number	Manufacturer	ModelNum	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	TBD	TBD	TBD	1C16	Bombardier	1C43805G06	Rail	2010	20	15	44,877	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	TBD	TBD	TBD	1C17	Bombardier	1C43805G06	Rail	2010	20	15	44,877	2,244	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axes while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	TBD	TBD	1C18	Bombardier	1C43805G06	Rail	2010	20	15	44,877	2,244	0.05	7	Oil residue on power/signal rail covers.	Location beneath vehicle axes while parked for maintenance. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Remove oil residue (potential fire hazard).	Priority
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	15217.071	15267.071	1C22	Bombardier	1C43805G06	Rail	2005	20	10	18,096	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
Rail	RAIL	SGNL	Signal Rail	I.B.APM.RAIL??	N/A	21015.33	21075.33	1C42	Bombardier	1C43805G06	Rail	2005	20	10	21,715	0	0	7	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - STAT

System_List	System	Apron_Comp onents	Component	Component_ Description	BarCode	Track_Block _Number	Manufacture r	SysFunction	YrInstalled	DesignLife	RemainingYe ars	Operational	Performing	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0005	122A	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal B, North - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0006	122B	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal B, North - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0009	136	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal C, North - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0010	136	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal C, North - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0007	222B	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal B, South - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0008	222A	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal B, South - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0011	238	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal C, South - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0012	238	Bombardier	Station	1999	20	4	Y	Y	50,000	50,000	1	3	Near end of service life	Terminal C, South - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0029	122A	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, North - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0030	122A	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, North - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0031	122B	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, North - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0032	122B	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, North - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0037	136	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, North - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0038	136	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, North - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0039	136	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, North - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0040	136	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, North - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0033	222B	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, South - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0034	222B	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, South - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0035	222A	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, South - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0036	222A	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal B, South - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority

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Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0041	238	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, South - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0042	238	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, South - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0043	238	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, South - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0044	238	Bombardier	Station	1999	15	-1	Y	Y	4,858	4,858	1	0	End of service life	Terminal C, South - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	Replace	Priority
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0045	148	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, North - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0046	148	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, North - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0047	149	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, North - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0048	149	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, North - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0049	251	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, South - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0050	251	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, South - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0051	250	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, South - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0052	250	Bombardier	Station	2005	15	5	Y	Y	4,858	0	0	5	No issue.	Terminal D, South - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Near Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0001	106A	Bombardier	Station	2010	20	15	Y	Y	50,000	0	0	7	No issue.	Terminal A, North - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0002	106B	Bombardier	Station	2010	20	15	Y	Y	50,000	0	0	7	No issue.	Terminal A, North - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0013	148	Bombardier	Station	2005	20	10	Y	Y	50,000	0	0	7	No issue.	Terminal D, North - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0014	149	Bombardier	Station	2005	20	10	Y	Y	50,000	0	0	7	No issue.	Terminal D, North - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0003	206B	Bombardier	Station	2010	20	15	Y	Y	50,000	0	0	7	No issue.	Terminal A, South - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0004	206A	Bombardier	Station	2010	20	15	Y	Y	50,000	0	0	7	No issue.	Terminal A, South - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0015	251	Bombardier	Station	2005	20	10	Y	Y	50,000	0	0	7	No issue.	Terminal D, South - Berth 1. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Station Doors	DOOR	Station Doors	I.B.APM.STA T0016	250	Bombardier	Station	2005	20	10	Y	Y	50,000	0	0	7	No issue.	Terminal D, South - Berth 2. QR Loc. = Station lobby, door #1 enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per berth.	None.	Long Term
Station	STAT	Term D ??	N/A	Term D ??	I.B.APM.STA T0064	250	Bombardier	Station	2005	N/A	N/A	Y	Y	N/A	N/A	N/A	N/A	No issue.	Terminal D - Station. QR Loc. = N/A	None.	Long Term

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Station	STAT	Term D ??	N/A	Term D ??	I.B.APM.STA T0065	251	Bombardier	Station	2005	N/A	N/A	Y	Y	N/A	N/A	N/A	N/A	No issue.	Terminal D - Station. QR Loc. = N/A	None.	Long Term
Station	STAT	Term D ??	N/A	Term D ??	I.B.APM.STA T0066	252	Bombardier	Station	2005	N/A	N/A	Y	Y	N/A	N/A	N/A	N/A	No issue.	Terminal D - Station. QR Loc. = N/A	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0021	106A	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, North - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0022	106B	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, North - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0023	106B	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, North - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0024	106B	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, North - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0025	206B	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, South - Berth 1, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0026	206B	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, South - Berth 1, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0027	206A	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, South - Berth 2, Door 1. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term
Station	STAT	Graphic Sign (Internal)	SIGN	Graphic Sign (Internal)	I.B.APM.STA T0028	206A	Bombardier	Station	2010	15	10	Y	Y	4,858	0	0	7	No issue.	Terminal A, South - Berth 2, Door 2. QR Loc. = Station lobby, door enclosure, exterior, horizontal (bottom) surface, left side, one (1) QR label per door.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - SEQ

System_List	System	Apron_Components	Component	Component Description	BarCode	Cabinet_ID	TagID	Manufacturer	SysFunction	YrInstalled	DesignLife	RemainingYears	Operational	Performing	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
Station Equipment	SEQ	Communications Cabinet	COMC	Communications Cabinet	I.B.APM.SEQ0009	N/A	N/A	Samsung	Communications	1999	20	4	Y	Y	100,000	100,000	1	3	Near end of service life	QR Loc. = Central Control	Replace	Priority
Station Equipment	SEQ	PA Cabinet	PAC	PA Cabinet	I.B.APM.SEQ0008	PA cabinet	5D81931G02-3	Samsung	Public address	1999	20	4	Y	Y	200,000	200,000	1	3	Near end of service life	QR Loc. = ATO B	Replace	Priority
Station Equipment	SEQ	PA Cabinet	PAC	PA Cabinet	I.B.APM.SEQ0007	PA cabinet	5D8193GO1-3	Samsung	Public announcement	1999	20	4	Y	Y	200,000	200,000	1	3	Near end of service life	QR Loc. = ATO C	Replace	Priority
Station Equipment	SEQ	CCTV cabinet	XXXX	CCTV cabinet	I.B.APM.SEQ0006	Arinc	Cab. 809	Samsung	CCTV	2005	10	0	Y	Y	100,000	100,000	1	0	Obsolete technology.	QR Loc. = ATO D	Replace	Priority
Station Equipment	SEQ	Communications Cabinet	COMC	Communications Cabinet	I.B.APM.SEQ0004	Houston communications cabinet	3016830G01	Samsung	Communication	2010	20	15	Y	Y	100,000	0	0	7	No issue.	QR Loc. = ATO A	None	Long Term
Station Equipment	SEQ	PA Cabinet	PAC	PA Cabinet	I.B.APM.SEQ0005	P A cabinet	5D81931G03	Samsung	Public announcement	2005	20	10	Y	Y	200,000	0	0	7	No issue.	QR Loc. = ATO D	None	Long Term

APPENDIX B - ASSET SUMMARY TABLES - SWCH

System	Apron_Comp onents	Component	Component_Descri ption	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintNeeded	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0010	Switch	1999	20	4	41,328	Ref. "Comments" section	41,328	1	3	Near end of service life	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0007	Switch	1999	20	4	41,328	Ref. "Comments" section	41,328	1	3	Near end of service life	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0033	Switch	1999	20	4	41,328	Ref. "Comments" section	41,328	1	3	Near end of service life	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0034	Switch	1999	20	4	41,328	Ref. "Comments" section	41,328	1	3	Near end of service life	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0009	Switch	1999	20	4	57,531	Ref. "Comments" section	57,531	1	3	Excessive rail gap @ switch junction.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0005	Switch	1999	20	4	57,531	Ref. "Comments" section	57,531	1	3	Near end of service life	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0013	Switch	1999	20	4	57,531	Ref. "Comments" section	57,531	1	3	Near end of service life	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0014	Switch	1999	20	4	57,531	Ref. "Comments" section	57,531	1	3	Excessive rail gap @ switch junction.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Priority
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0023	Switch	2010	20	15	41,328	Ref. "Comments" section	0	0	7	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0026	Switch	2010	20	15	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0019	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0016	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0028	Switch	2010	20	15	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0032	Switch	2010	20	15	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0035	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0037	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - SWCH

System	Apron_Comp onents	Component	Component_Descri ption	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintNeeded	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0101	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0102	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2010	20	15	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0106	Switch	2010	20	15	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0103	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0104	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H0105	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Hydraulics	HYD	Hydraulics	I.B.APM.SWC H??	Switch	2005	20	10	41,328	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0022	Switch	2010	20	15	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0025	Switch	2010	20	15	57,531	Ref. "Comments" section	37,382	0.649779372	7	Switch gap too tight.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Trim rail sections w/ consideration for thermal expansion/restriction.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0018	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0015	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - SWCH

System	Apron_Comp onents	Component	Component_Descri ption	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintNeeded	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0001	Switch	2010	20	15	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0031	Switch	2010	20	15	57,531	Ref. "Comments" section	57,531	1	7	Rail gap too tight @ switch junction.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace rail (end) sections w/ consideration for thermal expansion/restriction.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0012	Switch	2005	20	10	57,531	Ref. "Comments" section	57,531	1	7	Pitting of high speed ramp from electrical, resulting from mis-alignment at vehicle shoe interface.	Right hand pivot switch. Vehicle shoe mis-alignment is likely related to the observed alignment issues at track blocks TBLK228 and TBLK230. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace high speed ramp. Verify vehicle shoe interface (fit, seating, alignment, etc.) after expansion joint repair.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0011	Switch	2005	20	10	57,531	Ref. "Comments" section	57,531	1	7	Mechanical wear of high speed ramp from missaligned vehicle shoe interface.	Left hand pivot switch. Vehicle shoe mis-alignment is likely related to the observed alignment issues at track blocks TBLK228 and TBLK230. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	Replace high speed ramp. Verify vehicle shoe interface (fit, seating, alignment, etc.) after expansion joint repair.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0041	Switch	2005	20	10	57,531	Ref. "Comments" section	37,382	0.649779372	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0042	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0046	Switch	2010	20	15	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0043	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0044	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H0045	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H??	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Left hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Mechanical/M oving	MECH	Mechanical/Moving	I.B.APM.SWC H??	Switch	2005	20	10	57,531	Ref. "Comments" section	0	0	7	No issue.	Right hand pivot switch. QR Loc. = Wayside, pivot switch hydraulic cabinet, interior, vertical surface, right side, adjacent electrical disconnect switch.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0027	Switch	2010	30	25	64,268	Ref. "Comments" section	0	0	10	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0024	Switch	2010	30	25	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0004	Switch	1999	30	14	64,268	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0008	Switch	1999	30	14	64,268	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - SWCH

System	Apron_Comp onents	Component	Component_Descri ption	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintNeeded	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0020	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0017	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0029	Switch	2010	30	25	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0030	Switch	2010	30	25	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0003	Switch	1999	30	14	64,268	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0002	Switch	1999	30	14	64,268	Ref. "Comments" section	0	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0036	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H0038	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2010	30	25	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
SWCH	Relay Logic/Control	SLCC	Relay Logic/Control	I.B.APM.SWC H??	Switch	2005	30	20	64,268	Ref. "Comments" section	0	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - TBLK

System	Component	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
TBLK	N/A	I.B.APM.TBLK0036	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Evidence of previous derailment @ SW32 / SW31 junction.	The derailment occurred and was rectified 5+ years ago, per the Bombardier wayside escort (maintenance technician). The track block running surface and	Verify appropriate corrective action was taken after the initial derailment. Monitor back-to-back switch areas for the cause of	Priority
TBLK	N/A	I.B.APM.TBLK0048	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Wear on vertical surface of I-beam guideway surface adjacent pivot switch SW42.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	Verify alignment of guideway with respect to other track blocks. Cross-reference with structural assessment findings (by others).	Priority
TBLK	N/A	I.B.APM.TBLK0031	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0032	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0020	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0015	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0019	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0010	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0009	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0008	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0018	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0007	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0039	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0038	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0037	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0040	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0035	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0034	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0033	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0044	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0045	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0046	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	

APPENDIX B - ASSET SUMMARY TABLES - TBLK

System	Component	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
TBLK	N/A	I.B.APM.TBLK0047	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0049	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0050	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0051	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0052	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0053	Track Block	1999	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0071	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0072	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0073	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0074	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0075	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0070	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0069	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0066	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0061	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0062	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0021	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop,	None.	
TBLK	N/A	I.B.APM.TBLK0022	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop,	None.	
TBLK	N/A	I.B.APM.TBLK0023	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop,	None.	
TBLK	N/A	I.B.APM.TBLK0024	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, track block junction nearest maintenance shop,	None.	
TBLK	N/A	I.B.APM.TBLK0025	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0026	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	

APPENDIX B - ASSET SUMMARY TABLES - TBLK

System	Component	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
TBLK	N/A	I.B.APM.TBLK??	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK??	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK??	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0076	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0077	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0063	Track Block	2010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0067	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK0063	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	
TBLK	N/A	I.B.APM.TBLK??	Track Block	2005	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No issue.	Vehicle parked on guideway. QR Loc. = Wayside, track block junction nearest maintenance shop, emergency egress tread, vertical surface, towards catwalk.	None.	

APPENDIX B - ASSET SUMMARY TABLES - WEQ

System	Apron_Components	Component	Component_Description	Sub_Component_List	SubComponent	Sub_Component_Description	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintNeeded	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
WEQ	Flat Tire Indicator	XXXX	Flat Tire Indicator	N/A	N/A	N/A	I.B.APM.WE Q0037	Wayside Equipment	1999	20	4	5,000	Ref. "Comments" section	5,000	N/A	1	3	Near end of service life	Terminal B - Station. QR Loc. = Wayside, Terminal B, station wall, exterior, vertical surface, adjacent Bombardier access door.	Replace	Priority
WEQ	Flat Tire Indicator	XXXX	Flat Tire Indicator	N/A	N/A	N/A	I.B.APM.WE Q???	Wayside Equipment	1999	20	4	5,000	Ref. "Comments" section	5,000	N/A	1	3	Near end of service life	QR Loc. = Wayside, Terminal B, station wall, exterior, vertical surface, adjacent Bombardier access door.	Replace	Priority
WEQ	Brush Counters	XXXX	Brush Counters	N/A	N/A	N/A	I.B.APM.WE Q0047	Wayside Equipment	1999	20	4	5,000	Ref. "Comments" section	5,000	N/A	1	3	Near end of service life	QR Loc. = Wayside, brush counter location, emergency egress tread, vertical surface, towards catwalk.	Replace	Priority
WEQ	Brush Counters	XXXX	Brush Counters	N/A	N/A	N/A	I.B.APM.WE Q0046	Wayside Equipment	1999	20	4	5,000	Ref. "Comments" section	5,000	N/A	1	3	Near end of service life	QR Loc. = Wayside, brush counter location, emergency egress tread, vertical surface, towards catwalk.	Replace	Priority
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0022	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0015	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0010	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal C - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0007	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0006	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0035	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q0049	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal C - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	N/A	N/A	N/A	I.B.APM.WE Q???	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0016	Wayside Equipment	1999	30	14	4,892	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0002	Wayside Equipment	1999	30	14	345	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal C - Approach (West). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0029	Wayside Equipment	2005	30	20	4,892	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal C - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0003	Wayside Equipment	2005	30	20	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal C - Approach (East). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0008	Wayside Equipment	2005	30	20	4,892	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0033	Wayside Equipment	1999	30	14	4,892	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0042	Wayside Equipment	1999	30	14	345	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Approach (East). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0050	Wayside Equipment	1999	30	14	345	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal C - Approach (West). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - WEQ

System	Apron_Components	Component	Component_Description	Sub_Component_List	SubComponent	Sub_Component_Description	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintNeeded	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0045	Wayside Equipment	2005	30	20	4,892	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal C - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0023	Wayside Equipment	2010	30	25	4,892	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0024	Wayside Equipment	2010	30	25	N/A	Ref. "Comments" section	0	N/A	N/A	10	No issue.	QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0025	Wayside Equipment	2010	30	25	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Approach (East). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0026	Wayside Equipment	2010	30	25	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal B - Approach (West). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0017	Wayside Equipment	1999	30	14	N/A	Ref. "Comments" section	0	N/A	N/A	7	No issue.	QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q??	Wayside Equipment	1999	30	14	345	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Approach (East). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Approach (West). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0028	Wayside Equipment	2005	30	20	N/A	Ref. "Comments" section	0	N/A	N/A	10	No issue.	QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0018	Wayside Equipment	2010	30	25	4,892	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0032	Wayside Equipment	2010	30	25	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Approach (East). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q0036	Wayside Equipment	1999	30	14	345	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Approach (West). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal C - Approach (East). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	345	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Approach (West). QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Antennas per Sta Platform	ANTP	Antennas per Sta Platform	Program Stop	PSTP	Program Stop	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	4,892	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, program stop location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0020	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0030	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Common ground switch for SW11 and SW12. QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0039	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0040	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - WEQ

System	Apron_Components	Component	Component_Description	Sub_Component_List	SubComponent	Sub_Component_Description	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintNeeded	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0019	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0031	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0038	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0041	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0043	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0044	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0051	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0052	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0083	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0053	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0081	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q0082	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q???	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q???	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Guideway Switches Controls	GSC	Guideway Switches Controls	Traffic Signal Indicators	TSI	Traffic Signal Indicators	I.B.APM.WE Q???	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, pivot switch SLCC cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q0005	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q0034	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q0048	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal C - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q???	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - WEQ

System	Apron_Components	Component	Component_Description	Sub_Component_List	SubComponent	Sub_Component_Description	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintNeeded	MaintCost	OrigCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal B - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	1999	30	14	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	Terminal C - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Rail Power Indicators	RPI	Rail Power Indicators	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q0021	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Term. A North used for storage and emergency service (NOT typically used for revenue service). QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q0009	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q0004	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal A - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2010	30	25	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Trip Stop	TRPS	Trip Stop	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	30	20	5,000	Ref. "Comments" section	0	N/A	0	10	No issue.	Terminal D - Station. QR Loc. = Wayside, station wall, exterior, vertical surface, adjacent Bombardier access door.	None.	Long Term
WEQ	Brush Counters	XXXX	Brush Counters	N/A	N/A	N/A	I.B.APM.WE Q0027	Wayside Equipment	2005	20	10	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	QR Loc. = Wayside, brush counter location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term
WEQ	Brush Counters	XXXX	Brush Counters	N/A	N/A	N/A	I.B.APM.WE Q??	Wayside Equipment	2005	20	10	5,000	Ref. "Comments" section	0	N/A	0	7	No issue.	QR Loc. = Wayside, brush counter location, emergency egress tread, vertical surface, towards catwalk.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - PDS

System	Apron_Comp onents	Component	Component_Descri ption	Sub_Compon ent_List	SubComponent	Sub_Compon ent_Descripti	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0020	Power distribution	1999	20	4	200,000	200,000	1	3	Near end of service life	QR Loc. = PDS 1, between terminal B and C	Replace	Priority
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0019	Power distribution	1999	20	4	200,000	200,000	1	3	Near end of service life	QR Loc. = PDS 1, between terminal B and C	Replace	Priority
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0010	Power distribution	1999	20	4	200,000	200,000	1	3	Near end of service life	QR Loc. = PDS 2, between terminal C and D	Replace	Priority
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0009	Power distribution	1999	20	4	200,000	200,000	1	3	Near end of service life	QR Loc. = PDS 2, between terminal C and D	Replace	Priority
PDS	15Kv Motor Operated Disconnect Switches	15DS	15Kv Motor Operated Disconnect Switches	N/A	N/A	N/A	I.B.APM.PDS 0026	Power distribution	2010	50	45	25,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	15Kv Motor Operated Disconnect Switches	15DS	15Kv Motor Operated Disconnect Switches	N/A	N/A	N/A	I.B.APM.PDS 0022	Power distribution	2010	50	45	25,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	15Kv Motor Operated Disconnect Switches	15DS	15Kv Motor Operated Disconnect Switches	N/A	N/A	N/A	I.B.APM.PDS 0021	Power distribution	2010	50	45	25,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	15Kv Motor Operated Disconnect Switches	15DS	15Kv Motor Operated Disconnect Switches	N/A	N/A	N/A	I.B.APM.PDS 0003	Power distribution	1999	50	34	25,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	15Kv Motor Operated Disconnect Switches	15DS	15Kv Motor Operated Disconnect Switches	N/A	N/A	N/A	I.B.APM.PDS 0002	Power distribution	1999	50	34	25,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	15Kv Motor Operated Disconnect Switches	15DS	15Kv Motor Operated Disconnect Switches	N/A	N/A	N/A	I.B.APM.PDS 0001	Power distribution	1999	50	34	25,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	15Kv Switchgear	15SG	15Kv Switchgear	N/A	N/A	N/A	I.B.APM.PDS 0011	Power distribution	1999	50	34	350,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0003	Power Distribution System	2010	30	25	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0006	Power Distribution System	1999	30	14	29,522	0	0	7	No issue.	Common ground switch for SW21 and SW22. QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS ??	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS ??	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0002	Power Distribution System	2010	30	25	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0004	Power Distribution System	2010	30	25	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0005	Power Distribution System	1999	30	14	29,522	0	0	7	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0007	Power Distribution System	1999	30	14	29,522	0	0	7	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term

APPENDIX B - ASSET SUMMARY TABLES - PDS

System	Apron_Comp onents	Component	Component_Descri ption	Sub_Compon ent_List	SubCompon ent	Sub_Compon ent_Descripti	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0008	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0009	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS ??	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS ??	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0010	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0012	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0016	Power Distribution System	2010	30	25	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0013	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0014	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Ground Switches	GRND	Ground Switches	N/A	N/A	N/A	I.B.APM.PDS 0015	Power Distribution System	2005	30	20	29,522	0	0	10	No issue.	QR Loc. = Wayside, pivot switch GS cabinet, exterior, front vertical surface, right side, near top of enclosure.	None.	Long Term
PDS	Harmonic Filters	HARF	Harmonic Filters	N/A	N/A	N/A	I.B.APM.PDS 0015	Power distribution	1999	50	34	100,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	Harmonic Filters	HARF	Harmonic Filters	N/A	N/A	N/A	I.B.APM.PDS 0007	Power distribution	1999	50	34	100,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	Harmonic Filters	HARF	Harmonic Filters	N/A	N/A	N/A	I.B.APM.PDS 0008	Power distribution	1999	50	34	100,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	Harmonic Filters	HARF	Harmonic Filters	N/A	N/A	N/A	I.B.APM.PDS 0016	Power distribution	1999	50	34	100,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	Harmonic Filters	HARF	Harmonic Filters	N/A	N/A	N/A	I.B.APM.PDS ??	Power distribution	2010	50	45	100,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	Harmonic Filters	HARF	Harmonic Filters	N/A	N/A	N/A	I.B.APM.PDS ??	Power distribution	2010	50	45	100,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	Substation 600v Equipment	LV	Substation 600v Equipment	N/A	N/A	N/A	I.B.APM.PDS 0024	Power distribution	2010	50	45	300,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	Substation 600v Equipment	LV	Substation 600v Equipment	N/A	N/A	N/A	I.B.APM.PDS 0013	Power distribution	1999	50	34	300,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	Substation 600v Equipment	LV	Substation 600v Equipment	N/A	N/A	N/A	I.B.APM.PDS 0005	Power distribution	1999	50	34	300,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term

APPENDIX B - ASSET SUMMARY TABLES - PDS

System	Apron_Comp onents	Component	Component_Descri ption	Sub_Compon ent_List	SubCompone nt	Sub_Compon ent_Descripti	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
PDS	Power Factor Correction Capacitors	PFCC	Power Factor Correction Capacitors	N/A	N/A	N/A	I.B.APM.PDS 0017	Power distribution	1999	50	34	100,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	Power Factor Correction Capacitors	PFCC	Power Factor Correction Capacitors	N/A	N/A	N/A	I.B.APM.PDS 0018	Power distribution	1999	50	34	100,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	12.47 Kv-600v Transformer	XFMR	12.47 Kv-600v Transformer	N/A	N/A	N/A	I.B.APM.PDS 0025	Power distribution	2010	50	45	500,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	12.47 Kv-600v Transformer	XFMR	12.47 Kv-600v Transformer	N/A	N/A	N/A	I.B.APM.PDS 0023	Power distribution	2010	50	45	500,000	0	0	10	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	12.47 Kv-600v Transformer	XFMR	12.47 Kv-600v Transformer	N/A	N/A	N/A	I.B.APM.PDS 0014	Power distribution	1999	50	34	500,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	12.47 Kv-600v Transformer	XFMR	12.47 Kv-600v Transformer	N/A	N/A	N/A	I.B.APM.PDS 0012	Power distribution	1999	50	34	500,000	0	0	10	No issue.	QR Loc. = PDS 1, between terminal B and C	None	Long Term
PDS	12.47 Kv-600v Transformer	XFMR	12.47 Kv-600v Transformer	N/A	N/A	N/A	I.B.APM.PDS 0004	Power distribution	1999	50	34	500,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	12.47 Kv-600v Transformer	XFMR	12.47 Kv-600v Transformer	N/A	N/A	N/A	I.B.APM.PDS 0006	Power distribution	1999	50	34	500,000	0	0	10	No issue.	QR Loc. = PDS 2, between terminal C and D	None	Long Term
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0027	Power distribution	2010	20	15	200,000	0	0	7	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0029	Power distribution	2010	20	15	200,000	0	0	7	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term
PDS	PDS PLCs	XXXX	PDS PLCs	N/A	N/A	N/A	I.B.APM.PDS 0028	Power distribution	2010	20	15	200,000	0	0	7	No issue.	QR Loc. = PDS 3, between terminal A and B	None	Long Term

APPENDIX B - ASSET SUMMARY TABLES - UPS

System	BarCodeS	vsFunctionY	rlnstalled	DesignLifeR	emainingYR	eplaceCost	MaintCostF	CI	ACIC	ommentsD	escription	RecommendationsP	lanning Category
UPS	I.B.APM.UPS0001U	ninterruptible power supply	20042	09		50,000	5000	.015		No issue.Q	R Loc. = ATO DR	eplace air filterP	riority
UPS	I.B.APM.UPS0004U	ninterruptible power supply	20102	01	55	0,0000		07		No issue.Q	R Loc. = PDS 3, between terminal A and BN	one	Long Term
UPS	I.B.APM.UPS0003U	ninterruptible power supply	20152	02	05	0,0000		01	0	No issue.Q	R Loc. = Near ATO B	None	Long Term
UPS	I.B.APM.UPS0002U	ninterruptible power supply	20152	02	05	0,0000		01	0	No issue.Q	R Loc. = ATO CN	one	Long Term

APPENDIX B - ASSET SUMMARY TABLES - ATP

System	Apron_ Components	Component	Component_Description	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
ATP	CityFlo 550 Element Cab, Region B	ELMC	CityFlo 550 Element Cab, Region B	I.B.APM.ATP 0013	Automatic train protection	1999	15	-1	1,000,000	1,000,000	1	0	No issues. Exceeded service life	QR Loc. = ATO B. 2 cabinets	Replace	Priority
ATP	CityFlo 550 Termination Cab	TRMC	CityFlo 550 Termination Cab	I.B.APM.ATP 0010	Automatic train protection	1999	50	34	250,000	250,000	1	10	No issue.	QR Loc. = ATO B. 2 cabinets	Replace with new central control	Priority
ATP	CityFlo 550 Termination Cab	TRMC	CityFlo 550 Termination Cab	I.B.APM.ATP 0001	Automatic train protection	2010	50	45	250,000	250,000	1	10	No issue.	QR Loc. = ATO A	Might need replaced with new central control	Priority
ATP	CityFlo 550 Computer Cab	XXXX	CityFlo 550 Computer Cab	I.B.APM.ATP 0014	Automatic train protection	1999	15	-1	2,000,000	2,000,000	1	0	No issues. Exceeded service life	QR Loc. = ATO B. 2 cabinets	Replace	Priority
ATP	Tx/Rx Cabinet	TRC	Tx/Rx Cabinet	I.B.APM.ATP 0017	Automatic train protection	1999	30	14	500,000	0	0	7	No issue.	QR Loc. = ATO B	None	Long Term
ATP	Tx/Rx Cabinet	TRC	Tx/Rx Cabinet	I.B.APM.ATP 0016	Automatic train protection	1999	30	14	500,000	0	0	7	No issue.	QR Loc. = ATO B	None	Long Term
ATP	Tx/Rx Cabinet	TRC	Tx/Rx Cabinet	I.B.APM.ATP 0008	Automatic train protection	1999	30	14	500,000	0	0	7	No issue.	QR Loc. = ATO C	None	Long Term
ATP	Tx/Rx Cabinet	TRC	Tx/Rx Cabinet	I.B.APM.ATP 0006	Automatic train protection	2005	30	20	500,000	0	0	10	No issue.	QR Loc. = ATO D	None	Long Term
ATP	Tx/Rx Cabinet	TRC	Tx/Rx Cabinet	I.B.APM.ATP 0005	Automatic train protection	2010	30	25	500,000	0	0	10	No issue.	QR Loc. = ATO A	None	Long Term
ATP	Tx/Rx Cabinet	TRC	Tx/Rx Cabinet	I.B.APM.ATP 0004	Automatic train protection	2010	30	25	500,000	0	0	10	No issue.	QR Loc. = ATO A	None	Long Term
ATP	Tx/Rx Termination Cabinet	TRTC	Tx/Rx Termination Cabinet	I.B.APM.ATP 0015	Automatic train protection	1999	50	34	250,000	0	0	10	No issue.	QR Loc. = ATO B	None	Long Term
ATP	Tx/Rx Termination Cabinet	TRTC	Tx/Rx Termination Cabinet	I.B.APM.ATP 0009	Automatic train protection	1999	50	34	250,000	0	0	10	No issue.	QR Loc. = ATO C	None	Long Term
ATP	Tx/Rx Termination Cabinet	TRTC	Tx/Rx Termination Cabinet	I.B.APM.ATP 0007	Automatic train protection	2005	50	40	250,000	0	0	10	No issue.	QR Loc. = ATO D	None	Long Term
ATP	Tx/Rx Termination Cabinet	TRTC	Tx/Rx Termination Cabinet	I.B.APM.ATP 0003	Automatic train protection	2010	50	45	250,000	0	0	10	No issue.	QR Loc. = ATO A. 2 cabinets	None	Long Term
ATP	CityFlo 550 CPU	XXXX	CityFlo 550 CPU	I.B.APM.ATP 0002	Automatic train protection	2010	15	10	2,000,000	0	0	7	No issue.	QR Loc. = ATO A	None	Long Term

APPENDIX B - ASSET SUMMARY TABLES - ATO

System	Apron_Comp onents	Component	Component_Descri ption	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYe ars	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0010	Automatic train operation	1999	15	-1	1,000,000	1,000,000	1	0	No issues. Exceeded service life	QR Loc. = ATO B	Replace	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0009	Automatic train operation	1999	15	-1	1,000,000	1,000,000	1	0	No issues. Exceeded service life	QR Loc. = ATO C	Replace	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0007	Automatic train operation	1999	15	-1	1,000,000	1,000,000	1	0	No issues. Exceeded service life	QR Loc. = ATO C	Replace	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0006	Automatic train operation	2005	15	5	1,000,000	1,000,000	1	5	No issue.	QR Loc. = ATO D	Will need replaced for compatibility with new central control	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0004	Automatic train operation	2005	15	5	1,000,000	1,000,000	1	5	No issue.	QR Loc. = ATO D	Will need replaced for compatibility with new central control	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0003	Automatic train protection	2010	15	10	1,000,000	1,000,000	1	7	No issue.	QR Loc. = ATO A	Will need replaced for compatibility with new central control	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO 0001	Automatic train operation	2010	15	10	1,000,000	1,000,000	1	7	No issue.	QR Loc. = ATO A	Will need replaced for compatibility with new central control	Priority
ATO	ATO Cabinet	ATO	ATO Cabinet	I.B.APM.ATO ??	Automatic train operation	1999	15	-1	1,000,000	1,000,000	1	0	No issues. Exceeded service life	QR Loc. = ATO B	Replace	Priority
ATO	ATO Terminal Cabinet	ATOT	ATO Terminal Cabinet	I.B.APM.ATO 0011	Automatic train operation	1999	50	34	25,000	0	0	10	No issue.	QR Loc. = ATO B	None	Long Term
ATO	ATO Terminal Cabinet	ATOT	ATO Terminal Cabinet	I.B.APM.ATO 0008	Automatic train protection	1999	50	34	25,000	0	0	10	No issue.	QR Loc. = ATO C	None	Long Term
ATO	ATO Terminal Cabinet	ATOT	ATO Terminal Cabinet	I.B.APM.ATO 0005	Automatic train operation	2005	50	40	25,000	0	0	10	No issue.	QR Loc. = ATO D	None	Long Term
ATO	ATO Terminal Cabinet	ATOT	ATO Terminal Cabinet	I.B.APM.ATO 0002	Automatic train protection	2010	50	45	25,000	0	0	10	No issue.	QR Loc. = ATO A	None	Long Term

APPENDIX B - ASSET SUMMARY TABLES - CC

System	Apron_Components	Component	Component_Description	BarCode	SysFunction	YrInstalled	DesignLife	RemainingYears	ReplaceCost	MaintCost	FCI	ACI	Comments	Description	Recommendations	Planning Category
CC	Central Computer Cab	CCCB	Central Computer Cab	I.B.APM.CC002	Central control	1999	15	-1	2,000,000	2,000,000	1	0	No issues. Exceeded service life	QR Loc. = Central control	Replace	Priority
CC	Central Computer Cab	CCCB	Central Computer Cab	I.B.APM.CC003	Central control	1999	15	-1	2,000,000	2,000,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	Communications Cabinet	COMC	Communications Cabinet	I.B.APM.CC011	Central control	1999	20	4	100,000	100,000	1	3	No issues. Near end of service life	QR Loc. = Central Control	Replace	Priority
CC	Central Console	CTCN	Central Console	I.B.APM.CC008	Central control	1999	15	-1	500,000	500,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	MMI Panel	MMIP	MMI Panel	I.B.APM.ATP018	Central control	1999	15	-1	200,000	200,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	Maintenance Computer	MNCM	Maintenance Computer	I.B.APM.CC001	Central control	1999	20	4	50,000	50,000	1	3	Not in use since maintenance facility moved in 2005.	QR Loc. = ATO B	Remove	Priority
CC	Overhead Displays	OHD	Overhead Displays	I.B.APM.CC005	Central control	2010	5	0	10,000	10,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	Overhead Displays	OHD	Overhead Displays	I.B.APM.CC006	Central control	2010	5	0	10,000	10,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	Overhead Displays	OHD	Overhead Displays	I.B.APM.CC007	Central control	2010	5	0	10,000	10,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	Overhead Monitor CPU w/ VGA Booster	OHMN	Overhead Monitor CPU w/ VGA Booster	I.B.APM.CC004	Central control	1999	15	-1	1,000,000	1,000,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control	Replace	Priority
CC	Central CCTV Cabinet	XXXX	Central CCTV Cabinet	I.B.APM.CC010	CCTV	1999	10	-6	500,000	500,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control. Handles station B CCTV	Replace	Priority
CC	Central CCTV Cabinet	XXXX	Central CCTV Cabinet	I.B.APM.CC009	CCTV	1999	10	-6	500,000	500,000	1	0	No issues. Exceeded service life	QR Loc. = Central Control. Handles station A CCTV	Replace	Priority
CC	CityFlo 550 Monitoring System	XXXX	CityFlo 550 Monitoring System	I.B.APM.ATP019	Central control	2010	15	10	250,000	250,000	1	7	No issue.	QR Loc. = Central Control	Will need replaced for compatibility with new central control	Priority

APPENDIX B - ASSET SUMMARY TABLES - NTKW

System	Apron Component	Component	Component Description	Sub Component	Sub Component	Sub Component	Part Code	SysFunction	Year Installed	Design Life	Remaining Years	Replace Cost	Maint Cost	CI	ACIC	Comments	Description	Recommendation	Planning Category
NTWK	Fiber Optic Network Connections	ONC	Fiber Optic Network Connections	/A	N/AN	/A	I.B.APM.NTWK0003N	Network	1999	5	-1	100,000	100,000	00		No issues. Exceeded service life	QR Loc. = ATO B. Cabinet includes station camera equipment	Replace	Priority
NTWK	Fiber Optic Network Connections	ONC	Fiber Optic Network Connections	/A	N/AN	/A	I.B.APM.NTWK0001N	Network	1999	5	-1	100,000	100,000	00		No issues. Exceeded service life	QR Loc. = ATO CR	Replace	Priority

APPENDIX C
VEHICLE PMs: TIME VS. MILEAGE-BASED



APPENDIX C - VEHICLE TIME VS. MILEAGE BASED

The preventive maintenance program used for the IAH APM vehicle fleet is time-based, meaning that maintenance is performed in intervals of days, weeks, months and years. A time-based program uses the fleet average rate of mileage accumulation to determine the time intervals needed for preventive maintenance. Time-based preventive maintenance is convenient because it allows for steady scheduling of work in the shop. A prerequisite for a time-based preventive maintenance program is that vehicles in the fleet must be accumulating mileage evenly, because ultimately the driver for maintenance of nearly all vehicle components is miles traveled rather than the passage of time. If the vehicle preventive maintenance program is time-based and the fleet is not accumulating mileage evenly, then some cars are getting too much maintenance, while others get too little. If cars are getting too much maintenance then labor and parts are being wasted. If cars are getting too little maintenance then failures can occur that will reduce system availability, and useful life of the vehicles can be reduced.

Mileage records have been analyzed for the APM fleet at IAH as shown in **Table C.1**. The analysis was performed on a full year of data (calendar year 2014) to discount the inevitable short-term variation in mileage accumulation that all fleets have. The fleet average for 2014 was 124 miles/day/vehicle, but within the fleet there was wide variation. Over the course of 2014, car 9 averaged only 62 miles/day (half of the fleet average), while car 15 averaged 161 miles/day (30% above the fleet average). Car 15 has added miles 2.6 times faster than car 9, which is a massive difference, especially over an entire year. Over the year, car 9 gained about 22,000 miles, while car 15 gained nearly 59,000. The standard deviation for the average miles/day/vehicle is 28, so Car 9 and 15 really aren't outliers, but rather the whole fleet is highly erratic in mileage accumulation.

Such uneven accumulation of mileage makes a time-based preventive maintenance program severely dysfunctional. Efforts could be made to even out mileage accumulation, but that often proves problematic and unreliable. The most effective and reliable way to address this problem would be to convert the vehicle preventive maintenance program to a mileage-based system. Using mileage-based maintenance, which is the true driver of wear and tear for the vehicles, the best fleet performance will be achieved.

Vehicle	2014 Accumulation	Average Miles/Day
Car 1	37,162	102
Car 2	35,906	98
Car 3	51,693	142
Car 4	50,386	138
Car 5	51,764	142
Car 6	25,597	70
Car 7	48,333	133
Car 8	47,873	132
Car 9	22,465	62
Car 10	36,254	100
Car 11	53,095	146
Car 12	49,911	137
Car 13	49,439	135
Car 14	51,614	142
Car 15	58,786	161
Car 16	53,575	147

Table C.1 APM Fleet Mileage Accumulation in 2014

APPENDIX D
PM PERFORMANCE FREQUENCY



APPENDIX D - PM PERFORMANCE FREQUENCY

A. INTRODUCTION

Records in the INFOR-based asset management system were analyzed to verify whether preventive maintenance has been performed as prescribed. The records analyzed run from 01 June 2013 through 08 April 2015, covering the majority of 2 years, which runs from the implementation of INFOR to the day of data collection. The results are summarized below in a series of tables. Each table has a column for each preventive maintenance task, which shows the task number ("Task"), the prescribed interval for performing the task ("Interval"), the number of times the task should have been performed given the time span covered by the data ("Expected Occurrences"), and then the number of times the preventive maintenance task was performed on a given asset is displayed. Cells are highlighted in red where preventive maintenance has been performed significantly less than prescribed.

B. SUMMARY

A list of preventive maintenance tasks that have generally not been performed at the frequency prescribed by the maintenance program is shown in **Table D.1**.

A list of preventive maintenance tasks no longer being performed is shown in **Table D.2**. Research is needed to verify that this maintenance no longer needs to be performed.

Type	Task	Interval
Vehicle	100	2 Days
Vehicle	200	1 Week
Vehicle	300	1 Month
Vehicle	400	3 Months
Switch	1200	1 Week
Switch	1300	1 Month
Switch	1400	3 Months
Switch	1500	6 Months
Central Control	5200	1 Week
Central Control	5300	1 Month
Central Control	5400	3 Months
Guideway	2300	1 Month
Guideway	2500	6 Months
PDS	3300	1 Month
Station	4300	1 Month
Station	4400	3 Months
Vehicle Wash	7200	1 Week
Vehicle Wash	7300	1 Month

Table D.1 Preventive Maintenance Generally Not Performed at Prescribed Frequency

Type	Task	Interval
Guideway	2801	3 Years
UPS	3100	1 Day
Station	4100	1 Day
Station	4200	1 Week
Station	4500	6 Months
Vehicle Wash	7100	1 Day
Vehicle	7201	1 Week

Table D.2 Preventive Maintenance Tasks No Longer Being Performed

APPENDIX D - PM PERFORMANCE FREQUENCY

C. DETAIL

Nearly all of the bi-daily, weekly, monthly and quarterly vehicle preventive maintenance has been performed significantly less often than prescribed as shown in **Table D.3**, while semi-annual and annual maintenance has generally occurred as prescribed.

Task	100	200	300	400	500	600
Interval	2 Days	1 Week	1 Month	3 Months	6 Months	1 Year
Expected Occurrences	338	96	22	7	3	1.8
Car 1	197	49	9	3	1	2
Car 2	209	50	10	7	3	2
Car 3	234	59	12	3	4	2
Car 4	234	62	13	3	3	2
Car 5	229	57	10	5	3	2
Car 6	230	58	14	3	3	1
Car 7	245	63	12	6	3	1
Car 8	242	61	14	4	3	1
Car 9	226	61	10	5	3	1
Car 10	245	61	14	4	3	1
Car 11	243	61	15	3	3	1
Car 12	236	58	14	4	2	1
Car 13	217	57	9	4	3	2
Car 14	232	58	13	5	2	2
Car 15	231	60	11	6	3	2
Car 16	233	56	17	3	4	2

Table D.3 Vehicle Preventive Maintenance Frequency

Guideway switch preventive maintenance has been performed significantly less than prescribed for the weekly, monthly, quarterly and semi-annual tasks as shown in **Table D.4**, while the annual task has generally been performed at the prescribed frequency.

Task	1200	1300	1400	1500	1600
Interval	1 Week	1 Month	3 Months	6 Months	1 Year
Expected Occurrences	96	22	7	3	1.8
Switch 101	70	15	4	1	2
Switch 102	70	15	4	1	2
Switch 103	70	15	4	1	2
Switch 104	70	15	4	1	2
Switch 105	70	15	4	1	2
Switch 106	70	15	4	1	2
Switch 11	69	14	4	2	2
Switch 12	69	14	4	2	2
Switch 13	69	14	4	2	2
Switch 14	69	14	4	2	2
Switch 21	74	15	4	2	1
Switch 22	74	15	4	2	1
Switch 23	74	15	4	2	1
Switch 24	74	15	4	2	1
Switch 31	63	17	3	2	2
Switch 32	64	16	3	2	2
Switch 33	63	16	3	2	2
Switch 34	63	16	3	2	2
Switch 41	74	15	4	2	1
Switch 42	74	15	4	2	1

Table D.4 Guideway Switch Preventive Maintenance Frequency

Preventive maintenance of the guideway has not been performed as prescribed for the monthly work and about half of the semi-annual work. Annual and triennial preventive maintenance has roughly been performed as prescribed, as shown in **Table D.5**.

APPENDIX D - PM PERFORMANCE FREQUENCY

Task	2300	2500	2600	2800
Interval	1 Month	6 Months	1 Year	3 Years
Expected Occurrences	22	3	1.8	0.6
AB North	18	2	2	0
AB South	19	1	2	0
BC North	18	2	2	0
BC South	19	1	2	0
CD North	18	2	2	0
CD South	19	1	2	0
Maint. Facility	18	4	1	1

Table D.5 Guideway Preventive Maintenance Frequency

Preventive maintenance for the power distribution system has not been performed as prescribed for the monthly task, but has for the annual, biennial and triennial work (see Table 2.19 for more detail).

Task	3300	3600	3601	3700	3800
Interval	1 Month	1 Year	1 Year	2 Years	3 Years
Expected Occurrences	22	1.8	1.8	0.9	0.6
PDS 1	20	1	2	1	1
PDS 2	19	2	2	0	1
PDS 3	19	1	1	1	1

Table D.6 Power Distribution System Preventive Maintenance Frequency

UPS preventive maintenance has been performed as prescribed, as shown in Table D.7.

Task	3500
Interval	6 Months
Expected Occurrences	3
Terminal A	3
Terminal B	3
Terminal C	4
Terminal D	4
Maint. Facility	2

Table D.7 UPS Preventive Maintenance Frequency

Station preventive maintenance has generally not been performed as prescribed for the monthly and quarterly tasks, while annual and quadrennial work has been performed at the prescribed frequencies (see Table D.8 for more detail).

Task	4300	4400	4600	4900
Interval	1 Month	3 Months	1 Year	4 Years
Expected Occurrences	22	7	1.8	0.4
Station A	14	8	2	0
Station B	14	6	1	1
Station C	15	6	2	1
Station D	14	6	2	1

Table D.8 Station Preventive Maintenance Frequency

Preventive maintenance for central control has been performed as prescribed during all three shifts on a daily basis as shown in Table D.9. The semi-annual and annual maintenance has also been performed as prescribed, while the weekly, monthly and quarterly maintenance has not.

APPENDIX D - PM PERFORMANCE FREQUENCY

Task	5100-1	5100-2	5100-3	5200	5300	5400	5500	5600
Interval	1 Day	1 Day	1 Day	1 Week	1 Month	3 Months	6 Months	1 Year
Expected Occurrences	676	676	676	96	22	7	3	1.8
Actual	675	676	675	73	14	4	2	2

Table D.9 Central Control Preventive Maintenance Frequency

Maintenance shop and equipment preventive maintenance has been performed as prescribed, as shown in **Table D.10**.

Task	6300	6500	6600
Interval	1 Month	6 Months	1 Year
Expected Occurrences	22	3	1.8
Actual	20	3	1

Table D.10 Maintenance Shop & Equipment Preventive Maintenance Frequency

Preventive maintenance of the vehicle wash has not been performed as prescribed, with the exception of the semi-annual work, as shown in **Table D.11**.

Task	7100	7200	7300	7500
Interval	1 Day	1 Week	1 Month	6 Months
Expected Occurrences	676	96	22	3
Vehicle Wash	36	58	15	3

Table D.11 Vehicle Wash Preventive Maintenance Frequency

Recovery preventive maintenance has generally been performed as prescribed for all tasks.

Task	8100	8200	8300	8400	8500	8600	8700	8800
Interval	1 Day	1 Week	1 Month	3 Months	6 Months	1 Year	2 Years	3 Years
Expected Occurrences	676	96	22	7	3	1.8	0.9	0.4
Guideway	675	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ATC A	n/a	96	22	7	4	1	1	0
ATC B	n/a	95	22	8	4	2	1	1
ATC C	n/a	95	22	7	3	2	0	1
ATC D	n/a	97	22	7	3	2	1	0
Maint. Facility	n/a	96	23	7	4	2	1	0

Table D.12 Recovery Preventive Maintenance Frequency

Tool and test equipment preventive maintenance has been performed as prescribed, as shown in **Table D.13**.

Task	9600
Interval	1 Year
Expected Occurrences	1.8
Actual	1

Table D.13 Tool & Test Equipment Preventive Maintenance Frequency

The preventive maintenance tasks shown in **Table D.14** are no longer being performed. Further research should be done to verify that they are not needed.

APPENDIX D - PM PERFORMANCE FREQUENCY

Type	Task	Interval
Guideway	2801	3 Years
UPS	3100	1 Day
Station	4100	1 Day
Station	4200	1 Week
Station	4500	6 Months
Vehicle Wash	7100	1 Day
Vehicle	7201	1 Week

Table D.14 Preventive Maintenance No Longer Being Performed

APPENDIX E
CENTRAL CONTROL LOG ANALYSIS

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

A. INTRODUCTION

Central control logs from 2014 were analyzed for trends and patterns to see if they point to any parts of the system needing attention. Findings of note are discussed below.

B. SUMMARY OF ASSETS NEEDING FURTHER INVESTIGATION

This section summarizes the equipment that needs further attention based on analysis of the central control logs. For more detail on each type of alarm see the remaining sections of this document.

1. VEHICLES

Table E.1 shows which vehicles need attention for which errors.

Location	High Frequency Error
Car 4	Battery_Charger_Failure
Car 12	Battery_Charger_Failure
Car 3	Crossover_Graphic_Tx_Fail
Car 7	Crossover_Graphic_Tx_Fail
Car 8	Crossover_Graphic_Tx_Fail
Car 7	Loss_Of_Track_Signal
Car 4	HVAC_Failure
Car 10	HVAC_Failure
Car 11	HVAC_Failure
Car 13	HVAC_Failure
Car 16	HVAC_Failure
Car 8	No_Response_From_Veh_Radio
Car 15	Service_Brake_Fail
Car 15	Dynamic_Brakes_Failure
Car 8	Door_Lock_Failure

Table E.1 High Frequency Vehicle Errors

2. STATIONS

Table E.2 shows what station errors are occurring frequently and where they are occurring.

Location	High Frequency Error
North A	Unscheduled_Stn_Door
North D	Unscheduled_Stn_Door
South A	Unscheduled_Stn_Door
South D	Unscheduled_Stn_Door
North A	PA_Failure
North D	PA_Failure
South D	PA_Failure
Zone 1	PA_Failure
Zone 3	PA_Failure
North C Berth 2	Doors_Did_Not_Open
South A Berth 2	Doors_Did_Not_Open
South C Berth 1	Doors_Did_Not_Open

Table E.2 High Frequency Station Errors

3. GUIDEWAY

High frequency guideway errors and their location are shown in **Table E.3**.

Location	High Frequency Error
Switch 11	SW_Logic_Fluid_Level
Switch 12	SW_Logic_Fluid_Level
Switch 34	Switch_Failed_To_Respond
D245	VTE_Rollback
North D	Brush_Count_Wrong
Train 211	Brush_Count_Wrong

Table E.3 High Frequency Guideway Errors

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

4. PDS

Within the PDS, there are frequent harmonic filter faults as shown in **Table E.4**.

Location	High Frequency Error
1 North	Harm_Filt_Not_Operating
1 South	Harm_Filt_Not_Operating
2 North	Harm_Filt_Not_Operating
2 South	Harm_Filt_Not_Operating
3 North	Harmonic_Filter_Fault
3 South	Harmonic_Filter_Fault

Table E.4 High Frequency PDS Faults

5. UPS

The only high frequency UPS fault is for the UPS in the maintenance facility as shown in Table E.5.

Location	High Frequency Error
Maint. Facility	UPS_Alarm

Table E.5 High Frequency UPS Faults

6. VEHICLE ALARM DETAIL

The occurrence per vehicle of the "Battery_Charger_Failure" error is shown in **Table E.6**. There are frequent occurrences of this error in car numbers 4 and 12 which merit inspection of their battery chargers.

Location	Count
VEH_01	25
VEH_02	27
VEH_03	177
VEH_04	728
VEH_05	60
VEH_06	57
VEH_07	52
VEH_08	53
VEH_09	42
VEH_10	76
VEH_11	112
VEH_12	301
VEH_13	54
VEH_14	76
VEH_15	67
VEH_16	69

Table E.6 "Battery_Charger_Failure" Occurrences

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

The occurrence of "Crossover_Graphic_Tx_Fail" errors per vehicle is show in **Table E.7**. Cars 3, 7 and 8 had high occurrences of these errors so they should receive maintenance to address this issue.

Location	Count
VEH_01	177
VEH_02	178
VEH_03	1,235
VEH_04	374
VEH_05	176
VEH_06	925
VEH_07	1,194
VEH_08	6,889
VEH_09	431
VEH_10	671
VEH_11	448
VEH_12	337
VEH_13	299
VEH_14	335
VEH_15	378
VEH_16	309

Table E.7 "Crossover_Graphic_Tx_Fail" Errors

The occurrence of "Loss_Of_Track_Signal" errors is shown in **Table E.8**. Car 7 should be investigated to find out why it is having these errors so frequently.

Location	Count
VEH_01	223
VEH_02	196
VEH_03	668
VEH_04	417
VEH_05	410
VEH_06	300
VEH_07	1,284
VEH_08	522
VEH_09	232
VEH_10	997
VEH_11	427
VEH_12	432
VEH_13	391
VEH_14	409
VEH_15	390
VEH_16	319

Table E.8 "Loss_Of_Track_Signal" Errors

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

Failure of vehicle HVAC systems is recorded by the error "HVAC_Failure", with frequencies shown in **Table E.9**. The HVAC systems of vehicles 4, 10, 11, 13 and 16 should be assessed for additional maintenance.

Location	Count
VEH_01	110
VEH_02	178
VEH_03	333
VEH_04	1,136
VEH_05	398
VEH_06	198
VEH_07	242
VEH_08	361
VEH_09	64
VEH_10	553
VEH_11	620
VEH_12	359
VEH_13	573
VEH_14	276
VEH_15	297
VEH_16	558

Table E.9 "HVAC_Failure" Errors

The "No_Response_From_Veh_Radio" error occurred frequently in car 8, as shown in **Table E.10**, so the radio in car 8 should be inspected.

Location	Count
VEH_01	128
VEH_02	148
VEH_03	126
VEH_04	187
VEH_05	99
VEH_06	227
VEH_07	122
VEH_08	1,259
VEH_09	95
VEH_10	146
VEH_11	158
VEH_12	163
VEH_13	171
VEH_14	128
VEH_15	126
VEH_16	101

Table E.10 "No_Response_From_Veh_Radio" Errors

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

The high frequency of “Service_Brake_Fail” errors in car 15 have spanned all of 2014, so the service brakes on car 15 should be inspected. See **Table E.11** below for more details.

Location	Count
VEH_01	57
VEH_02	12
VEH_03	18
VEH_04	14
VEH_05	18
VEH_06	17
VEH_07	65
VEH_08	25
VEH_09	16
VEH_10	18
VEH_11	14
VEH_12	21
VEH_13	18
VEH_14	36
VEH_15	202
VEH_16	15

Table E.11 “Service_Brake_Fail” Errors

The “Dynamic_Brakes_Failure” error may not really point to a failure of the dynamic brakes, but rather that the brake relay fails to report that the brakes are engaged. This error is occurring fairly frequently in car 15 (see **Table E.12** below), so the brakes should be checked.

Location	Count
VEH_01	22
VEH_02	6
VEH_03	24
VEH_04	12
VEH_05	18
VEH_06	10
VEH_07	20
VEH_08	19
VEH_09	18
VEH_10	33
VEH_11	10
VEH_12	15
VEH_13	54
VEH_14	65
VEH_15	91
VEH_16	24

Table E.12 “Dynamic_Brakes_Failure” Occurrences

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

“Door_Lock_Failure” errors have been occurring frequently in vehicle 8 (see **Table E.13** below), so it should be checked to see if it needs maintenance.

Location	Count
VEH_02	2
VEH_03	5
VEH_04	1
VEH_05	2
VEH_07	2
VEH_08	258
VEH_10	2
VEH_11	4
VEH_12	1
VEH_13	2
VEH_14	2
VEH_15	2
VEH_16	1

Table E.13 “Door_Lock_Failure” Occurrences

7. STATION ALARM DETAIL

The occurrences of “Unscheduled_Stn_Door” errors are shown in **Table E.14**. When this occurs often, station doors generally need to be adjusted. Doors at north A, north D, south A, and south D should be checked to see if they need to be adjusted.

Location	Count
NORTH_A	1,125
NORTH_B	326
NORTH_C	557
NORTH_D	825
SOUTH_A	1,172
SOUTH_B	439
SOUTH_C	503
SOUTH_D	997

Table E.14 “Unscheduled_Stn_Door” Occurrences

The occurrence of the “PA_Failure” error is shown in **Table E.15**. The ORS PA systems at north A, north D, south D, zone 1 and zone 3 have potential issues that should be investigated.

Location	Count
NORTH_A	295
NORTH_B	30
NORTH_C	32
NORTH_D	225
SOUTH_A	67
SOUTH_B	28
SOUTH_C	9
SOUTH_D	277
Zone_1	224
Zone_2	14
Zone_3	221

Table E.15 “PA_Failure” Occurrences

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

The frequent occurrence of "Doors_Did_Not_Open" errors at north C berth 2, south A berth 2, and south C berth 1 point to potential maintenance issues that should be investigated. **Table E.16** shows more detail.

Location	Berth	Count
NORTH_A	_Brth 1	19
NORTH_A	_Brth 2	19
NORTH_B	_Brth 1	40
NORTH_B	_Brth 2	29
NORTH_C	_Brth 1	22
NORTH_C	_Brth 2	132
NORTH_D	_Brth 1	23
NORTH_D	_Brth 2	25
SOUTH_A	_Brth 1	34
SOUTH_A	_Brth 2	285
SOUTH_B	_Brth 1	43
SOUTH_B	_Brth 2	39
SOUTH_C	_Brth 1	577
SOUTH_C	_Brth 2	13
SOUTH_D	_Brth 1	17
SOUTH_D	_Brth 2	24

Table E.16 "Doors_Did_Not_Open" Errors

8. GUIDEWAY ALARM DETAIL

The frequent occurrence of "SW_Logic_Fluid_Level" errors could point to hydraulic fluid leaks in guideway switches or faulty fluid level switches. Switches 11 and 12 should be inspected.

Location	Count
SW_101	14
SW_102	14
SW_103	14
SW_104	14
SW_105	14
SW_106	14
SW_11	128
SW_12	128
SW_13	67
SW_14	67
SW_21	37
SW_22	30
SW_23	28
SW_24	28
SW_31	39
SW_32	34
SW_33	61
SW_34	63
SW_41	31
SW_42	28

Table E.17 "SW_Logic_Fluid_Level" Errors

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

The high frequency of “Switch_Failed_To_Respond” errors in switch 34 (see **Table E.18**) point to a need to troubleshoot switch 34 to find out why it is failing to respond.

Location	Count
SW_101	21
SW_102	9
SW_103	5
SW_104	51
SW_105	7
SW_106	10
SW_11	49
SW_12	27
SW_13	43
SW_14	37
SW_21	17
SW_23	19
SW_24	7
SW_31	19
SW_32	14
SW_33	7
SW_34	103
SW_41	40
SW_42	9

Table E.18 “Switch_Failed_To_Respond” Errors

“VTE_Rollback” errors are occurring relatively frequently in track block 245 (see **Table E.19**), so this track block should be inspected.

Location	Count
1C11	6
1C12	6
1C13	17
1C14	9
1C22	30
1C23	17
1C25	5
1C42	29
A120	6
A122A	4
A124	5
B220	15
B222A	7
B222B	9
B224	17
B226	15
B228	7
B230	17
B234	5
B240	29
C144	16
C145	4
C146	26
D244	18
D245	60
D246	4
D248	5
D252	6
E106A	7
E108	12
E110	5
F208	7
F210	5
F216	4

Table E.19 “VTE_Rollback” Errors (occurrences of only 4 or more shown)

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

The high frequency of “Brush_Count_Wrong” errors at north D (see **Table E.20**) points to a potential problem with the brush counter there, which warrants further investigation.

Location	Count
NORTH_C	65
NORTH_D	1,518
SOUTH_C	81
SOUTH_D	32

Table E.20 “Brush_Count_Wrong” Occurrences

Digging deeper into the data shown in **Table E.20**, **Table E.21** shows how frequently brush count errors occurred at each brush counter combined with various trains. Of these brush counter/train pairs, the combination of north D and train 211 (2-car train led by car 11) produced the most errors. So there may also be a problem with the brushes on train 211, which should be further investigated.

Location	Train	Count
NORTH_D	201	173
SOUTH_C	201	6
NORTH_C	203	11
NORTH_D	203	142
SOUTH_D	203	8
NORTH_C	205	11
NORTH_D	205	149
SOUTH_C	205	9
NORTH_D	206	47
NORTH_D	207	176
SOUTH_C	207	10
NORTH_D	209	109
SOUTH_C	209	7
NORTH_D	211	306
SOUTH_C	211	16
NORTH_C	213	7
NORTH_D	213	196
NORTH_C	215	6
NORTH_D	215	137
SOUTH_C	215	6
NORTH_C	104	10
NORTH_D	108	79

Table E.21 “Brush_Count_Wrong” Occurrences for Brush Counter/Train Pairs (occurrences of only 6 or more shown)

APPENDIX E - CENTRAL CONTROL LOG ANALYSIS

9. PDS ALARM DETAIL

Harmonic filters generally don't fault often, so the high frequency of the "Harm_Filt_Not_Operating" faults in the 1 north, 1 south, 2 north and 2 south harmonic filters warrant further investigation.

Location	Count
HF1N	222
HF1S	221
HF2N	185
HF2S	209
HF3N	18
HF3S	15

Table E.22 "Harm_Filt_Not_Operating" Occurrences

In contrast to **Table E.22**, **Table E.23** shows a relatively high frequency of harmonic filter faults in 3 north and 3 south. So all harmonic filters could be in need of maintenance and should be inspected.

Location	Count
HF1S	21
HF2S	20
HF3N	90
HF3S	60

Table E.23 "Harmonic_Filter_Fault" Occurrences

10. UPS ALARM DETAIL

Table E.24 shows a high number of "UPS_Alarm" occurrences at the maintenance facility. This could point to a problem with the UPS or a false positive, so further investigation is in order. The maintenance facility UPS also has a relatively high frequency of "UPS_Load_On_Bypass" and "UPS_Not_Normal" errors.

Location	Count
MAINT	124
NORTH_B	36
NORTH_C	32
NORTH_D	37
WA_UPS	4

Table E.24 "UPS_Alarm" Occurrences

APPENDIX F
NEW CONTROL CENTER



APPENDIX F - CONTROL ROOM RELOCATION STUDY

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APPENDIX F - CONTROL ROOM RELOCATION STUDY

A. INTRODUCTION

HAS has identified the need for a new Control Center for the Automated People Mover (APM). The current Control Center is original to the APM and has not been updated to accommodate changes to technology or the operating system since its inception. The main drivers for consideration of developing a new APM Control Center are:

- 1) Current Control Center is outdated.
- 2) Current Control Center is not conveniently located to the Maintenance Facility.
- 3) Space currently occupied by the Control Center in Terminal B is being phased out because of remodeling of the terminal it is located in.

B. SPACE NEEDS

The focus of the operation is the Control Room; however there are associated facilities that should be considered in planning of a new Control Room. Planning for a new Control Room and associated facilities needs to consider the following:

Control Room – Space for monitoring and managing the operations of the APM on a 24/7 basis

Administrative Spaces – Office(s), work stations and meeting room spaces to house HAS Contract Managers and Inspectors

Break Room – Kitchenette space directly adjacent to the Control Room

Toilet Room – Toilet facilities directly adjacent to the Control Room

Storage - Storage space directly adjacent to the Control Room

Computer Room – IT space for the housing of computer servers

Electrical Room – Space for electrical switchgear and controls associated with the equipment needed for the Control Room and Computer Room. The Electrical Room also houses the uninterruptable power supplies

Mechanical Room – Space needed for housing heating and cooling equipment needed for the operation of the space

C. SPACE JUSTIFICATION

Control Room – Space needed for people and computer equipment to monitor and manage the operations of the APM. Space needs for training in control room operations. Space needs for two operator work stations and one training station. Also space needs for a library for technical and reference manuals.

Administrative Spaces – Office(s), work stations and meeting room spaces used by people managing and coordinating the activities of the control room operations and coordination with the maintenance of the APM systems. It is anticipated that space will be needed for one office, two work stations for operational staff and one flexible workstation for visiting HAS Staff.

Break Room – Kitchenette space needs to be provided adjacent to the Control Room to minimize the time away from the control facilities.

Toilet Room – Toilet facility space needs to be provided adjacent to the Control Room to minimize the time away from the control facilities. Depending upon the location of the Control Center and vertical/horizontal circulation, separate Men's and Women's toilet rooms may need to be provided.

Storage - Storage space, although minimal, is necessary for toilet and break room supplies, PPE storage and emergency supplies.

Computer Room – IT space for the housing of the computer servers

Electrical Room – Space for electrical switchgear and controls associated with the equipment needed for the Control Room and Computer Room. Uninterruptable power supplies used in conjunction with the control facilities and operations are also housed in the Electrical Equipment Room.

Mechanical Room – Space needed for housing heating and cooling equipment needed for the operation

APPENDIX F - CONTROL ROOM RELOCATION STUDY

of the control room equipment and spaces.

Beside circulation space needed for accessing the different spaces it is anticipated that two exit stairs will be needed. It is also recommended that vertical circulation in the form of an elevator be included serving the Control Facilities to minimize cross traffic between the Maintenance Facility and to provide a secure access point to the Control Facilities and maintenance equipment access.

D. SPACE ASSESSMENT

- Control Room
 - Two Control Room Operator Workstations 150 sf each = 300 sf
 - One Training Station 100 sf = 100 sf
 - Library Area w/ Workstation 200 sf = 200 sf
 - Total 600 sf
- Administrative Spaces
 - Office – One 12' x 12' 144 sf = 144 sf
 - Workstations – Two 8' x 10' 80 sf each = 160 sf
 - Workstation – One Floating Station 80 sf = 80 sf
 - Conference Room – 12' x 14' 168 sf = 168 sf
 - Total 552 sf
- Break/Toilet Room
 - Kitchenette 80 sf = 80 sf
 - Toilet Rooms (2) 80 sf each = 160 sf
 - Total 240 sf
- Storage 60 sf = 60 sf

- Computer Room - 10' x 12' 120 sf = 120 sf
- Electrical Room – 10' x 10' 100 sf = 100 sf
- Mechanical Room – 12' x 12' 144 sf = 144 sf
- **Subtotal of Basic Needs** **1,816 sf**

Space assignments for circulation within the operation space or for vertical circulation have not been included in the numbers because of the wide variation in the space (20% to 30% additional) needed depending on the type of option. For example the elevated options require considerably more circulation because of the need for access corridors, walls, stairs and an elevator. Also multiple story options require additional space. The total square footage for each of the options is listed later in this report.

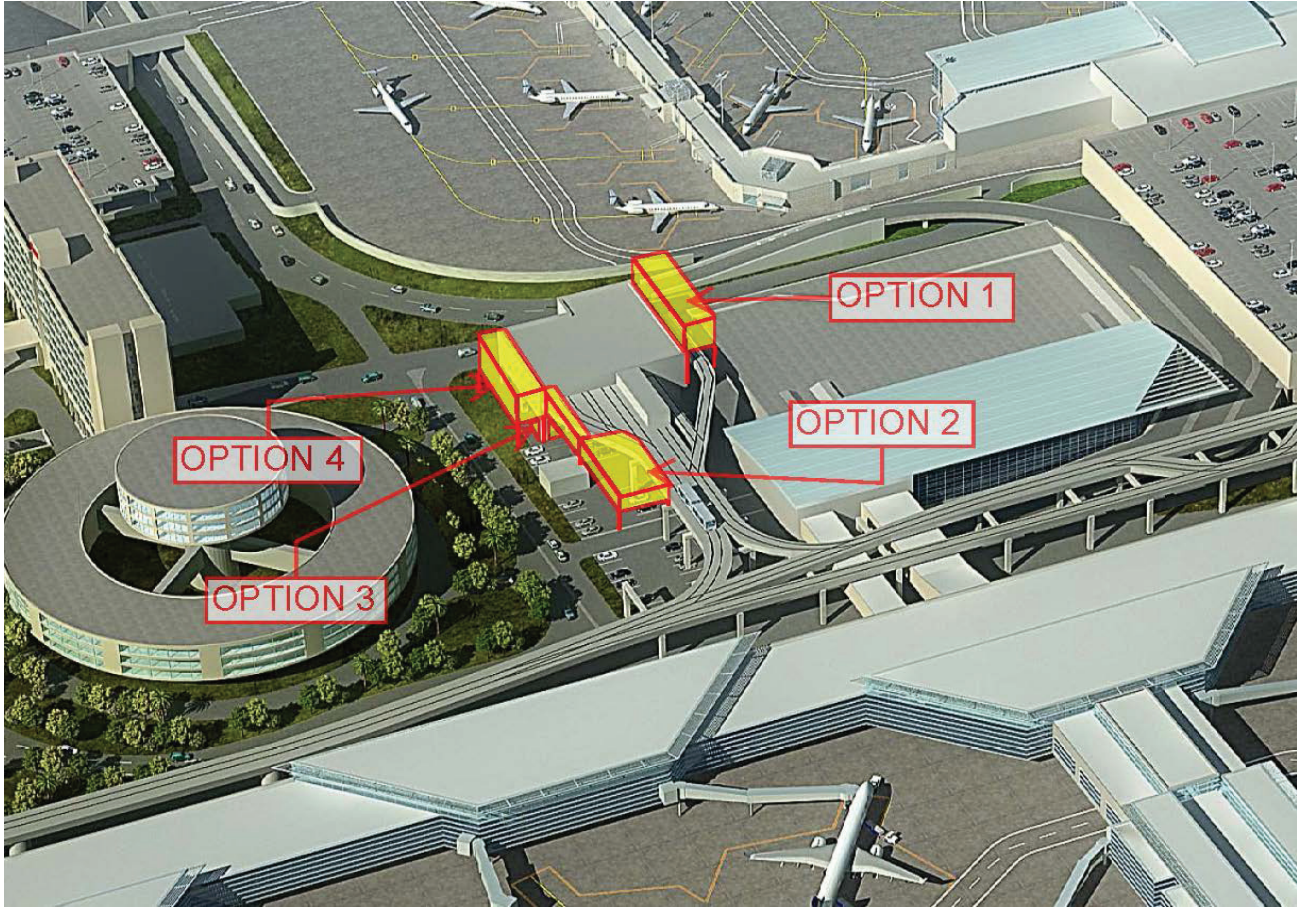
E. OPTION ANALYSIS

For preliminary planning purposes a one story space of 40' x 60' (2,600 sf, basic needs plus an allowance for circulation) was used to determine suitable locations. Four primary options have been reviewed for a new Control Center. An assessment was also done of the potential for remodeling the existing Control Room and associated facilities. The comparison review is included as **Option 5**.

APPENDIX F - CONTROL ROOM RELOCATION STUDY



OVERVIEW OF IAH AIRPORT



LARGE SCALE VIEW OF CONTROL ROOM OPTIONS

Overview of Control Center Location Options

- Option 1 - Elevated Space over APM Storage Track
- Option 2 - Extend Mezzanine Level Space
- Option 3 - Parking Lot Space Under the Maintenance Facility
- Option 4 - Elevated on East Side of Maintenance Facility
- Option 5 - Remodeling of Existing Control Room

APPENDIX F - CONTROL ROOM RELOCATION STUDY



OPTION 1 - ELEVATED SPACE OVER APM STORAGE TRACK

- Pros**
- Near to Offices and Maintenance Operations
 - Consolidates APM functions
 - Isolates Control Center from Terminal functions
 - Little Impact to Adjacent Spaces

- Cons**
- Elevated Construction Cost is higher
 - Pedestrian Traffic is complicated due to offset levels
 - Vertical Circulation is complicated because of tracks below
 - Access to the Maintenance Facility is complicated

APPENDIX F - CONTROL ROOM RELOCATION STUDY



OPTION 2 - EXTEND MEZZANINE LEVEL SPACE

Pros

- Adjacent to Offices and Maintenance Operations
- Consolidates APM functions
- Isolates Control Center from Terminal functions

Cons

- Elevated Construction Cost is higher
- Vertical Circulation is complicated because of tracks below
- Access to the Maintenance Facility is complicated
- Pedestrian circulation to Offices is inconvenient
- Construction conflicts with service tracks
- Significant disruption to Offices and Operations during construction

APPENDIX F - CONTROL ROOM RELOCATION STUDY



OPTION 3 - PARKING LOT SPACE UNDER THE MAINTENANCE FACILITY

- Pros**
- Located at Ground Level
 - Vertical circulation needed to access Maintenance Offices
 - Minimal disruption to Offices and Operations during construction
 - Minimal cost of remodeling existing Facility
 - Consolidates APM Control Center operations to one story
 - Isolates Control Center from Maintenance operations and Terminals

- Cons**
- Eliminates some parking
 - Requires Men’s and Women’s toilet rooms
 - Access to the Maintenance Facility is complicated
 - Pedestrian circulation to Offices is inconvenient

APPENDIX F - CONTROL ROOM RELOCATION STUDY



OPTION 4 - ELEVATED ON EAST SIDE OF MAINTENANCE FACILITY

Pros

- Near Offices and Maintenance facilities
- Minimal disruption to facilities and operations during construction
- Consolidates APM functions
- Isolates Control Center from Terminal functions

Cons

- Elevated Construction Cost is higher
- Vertical Circulation necessary
- Access to the Maintenance Facility is complicated
- Pedestrian circulation to Offices is inconvenient
- Disruption to Offices and Operations during construction

APPENDIX F - CONTROL ROOM RELOCATION STUDY



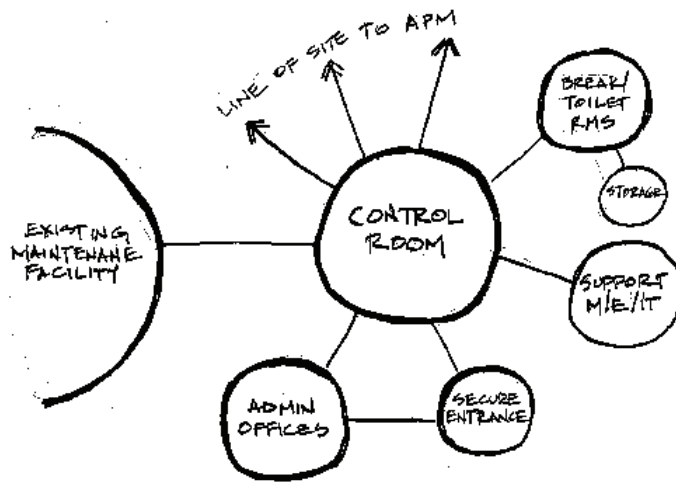
OPTION 5 - REMODELING OF EXISTING CONTROL ROOM

Pros Less Construction Cost to Remodel Existing than Construct New
No Interference with Tracks or Trams during Construction

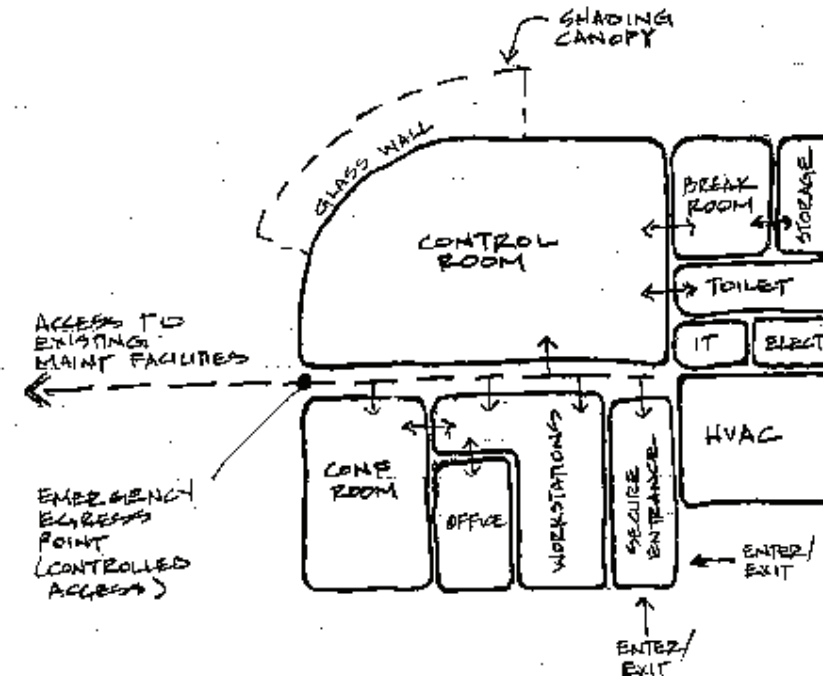
Cons Location removed from APM Maintenance Facility
Access to the Maintenance Facility is complicated
Significant operational interferences during Construction
Increased construction cost of an in-operation facility
No expansion space gained

APPENDIX F - CONTROL ROOM RELOCATION STUDY

F. BUBBLE DIAGRAMS



Basic Relationship Diagram



Preliminary Relationship Diagram

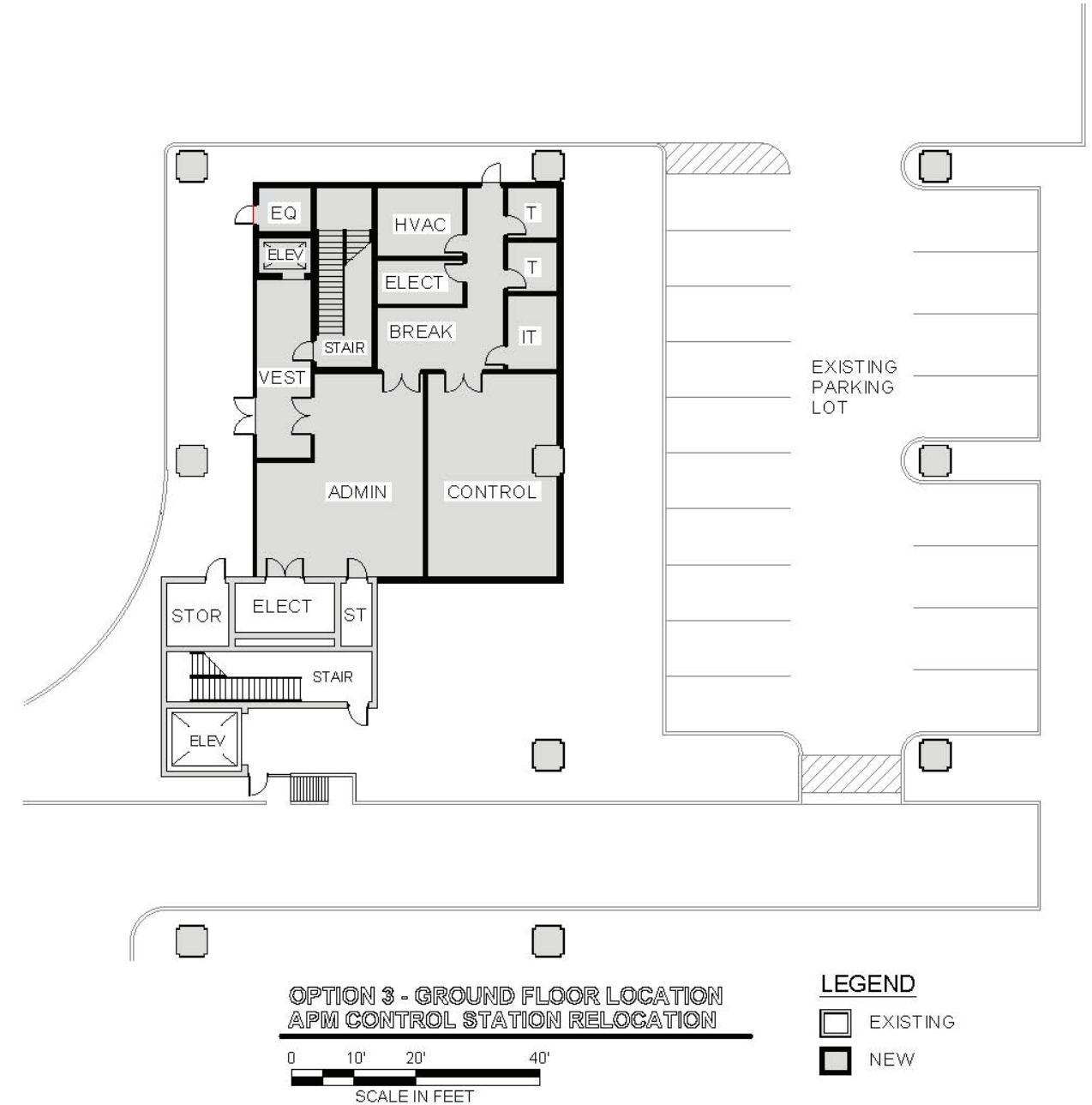
APPENDIX F - CONTROL ROOM RELOCATION STUDY

G. DIAGRAMMATIC FLOOR PLANS

Diagrammatic floor plans were developed to review each of the Options in relation to the operations of the existing Maintenance Facility. In the development of these plans Option 1 and Option 2 proved to include too many technical difficulties to make these effective solutions. Technical difficulties included circulation pathways connecting to the existing Maintenance Facility, and interference with the APM rail system. For these reasons Option 1 and Option 2 have not been included in further development.

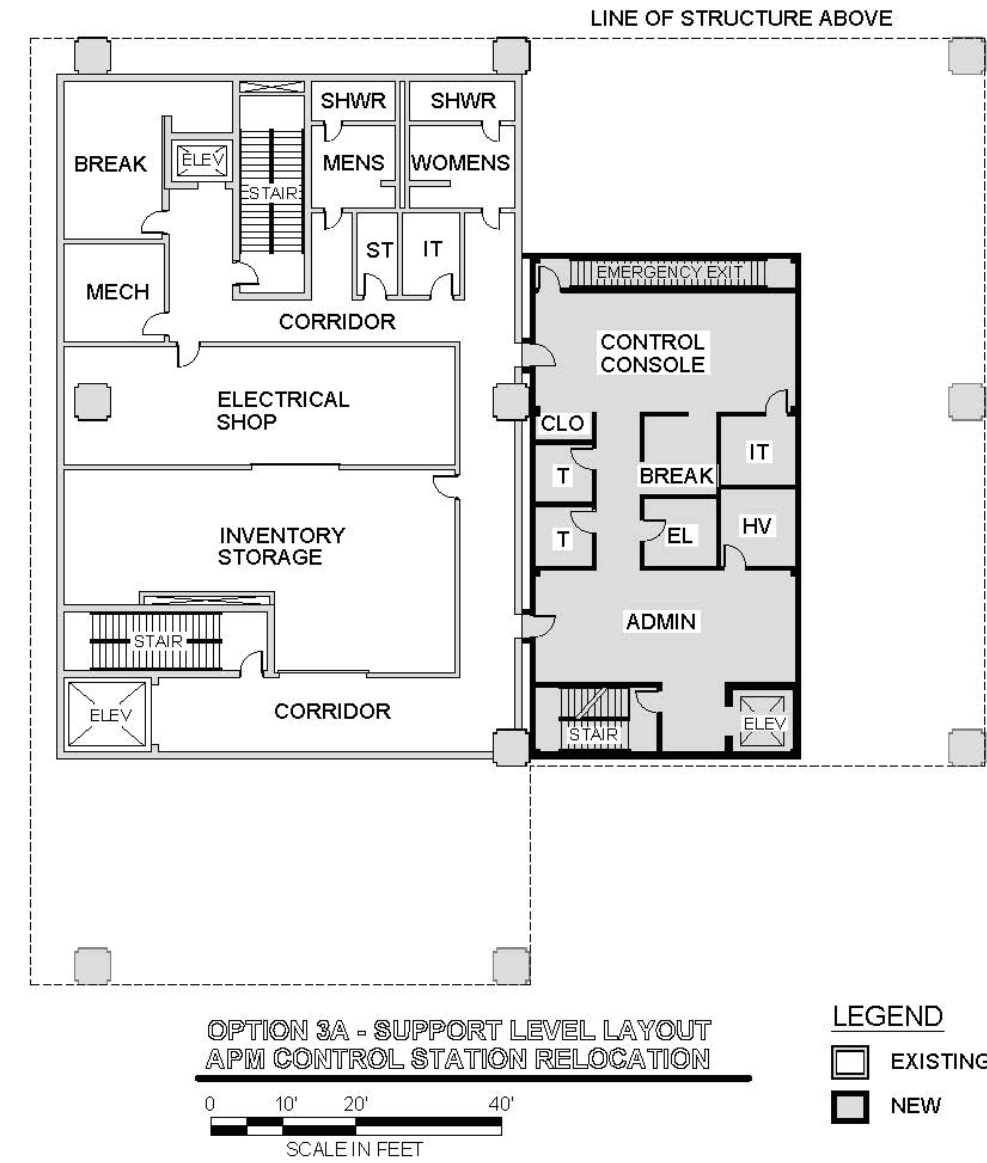
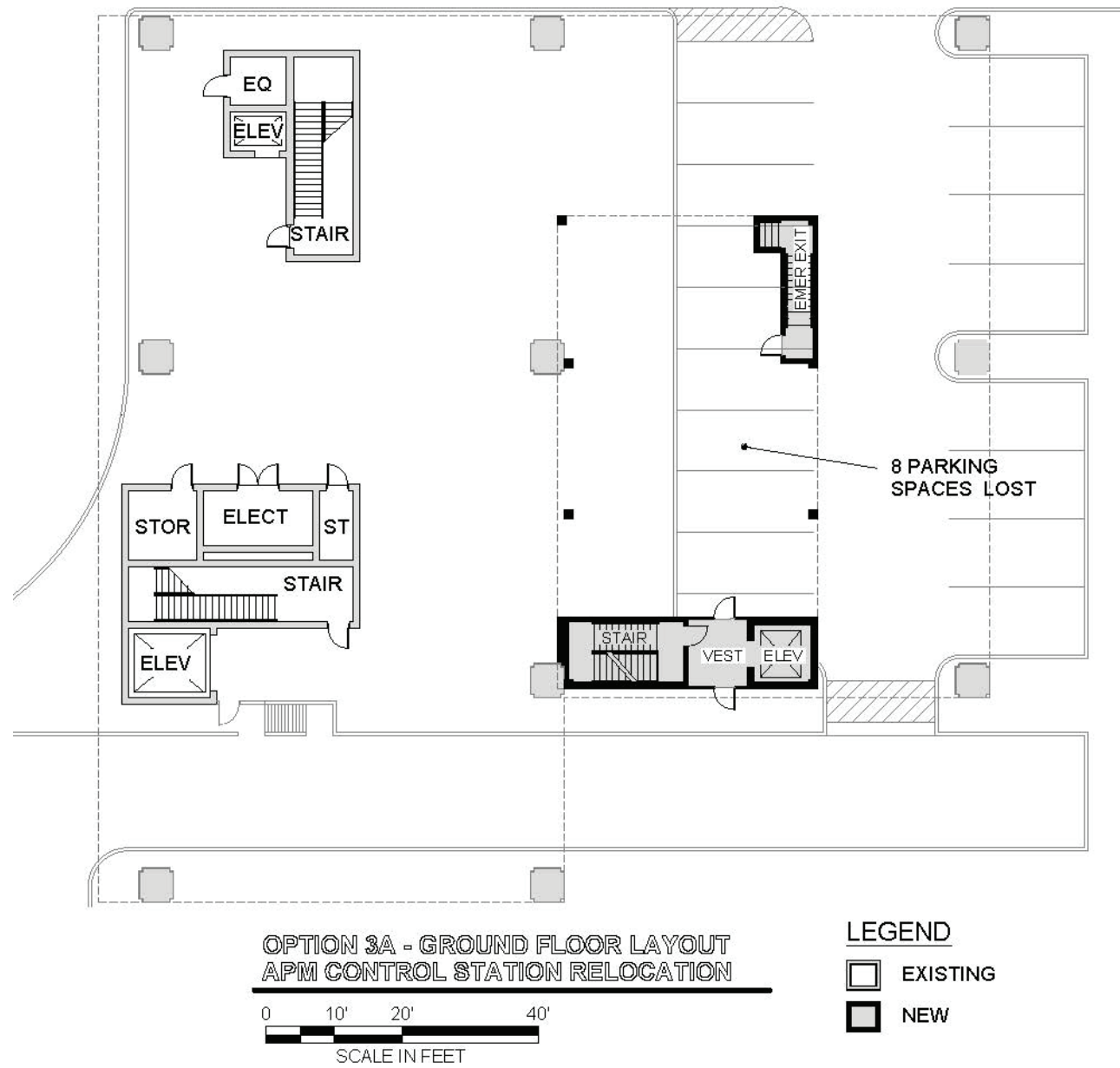
The following diagrammatic floor plans were developed to aid in the review of viable options. These include floor plans of Option 3 and Option 4. Additionally in the development of Option 3, a variation of Option 3, Option 3A, was developed and added as an additional potential solution. Option 3A provides some significant advantages to incorporating the Control Center into the Maintenance Facility. The advantages are listed below the floor plans for Option 3A.

OPTION 3 - PARKING LOT SPACE UNDER THE MAINTENANCE



APPENDIX F - CONTROL ROOM RELOCATION STUDY

OPTION 3A - PARKING LOT SPACE UNDER THE MAINTENANCE FACILITY

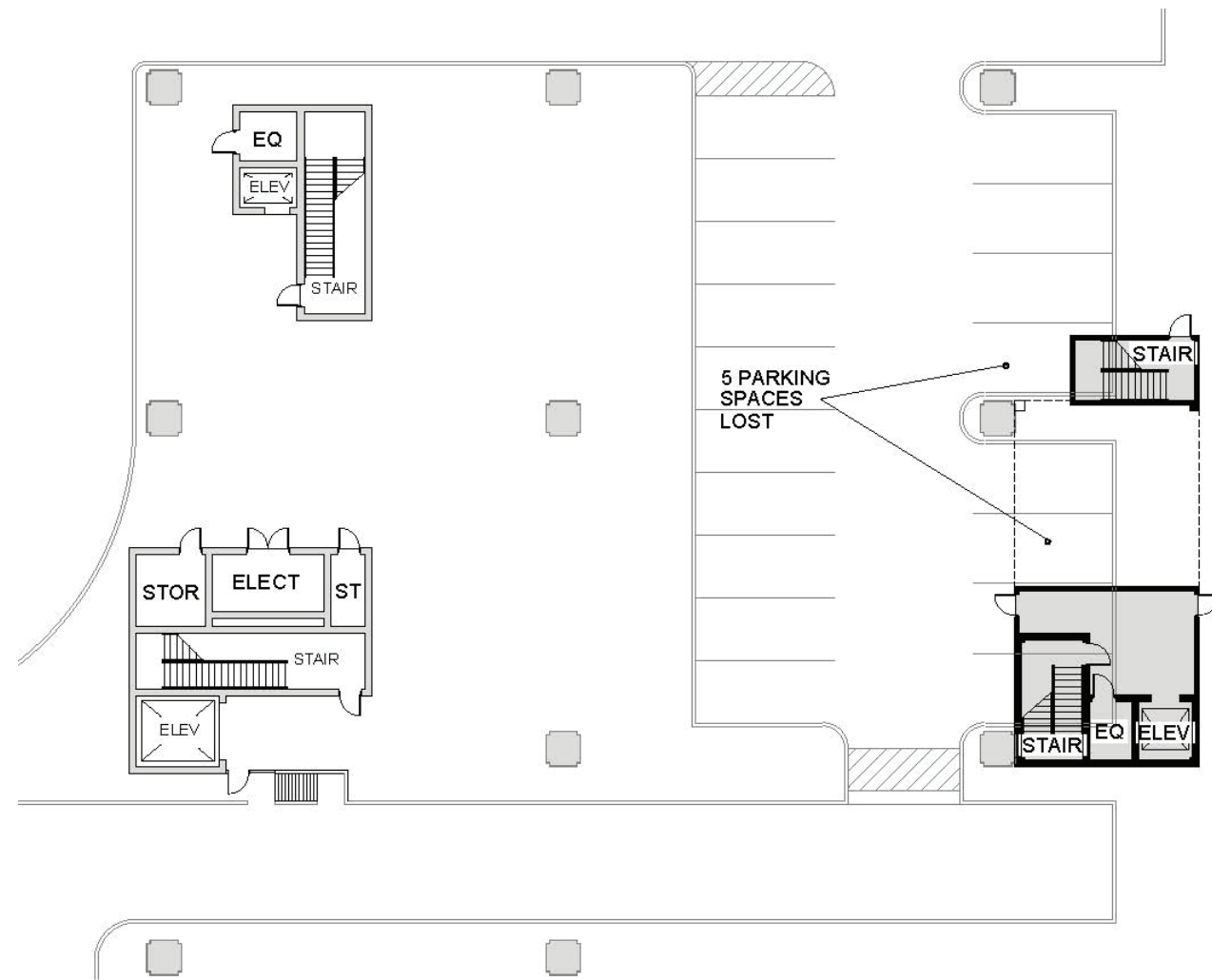


APPENDIX F - CONTROL ROOM RELOCATION STUDY

Advantages to Option 3A include consolidation of all new operations on one level, connection to the existing Maintenance Facility operations, minimal interference with the existing Maintenance Facility, and minimal interference with APM track and car operations. Stairs have been included to serve the Control Center separate from the Maintenance Facility to allow the Center to function completely independently of the Maintenance facility. It may be possible to eliminate one of the stairs depending on the access and security arrangements between the two facilities.

APPENDIX F - CONTROL ROOM RELOCATION STUDY

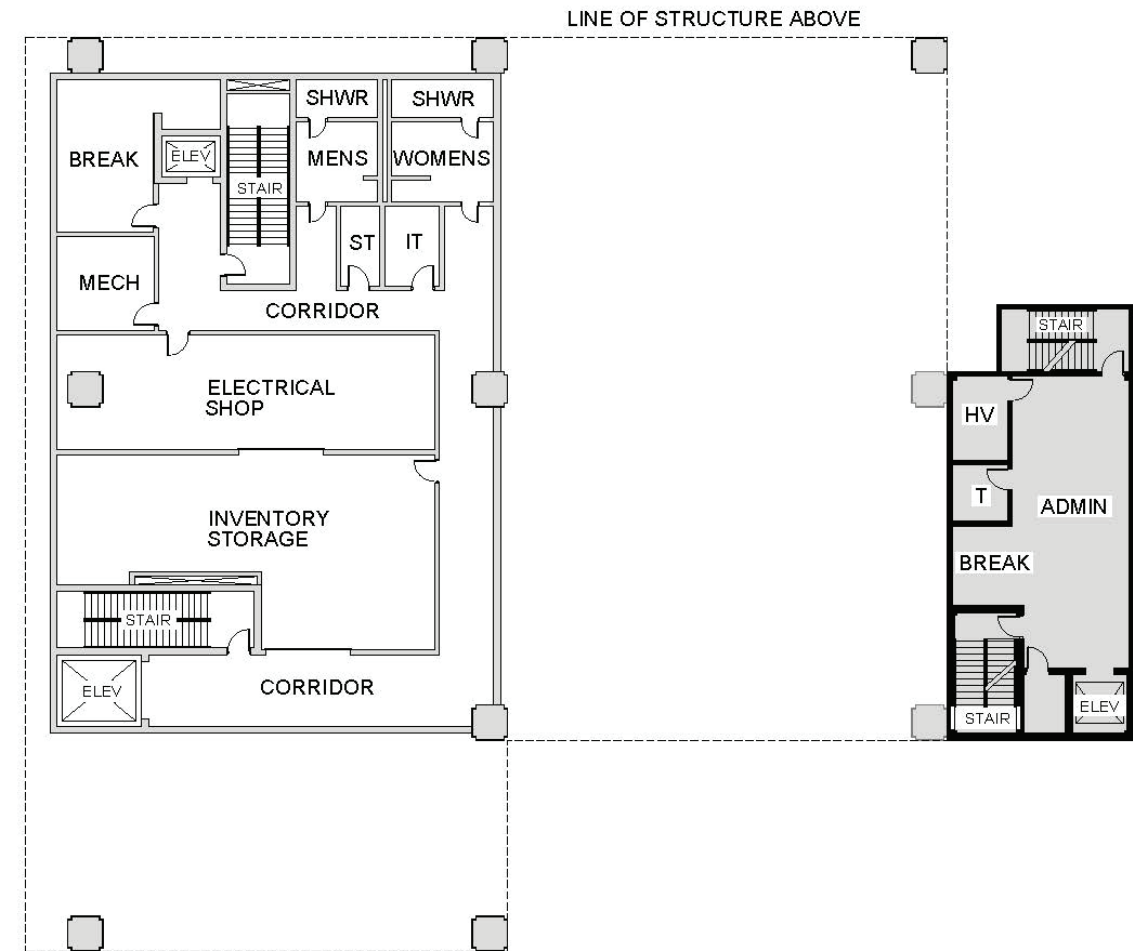
OPTION 4 - Elevated on East Side of Maintenance Facility



**OPTION 4 - GROUND FLOOR LAYOUT
APM CONTROL STATION RELOCATION**



- LEGEND**
- EXISTING
 - NEW

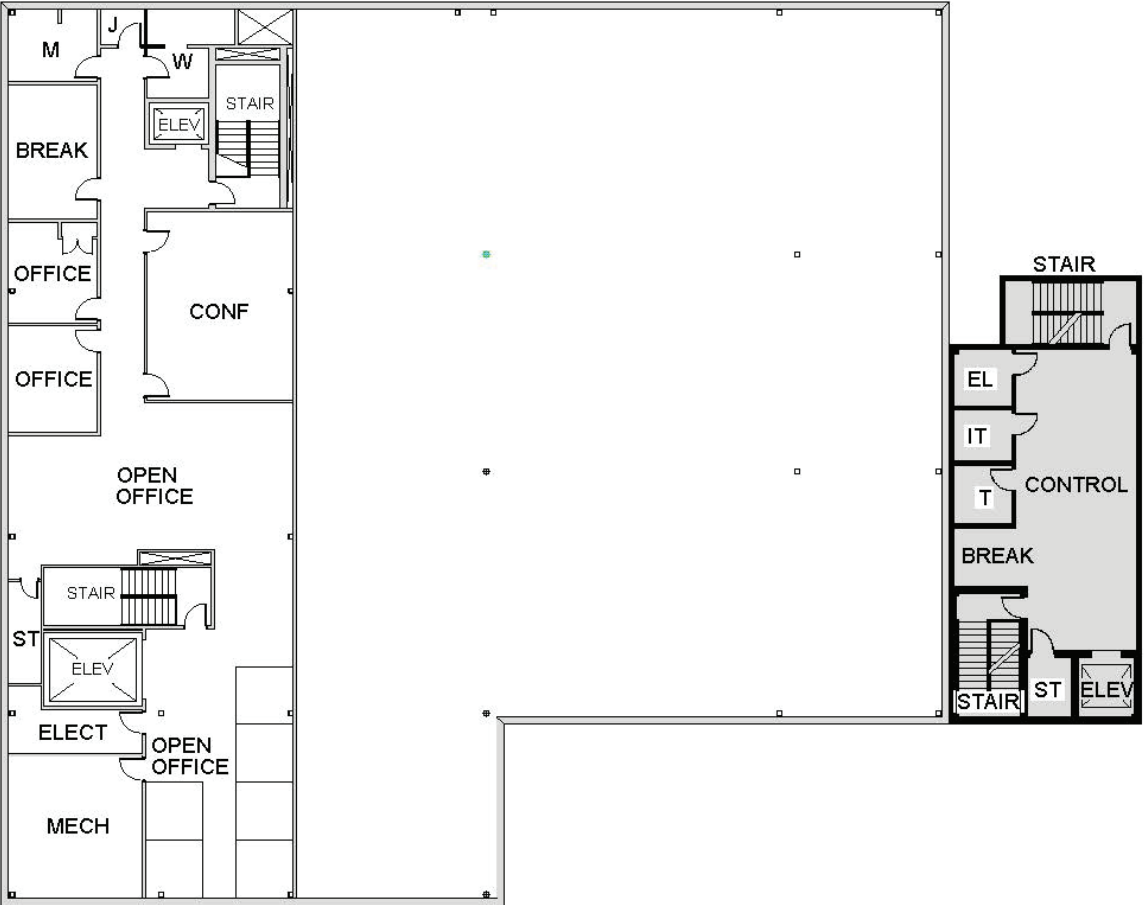


**OPTION 4 - SUPPORT LEVEL LAYOUT
APM CONTROL STATION RELOCATION**



- LEGEND**
- EXISTING
 - NEW

APPENDIX F - CONTROL ROOM RELOCATION STUDY



OPTION 4 - MEZZANINE LEVEL LAYOUT
APM CONTROL STATION RELOCATION



- LEGEND
- EXISTING
 - NEW

APPENDIX F - CONTROL ROOM RELOCATION STUDY

OPTION 5 - REMODELING OF EXISTING CONTROL ROOM

The existing Control Center is original to the APM and has not been updated to accommodate changes to technology or the operating system since its inception. As a comparative measure to replacing the Control Center, review of the existing Control Center is helpful in comparing all options. The existing Control Center includes the following spaces:

- 1) Control Console Room of 560 square feet
- 2) Computer Room of 150 square feet
- 3) Cable Pull Room of 160 square feet
- 4) Two Toilet Rooms of 50 square feet each for a total of 100 square feet
- 5) Circulation of 65 square feet

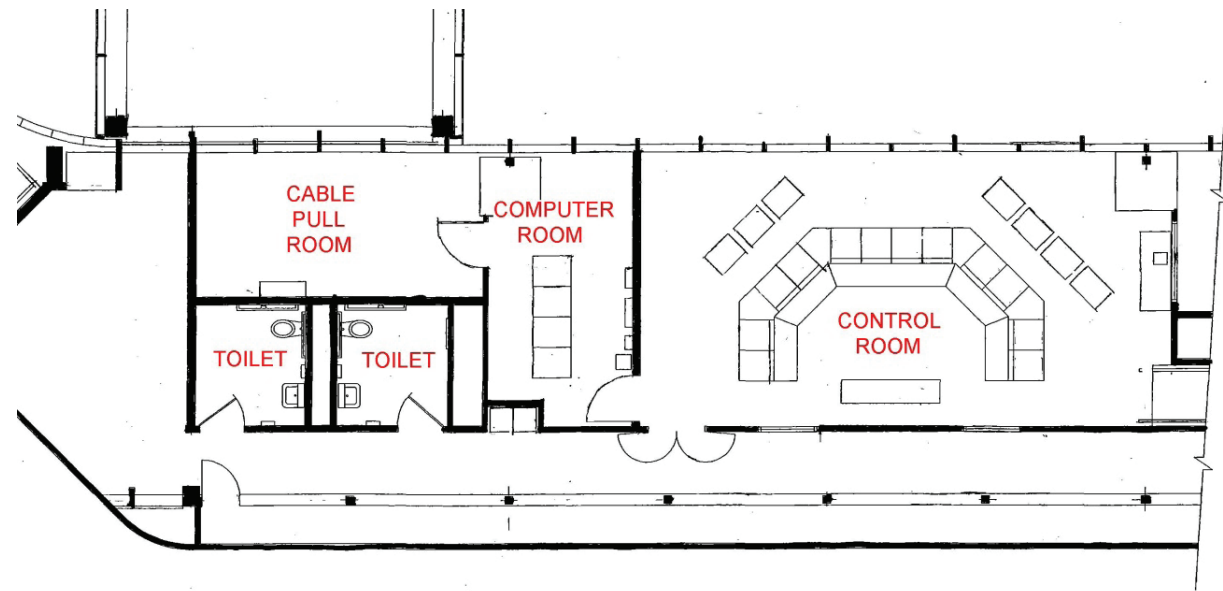
The total area for the Control Center is 985 square feet. This facility is combined with other facilities which minimizes mechanical, electrical and circulation space.

Comparing continued use of the existing Control Center to that of new construction would include renovation of the existing control facilities including:

- 1) Control Console Room
 - a) Install new acoustic tile ceilings
 - b) Install new recessed lighting
 - c) Install new static resistant flooring
 - d) Remodel the existing HVAC ductwork to accommodate the new ceiling and clean portions of ductwork to remain
- 2) Computer Room
 - a) Install new acoustic tile ceilings
 - b) Install new recessed lighting

- c) Install new static resistant flooring
 - d) Remodel the existing HVAC ductwork to accommodate the new ceiling and clean portions of ductwork to remain
- 3) Cable Pull Room
 - a) Install new acoustic tile ceilings
 - b) Install new recessed lighting
 - c) Install new static resistant flooring
 - d) Remodel the existing HVAC ductwork to accommodate the new ceiling and clean portions of ductwork to remain
- 4) Two Toilet Rooms
 - a) Install new acoustic tile ceilings
 - b) Install new recessed lighting
 - c) Install new static resistant flooring
 - d) Remodel the existing HVAC ductwork to accommodate the new ceiling and clean portions of ductwork to remain
- 5) Circulation
 - a) Install new acoustic tile ceilings
 - b) Install new recessed lighting
 - c) Remodel the existing HVAC ductwork to accommodate the new ceiling and clean portions of ductwork to remain

APPENDIX F - CONTROL ROOM RELOCATION STUDY



LAYOUT OF EXISTING CONTROL CENTER

H. RECOMMENDATIONS

Based on the following criteria, Option 3A provides the most effective solution available for relocation of the Control Center. This excludes Option 5 from consideration since it only considers renovation of existing area.

Access from Grade

Option 3A provides access from grade in similar fashion to that of the other Options.

Access to the existing Maintenance Facility Operations

Option 3A provides access to the Maintenance Facility Support Level operations directly as opposed to needing vertical circulation elements to gain access to that level.

Effect on Parking

Option 3A reduces the amount of existing parking no more than any of the other Options with the exception of Option 3.

Effect on Storage Facilities

Option 3A reduces the amount of existing at grade storage no more than any of the other Options.

Effect on Maintenance Facility Operations

Option 3A has the least significant impact of all the Options on existing Maintenance Facility operations while providing the most contiguous access to the Operations of the Support Level of the Maintenance Facility.

APPENDIX F - CONTROL ROOM RELOCATION STUDY

Effect on APM Rail/Track Operations

Option 3A has the least significant impact of all the Options on APM Rail/Track operations.

Simplicity of Control Center Operations

Option 3A having all of its functions on one level makes it the most operationally effective of all the solutions.

Square Footage

The preliminary square footage requirements for each of the Options are as follows:

- Option 1 4,200 sf (total for all levels including connection to existing Maintenance Offices)
- Option 2 3,824 sf (total for all levels)
- Option 3 3,224 sf (total for all levels)
- Option 3A 3,177 sf (total for all levels)
- Option 4 4,046 sf (total for all levels)
- Option 5 985 sf (total)

I. ESTIMATED COST

The cost of all of the Options is as follows:

- Option 1 \$ 2,921,577
- Option 2 \$ 2,439,756
- Option 3 \$ 1,850,136
- Option 3A \$ 1,845,085
- Option 4 \$ 2,459,703
- Option 5 \$ 81,433

Breakdowns for each of the estimates are included in **Appendix B**.

APPENDIX A
DESIGN CRITERIA



APPENDIX A - DESIGN CRITERIA

A. DESIGN CRITERIA

The following information is included as the recommended design criteria for new Control Center. The Control Center is recommended to be designed as a secure Control Room, with stand-alone support facilities of heating, cooling, electrical and fire protection. The Control Center operates a people moving operation that needs to focus on the operation of the moving system and provides for the safety of the passengers. The Control Center needs to have access to the existing Maintenance Facility with the ability control and/or restrict traffic between the facilities. The basis of the design for the proposed options includes:

B. ARCHITECTURAL

Walls – Exterior walls shall be precast concrete or concrete masonry for durability, reinforced and tied to the main structural elements for weather protection (hurricanes, tornados, etc.). Interior walls shall be gypsum board on metal studs for simplicity of separation of spaces and to provide for ease of future reconfiguration of the space.

Roof – Roofing shall be single ply PVC roofing on rigid insulation. PVC roofing is recommended for its ability to resist damage or accelerated aging caused by airborne solvents, primarily jet fuel.

Ceilings – Ceilings within the Control Center shall lay-in acoustic tile ceiling systems to aid in noise reduction within the spaces.

Flooring – Flooring throughout the space shall be static control carpet tile in offices and control room spaces to minimize noise and vinyl composition tile in break, toilet and high traffic spaces.

Doors – Doors shall be heavy duty insulated hollow metal to minimize outside noise effects, provide a higher level of security, and simplicity of construction and maintenance. Hardware shall be stainless steel, heavy duty locks and accessories for security and ease of maintenance.

C. FURNITURE, FIXTURES AND EQUIPMENT

Furniture recommended for the Control Room is commercial grade control room consoles with commercial grade chairs. Control Room operators typically spend several hours sitting and monitoring video feed. Commercial grade furniture is ergonomically designed for comfort and to minimize fatigue. Commercial grade control consoles also provide more adjustment options to suit the physical characteristics of each individual operator. A few of the commercial grade console furniture manufacturers include:

- Evans Consoles
- Americon

D. STRUCTURAL

Super Structure – Main structural elements, beams, columns and slabs, shall be cast in place or precast concrete to minimize maintenance.

Sub Structure – Secondary structural elements shall also be cast in place or precast concrete to minimize maintenance.

E. PLUMBING

Sanitary Waste & Vent - New sanitary and waste and vent piping shall be coordinated and tied into the existing system where practical. The system shall be a no hub cast iron waste and vent system. The sewer system shall service all janitors' closets, floor drains, restrooms and any other plumbing fixtures located within the facility. All fixtures shall be trapped and vented to atmosphere. Floor drains and other spaces which are not subject to regular and frequent wetting will be provided with a trap primer.

A hub drain shall be provided in the mechanical room to convey condensate from the air handling unit to the storm drain system. Piping from the hub drain shall be insulated to prevent condensation on the piping.

Below grade sanitary waste and vent piping will be Type PVC-DWV Schedule 40 with solvent cement joints, where subject to receipt of waste in excess of 130°F. Sanitary waste and vent piping above grade shall be hubless cast-iron pipe with heavy duty stainless steel couplings.

Water Service- Water will be extended from the existing water service currently servicing the maintenance

APPENDIX A - DESIGN CRITERIA

facility.

The domestic hot and cold water systems will be Type L copper tube with wrought copper fittings and soldered joints. Solder will be lead-free.

Hot water will be insulated in accordance with the Uniform Plumbing Code with the City of Houston amendments. Isolation valves will be provided at all riser connections, branch piping run-outs to fixture groups and at all fixtures requiring maintenance.

F. HVAC

Air Systems - The system will consist of a single built up variable volume air handling unit, variable volume boxes with electric heat. The variable volume air handling unit shall consist of pre-filters, draw-through chilled water coil, and access sections and plenum fan. The single duct variable volume boxes shall be provided with electric heat. Outside air will be provided to the air handling unit in accordance with ASHRAE Standard 62.1 with City of Houston Amendments.

The air will be supplied to all appropriate spaces and a portion of the air will be returned to the air handling unit. The portion not returned to the unit shall be utilized as make-up air for the exhaust system and building pressurization. The restrooms and storage closets will be provided with a constant volume exhaust system ducted to the exterior of the building.

Ductwork shall be constructed in accordance with SMACNA Standards for the appropriate pressure class. Ductwork leakage shall be limited to 1% of the design flow rate and all supply air ductwork shall be externally insulated.

Hydronics - Existing chilled water system piping that currently serves the maintenance facility will be extended to provide chilled water to the new air handling unit. A new chilled water pump will be installed to ensure that proper flow is capable of being maintained.

The chilled water piping shall be Type L copper piping for pipes smaller than 2" and carbon steel piping with welded fittings for pipes 2" and larger. Grooved fittings can be used in the mechanical room at equipment connections in lieu of welded fittings.

All chilled water piping insulation shall be closed cell type insulation with an appropriate jacket.

Controls - Mechanical systems shall be controlled and monitored through a DDC based Building Automation System (BAS) with distributed processing at the local levels. This system shall be capable of being tied into the existing BAS that is installed in the maintenance facility.

G. ELECTRICAL

Main Power - Power will be provided from a sub feed breaker placed in the Main Distribution Panel located in the main electrical room to serve a 480/277 volt 3-phase 4-wire, 400 Amp panel. Power will be distributed from the main distribution panel to the various electrical panels throughout the facility. Large motor loads, and HVAC equipment will be fed at 480 volts, 3-phase; lighting will be fed at 277 volts, receptacles and other misc. loads will be fed at 120 volts through branch circuit panels served from step down dry type transformers (aluminum wound). Secondary service from the utility transformer will be in PVC conduit. All feeders will be installed in conduit.

Emergency Power - An Uninterruptible Power Supply (UPS) system with a minimum 20 minute stand by time will be provided to back up the MDF Room, computers, and other low voltage data systems. A small 45KVA generator located on the lower level will provide backup power to support the life safety systems (lighting, fire alarm, and security) in the building. The UPS shall provide short term emergency power for the MDF room and computer while the emergency generator starts-up to ensure constant power to computer and data systems.

Lighting - Lighting will be provided by the use of energy efficient LED light fixtures. Public and office areas will be provided with 2x4 troffers. Control rooms shall be provided with dimmable light fixtures. Lighting shall be controlled via occupancy sensor and electronic dimming devices. Daylight harvesting controls will be provided to accommodate the incoming daylight to reduce energy costs. Light levels will meet or exceed the IES foot-candle recommendations.

Fire Alarm Notification - Fire alarm system will be an intelligent addressable system with a voice evacuation. The fire alarm system will be designed in compliance with NFPA, FBC, and HCC Standards. The fire alarm panel will be located in the main data/telecomm room with an annunciator located in the main lobby. Alarm initiating devices shall include manual pull stations, smoke detectors, duct mounted smoke detectors, heat detectors, and sprinkler flow switches as required by Code. Alarm signaling devices shall include audible speakers and visual flashing strobes in compliance with the American Disabilities Act (ADA). The fire alarm

APPENDIX A - DESIGN CRITERIA

system shall be connected to the emergency power system, with integral battery/charger located within the fire alarm control panel.

Data Networking - Cabling shall be provided by low voltage contractor. Cabling shall be housed within a raised floor system. The Entrance Facility (EF) shall be located in the same space as the Main Equipment Room (MER) which is the main telecom equipment room. Terminal Racks (TR's) shall be equipped with floor standing equipment racks as shown on project drawings. Three Category 6 horizontal cables shall extend from rack mounted patch panels in each TR to Information Management Outlets (IMO) in each room. In lobbies, offices, and common areas, two Category 6 horizontal cables shall extend from the TR to each IMO as shown on floor plans. Distributed wireless data access shall be provided throughout the facility.

Security - Power over Ethernet (PoE) powered, IP cameras should be included to monitor access and security. Rack-mounted server and NVR (Network Video Recorder) shall be located in MER. Distribution of signals shall be via the structured cabling system. Category 6 horizontal cables shall extend from rack-mounted patch panels in each TR to an IMO located at each camera location.

H. FIRE PROTECTION

New water based fire protection design shall be provided based on a space by space hazard analysis of the new spaces. The new sprinkler system shall be designed in compliance with the 2006 International Fire Code with the City of Houston Amendments. The new system shall be tied into the existing water based fire protection system that is currently installed in the maintenance facility.

A new clean agent system will be installed in the IT area to minimize the potential for damage to the sensitive electrical equipment installed for the monitoring of the APM and the control room.

APPENDIX B
COST ESTIMATE REPORT



APPENDIX B - COST ESTIMATE REPORT-OPTION 1

PROJECT		
COST ESTIMATE		
REPORT		
	PROJECT:	OPTION 1 - APM CONTROL STATION
	JOB NO.:	AMP CONT STA - OPT 1
	DESCRIPTION:	OPTION 1 - APM CONTROL STATION
	CLIENT:	HOUSTON AIRPORT SYSTEM
	ESTIMATOR:	SUNLAND GROUP
	ESTIMATE LOCATION:	SAN ANTONIO, TX
	REPORT DATE:	5/28/2015

NOTE REGARDING THE PREPARATION OF THIS ESTIMATE:
THIS OPTION IS BASED ON THE REQUIREMENTS AND RECOMMENDATIONS INCLUDED IN THE NEW CONTROL CENTER FOR AUTOMATED PEOPLE MOVER SYSTEM DRAFT REV.3 DATED MAY 27, 2015.

APPENDIX B - COST ESTIMATE REPORT-OPTION 1

SUMMARY REPORT

OPTION 1 - APM CONTROL STATION 5/28/2015				
--SUMMARY REPORT--				
SUMMARY OF APM CONTROL CENTER - OPTION 1			HOUSTON AIRPORT SYSTEM	
OPTION 1 - APM CONTROL STATION			JOB No.: AMP CONT STA - OPT 1	
2800 N. TERMINAL ROAD				
	TOTAL SF	COST PER/ SF	TOTAL COST	
APM CONTROL CENTER - OPTION 1	4200	\$695.61	\$2,921,577	
DIVISION			UNIT PRICE	TOTAL
01-GENERAL REQUIREMENTS			\$32.14	\$135,000
02-EXISTING CONDITIONS			\$28.13	\$118,125
03-CONCRETE			\$43.20	\$181,440
04-MASONRY			\$13.50	\$56,700
05-METALS			\$74.96	\$314,820
07-THERMAL & WATERPROOFING			\$31.05	\$130,410
08-OPENINGS			\$20.25	\$85,050
09-FINISHES			\$27.00	\$113,400
14-CONVEYING SYSTEM			\$27.32	\$114,750
21-FIRE SUPPERSSION			\$5.40	\$22,680
22-PLUMBING			\$13.50	\$56,700
23-HVAC			\$47.25	\$198,450
26-ELECTRICAL			\$40.50	\$170,100
27-COMMUNICATIONS			\$40.50	\$170,100
Direct Cost			\$444.70	\$1,867,725
GENERAL CONDITIONS	15.00000%			\$280,159
OVERHEAD AND PROFIT	7.00000%			\$150,352
TESTING	2.00000%			\$45,965
BOND/INSURANCE	3.00000%			\$70,326
DESGIN FEES	10.00000%			\$241,453
OWNER CONTINGENCY	10.00000%			\$265,598
TOTAL OF APM CONTROL CENTER - OPTION 1			\$695.61	\$2,921,577

APPENDIX B - COST ESTIMATE REPORT-OPTION 1

DETAIL REPORT

OPTION 1 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM					DATE: 5/28/2015				
2800 N. TERMINAL ROAD					--DETAIL REPORT--				
HOUSTON, TX					JOB NO.: AMP CONT STA - OPT 1				
					PROJECT: OPTION 1 - APM CONTROL STATION				
					PROJECT				
					HOUSTON, TX				
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
01-GENERAL REQUIREMENTS									
1020	ALLOWANCES								
1	ALLOWANCE FOR WORKING OVER TRACK	1	ALLO				\$135,000.00	\$135,000	
	TOTAL OF ALLOWANCES							\$135,000	
	TOTAL OF 01-GENERAL REQUIREMENTS							\$135,000	
02-EXISTING CONDITIONS									
2060	BUILDING DEMOLITION								
1	RENOVATE EXISTING BUILDING	500	SF				\$236.25	\$118,125	
	TOTAL OF BUILDING DEMOLITION							\$118,125	
	TOTAL OF 02-EXISTING CONDITIONS							\$118,125	
03-CONCRETE									
3304	FOUNDATION SYSTEMS								
1	CONCRETE PEIRS AND FOUNDATIONS	4,200	SF				\$21.60	\$90,720	
2	CONCRETE PEIRS AND FOUNDATIONS (INCREASE FOR ELEVATED STRUCTURE)	4,200	SF				\$21.60	\$90,720	
	TOTAL OF FOUNDATION SYSTEMS							\$181,440	
	TOTAL OF 03-CONCRETE							\$181,440	
04-MASONRY									
4220	CONCRETE MASONRY UNIT								
1	STONE AND UNIT MASONRY	4,200	SF				\$13.50	\$56,700	
	TOTAL OF CONCRETE MASONRY UNIT							\$56,700	
	TOTAL OF 04-MASONRY							\$56,700	

APPENDIX B - COST ESTIMATE REPORT-OPTION 1

OPTION 1 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 1	
HOUSTON, TX								PROJECT: OPTION 1 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
05-METALS									
5120	STRUCTURAL STEEL								
1	STRUCTURAL STEEL	4,200	SF					\$31.05	\$130,410
2	STRUCTURAL STEEL (INCREASE FOR ELEVATED STRUCTURE)	4,200	SF					\$31.05	\$130,410
	TOTAL OF STRUCTURAL STEEL								\$260,820
5510	METAL STAIRS								
1	STAIRCASE	4	FLHT					\$13,500.00	\$54,000
	TOTAL OF METAL STAIRS								\$54,000
	TOTAL OF 05-METALS								\$314,820
07-THERMAL & WATERPROOFING									
7110	THERMAL & MEMBRANE WATERPROOFING								
1	THERMAL/MOISTURE PROTECTION	4,200	SF					\$31.05	\$130,410
	TOTAL OF THERMAL & MEMBRANE WATERPROOFING								\$130,410
	TOTAL OF 07-THERMAL & WATERPROOFING								\$130,410
08-OPENINGS									
8110	STEEL DOORS								
1	DOORS AND WINDOWS	4,200	SF					\$20.25	\$85,050
	TOTAL OF STEEL DOORS								\$85,050
	TOTAL OF 08-OPENINGS								\$85,050

APPENDIX B - COST ESTIMATE REPORT-OPTION 1

OPTION 1 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD					--DETAIL REPORT--			JOB NO.: AMP CONT STA - OPT 1	
HOUSTON, TX								PROJECT: OPTION 1 - APM CONTROL STATION	
					PROJECT			HOUSTON, TX	
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
09-FINISHES									
9100	INTERIOR FINISH OUT								
1	FINISHES	4,200	SF					\$27.00	\$113,400
TOTAL OF INTERIOR FINISH OUT									\$113,400
TOTAL OF 09-FINISHES									\$113,400
14-CONVEYING SYSTEM									
14200	ELEVATORS								
1	ELEVATOR	3	STOP					\$27,000.00	\$81,000
2	ELEVATOR (INCREASED HEIGHT)	1	ALLO					\$33,750.00	\$33,750
TOTAL OF ELEVATORS									\$114,750
TOTAL OF 14-CONVEYING SYSTEM									\$114,750
21-FIRE SUPPERSSION									
21501	SPRINKLER SYSTEMS								
1	WET AUTOMATIC SPRINKLER SYSTEM ALLOWANCE	4,200	SF					\$5.40	\$22,680
TOTAL OF SPRINKLER SYSTEMS									\$22,680
TOTAL OF 21-FIRE SUPPERSSION									\$22,680
22-PLUMBING									
22420	PLUMBING SYSTEMS								
1	PLUMBING SYSTEM	4,200	SF					\$13.50	\$56,700
TOTAL OF PLUMBING SYSTEMS									\$56,700
TOTAL OF 22-PLUMBING									\$56,700
23-HVAC									
23650	HVAC SYSTEM								
1	MECHANICAL/HVAC SYSTEM	4,200	SF					\$47.25	\$198,450
TOTAL OF HVAC SYSTEM									\$198,450
TOTAL OF 23-HVAC									\$198,450

APPENDIX B - COST ESTIMATE REPORT-OPTION 1

OPTION 1 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 1	
HOUSTON, TX								PROJECT: OPTION 1 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
26-ELECTRICAL									
26001	ELECTRICAL SYSTEM								
1	ELECTRICAL SYSTEM	4,200	SF				\$40.50	\$170,100	
	TOTAL OF ELECTRICAL SYSTEM							\$170,100	
	TOTAL OF 26-ELECTRICAL							\$170,100	
27-COMMUNICATIONS									
27005	COMMUNICATIONS SYSTEMS								
1	DATA, COMMUNICATIONS, IT, CCTV, AND SECURITY	4,200	SF				\$40.50	\$170,100	
	TOTAL OF COMMUNICATIONS SYSTEMS							\$170,100	
	TOTAL OF 27-COMMUNICATIONS							\$170,100	
	TOTAL DIRECT COST							\$1,867,725	
	GENERAL CONDITIONS	15.00000%						\$280,159	
	OVERHEAD AND PROFIT	7.00000%						\$150,352	
	TESTING	2.00000%						\$45,965	
	BOND/INSURANCE	3.00000%						\$70,326	
	DESIGN FEES	10.00000%						\$241,453	
	OWNER CONTINGENCY	10.00000%						\$265,598	
	TOTAL OF APM CONTROL CENTER - OPTION 1							\$2,921,577	

APPENDIX B - COST ESTIMATE REPORT-OPTION 2

PROJECT		
COST ESTIMATE		
REPORT		
	PROJECT:	OPTION 2 - APM CONTROL STATION
	JOB NO.:	AMP CONT STA - OPT 2
	DESCRIPTION:	OPTION 2 - APM CONTROL STATION
	CLIENT:	HOUSTON AIRPORT SYSTEM
	ESTIMATOR:	SUNLAND GROUP
	ESTIMATE LOCATION:	SAN ANTONIO, TX
	REPORT DATE:	5/28/2015

NOTE REGARDING THE PREPARATION OF THIS ESTIMATE:
THIS OPTION IS BASED ON THE REQUIREMENTS AND RECOMMENDATIONS INCLUDED IN THE NEW CONTROL CENTER FOR AUTOMATED PEOPLE MOVER SYSTEM DRAFT REV.3 DATED MAY 27, 2015.

APPENDIX B - COST ESTIMATE REPORT-OPTION 2

SUMMARY REPORT

OPTION 2 - APM CONTROL STATION 5/28/2015				
--SUMMARY REPORT--				
SUMMARY OF APM CONTROL CENTER - OPTION 2			HOUSTON AIRPORT SYSTEM	
OPTION 2 - APM CONTROL STATION			JOB No.: AMP CONT STA - OPT 2	
2800 N. TERMINAL ROAD				
	TOTAL SF	COST PER/ SF	TOTAL COST	
APM CONTROL CENTER - OPTION 2	3824	\$638.01	\$2,439,756	
DIVISION			UNIT PRICE	TOTAL
01-GENERAL REQUIREMENTS			\$1.77	\$6,750
02-EXISTING CONDITIONS			\$30.89	\$118,125
03-CONCRETE			\$37.80	\$144,547
04-MASONRY			\$13.50	\$51,624
05-METALS			\$68.46	\$261,787
07-THERMAL & WATERPROOFING			\$31.05	\$118,735
08-OPENINGS			\$20.25	\$77,436
09-FINISHES			\$27.00	\$103,248
14-CONVEYING SYSTEM			\$30.01	\$114,750
21-FIRE SUPPERSSION			\$5.40	\$20,650
22-PLUMBING			\$13.50	\$51,624
23-HVAC			\$47.25	\$180,684
26-ELECTRICAL			\$40.50	\$154,872
27-COMMUNICATIONS			\$40.50	\$154,872
Direct Cost			\$407.87	\$1,559,704
GENERAL CONDITIONS	15.00000%			\$233,956
OVERHEAD AND PROFIT	7.00000%			\$125,556
TESTING	2.00000%			\$38,384
BOND/INSUREANCE	3.00000%			\$58,728
DESIGN	10.00000%			\$201,633
OWNER CONTINGENCY	10.00000%			\$221,796
TOTAL OF APM CONTROL CENTER - OPTION 2			\$638.01	\$2,439,756

APPENDIX B - COST ESTIMATE REPORT - OPTION 2

DETAIL REPORT

OPTION 2 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 2	
HOUSTON, TX								PROJECT: OPTION 2 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
01-GENERAL REQUIREMENTS									
1020	ALLOWANCES								
1	ALLOWANCE FOR WORKING ADJACENT TO TRACK	1	ALLO				\$6,750.00	\$6,750	
TOTAL OF ALLOWANCES								\$6,750	
TOTAL OF 01-GENERAL REQUIREMENTS								\$6,750	
02-EXISTING CONDITIONS									
2060	BUILDING DEMOLITION								
1	RENOVATE EXISTING BUILDING	500	SF				\$236.25	\$118,125	
TOTAL OF BUILDING DEMOLITION								\$118,125	
TOTAL OF 02-EXISTING CONDITIONS								\$118,125	
03-CONCRETE									
3304	FOUNDATION SYSTEMS								
1	CONCRETE PEIRS AND FOUNDATIONS	3,824	SF				\$21.60	\$82,598	
2	CONCRETE PEIRS AND FOUNDATIONS (INCREASE FOR ELEVATED STRUCTURE)	3,824	SF				\$16.20	\$61,949	
TOTAL OF FOUNDATION SYSTEMS								\$144,547	
TOTAL OF 03-CONCRETE								\$144,547	
04-MASONRY									
4220	CONCRETE MASONRY UNIT								
1	STONE AND UNIT MASONRY	3,824	SF				\$13.50	\$51,624	
TOTAL OF CONCRETE MASONRY UNIT								\$51,624	
TOTAL OF 04-MASONRY								\$51,624	

APPENDIX B - COST ESTIMATE REPORT - OPTION 2

OPTION 2 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 2	
HOUSTON, TX								PROJECT: OPTION 2 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
05-METALS									
5120	STRUCTURAL STEEL								
1	STRUCTURAL STEEL	3,824	SF					\$31.05	\$118,735
2	STRUCTURAL STEEL (INCREASE FOR ELEVATED STRUCTURE)	3,824	SF					\$23.29	\$89,051
	TOTAL OF STRUCTURAL STEEL								\$207,787
5510	METAL STAIRS								
1	STAIRCASE	4	FLHT					\$13,500.00	\$54,000
	TOTAL OF METAL STAIRS								\$54,000
	TOTAL OF 05-METALS								\$261,787
07-THERMAL & WATERPROOFING									
7110	THERMAL & MEMBRANE WATERPROOFING								
1	THERMAL/MOISTURE PROTECTION	3,824	SF					\$31.05	\$118,735
	TOTAL OF THERMAL & MEMBRANE WATERPROOFING								\$118,735
	TOTAL OF 07-THERMAL & WATERPROOFING								\$118,735
08-OPENINGS									
8110	STEEL DOORS								
1	DOORS AND WINDOWS	3,824	SF					\$20.25	\$77,436
	TOTAL OF STEEL DOORS								\$77,436
	TOTAL OF 08-OPENINGS								\$77,436
09-FINISHES									
9100	INTERIOR FINISH OUT								
1	FINISHES	3,824	SF					\$27.00	\$103,248
	TOTAL OF INTERIOR FINISH OUT								\$103,248
	TOTAL OF 09-FINISHES								\$103,248

APPENDIX B - COST ESTIMATE REPORT - OPTION 2

OPTION 2 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 2	
HOUSTON, TX								PROJECT: OPTION 2 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
14-CONVEYING SYSTEM									
14200	ELEVATORS								
1	ELEVATOR	3	STOP					\$27,000.00	\$81,000
2	ELEVATOR (INCREASED HEIGHT)	1	ALLO					\$33,750.00	\$33,750
	TOTAL OF ELEVATORS								\$114,750
	TOTAL OF 14-CONVEYING SYSTEM								\$114,750
21-FIRE SUPPERSSION									
21501	SPRINKLER SYSTEMS								
1	WET AUTOMATIC SPRINKLER SYSTEM ALLOWANCE	3,824	SF					\$5.40	\$20,650
	TOTAL OF SPRINKLER SYSTEMS								\$20,650
	TOTAL OF 21-FIRE SUPPERSSION								\$20,650
22-PLUMBING									
22420	PLUMBING SYSTEMS								
1	PLUMBING SYSTEM	3,824	SF					\$13.50	\$51,624
	TOTAL OF PLUMBING SYSTEMS								\$51,624
	TOTAL OF 22-PLUMBING								\$51,624
23-HVAC									
23650	HVAC SYSTEM								
1	MECHANICAL/HVAC SYSTEM	3,824	SF					\$47.25	\$180,684
	TOTAL OF HVAC SYSTEM								\$180,684
	TOTAL OF 23-HVAC								\$180,684
26-ELECTRICAL									
26001	ELECTRICAL SYSTEM								
1	ELECTRICAL SYSTEM	3,824	SF					\$40.50	\$154,872
	TOTAL OF ELECTRICAL SYSTEM								\$154,872
	TOTAL OF 26-ELECTRICAL								\$154,872
27-COMMUNICATIONS									

APPENDIX B - COST ESTIMATE REPORT - OPTION 2

OPTION 2 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM							DATE: 5/28/2015		
2800 N. TERMINAL ROAD			--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 2		
HOUSTON, TX							PROJECT: OPTION 2 - APM CONTROL STATION		
			PROJECT				HOUSTON, TX		
PREPARED BY:			ESTIMATE						
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
27005	COMMUNICATIONS SYSTEMS								
1	DATA, COMMUNICATIONS, IT, CCTV, AND SECURITY	3,824	SF				\$40.50	\$154,872	
	TOTAL OF COMMUNICATIONS SYSTEMS							\$154,872	
	TOTAL OF 27-COMMUNICATIONS							\$154,872	
	TOTAL DIRECT COST							\$1,559,704	
	GENERAL CONDITIONS	15.00000%						\$233,956	
	OVERHEAD AND PROFIT	7.00000%						\$125,556	
	TESTING	2.00000%						\$38,384	
	BOND/INSUREANCE	3.00000%						\$58,728	
	DESIGN	10.00000%						\$201,633	
	OWNER CONTINGENCY	10.00000%						\$221,796	
	TOTAL OF APM CONTROL CENTER - OPTION 2							\$2,439,756	

APPENDIX B - COST ESTIMATE REPORT - OPTION 3

PROJECT		
COST ESTIMATE		
REPORT		
	PROJECT:	OPTION 3 - APM CONTROL STATION
	JOB NO.:	AMP CONT STA - OPT 3
	DESCRIPTION:	OPTION 3 - APM CONTROL STATION
	CLIENT:	HOUSTON AIRPORT SYSTEM
	ESTIMATOR:	SUNLAND GROUP
	ESTIMATE LOCATION:	SAN ANTONIO, TX
	REPORT DATE:	5/28/2015

NOTE REGARDING THE PREPARATION OF THIS ESTIMATE:
THIS OPTION IS BASED ON THE REQUIREMENTS AND RECOMMENDATIONS INCLUDED IN THE NEW CONTROL CENTER FOR AUTOMATED PEOPLE MOVER SYSTEM DRAFT REV.3 DATED MAY 27, 2015.

APPENDIX B - COST ESTIMATE REPORT - OPTION 3

SUMMARY REPORT

OPTION 3 - APM CONTROL STATION 5/28/2015				
--SUMMARY REPORT--				
SUMMARY OF APM CONTROL CENTER - OPTION 3			HOUSTON AIRPORT SYSTEM	
OPTION 3 - APM CONTROL STATION			JOB No.: AMP CONT STA - OPT 3	
2800 N. TERMINAL ROAD				
	TOTAL SF	COST PER/ SF	TOTAL COST	
APM CONTROL CENTER - OPTION 3	3224	\$573.86	\$1,850,136	
DIVISION			UNIT PRICE	TOTAL
02-EXISTING CONDITIONS			\$36.64	\$118,125
03-CONCRETE			\$21.60	\$69,638
04-MASONRY			\$13.50	\$43,524
05-METALS			\$39.42	\$127,105
07-THERMAL & WATERPROOFING			\$31.05	\$100,105
08-OPENINGS			\$20.25	\$65,286
09-FINISHES			\$27.00	\$87,048
14-CONVEYING SYSTEM			\$16.75	\$54,000
21-FIRE SUPPERSSION			\$5.40	\$17,410
22-PLUMBING			\$27.00	\$87,048
23-HVAC			\$47.25	\$152,334
26-ELECTRICAL			\$40.50	\$130,572
27-COMMUNICATIONS			\$40.50	\$130,572
Direct Cost			\$366.86	\$1,182,767
GENERAL CONDITIONS	15.00000%			\$177,415
OVERHEAD AND PROFIT	7.00000%			\$95,213
TESTING	2.00000%			\$29,108
BOND/INSURANCE	3.00000%			\$44,535
DESIGN FEES	10.00000%			\$152,904
OWNER CONTINGENCY	10.00000%			\$168,194
TOTAL OF APM CONTROL CENTER - OPTION 3			\$573.86	\$1,850,136

APPENDIX B - COST ESTIMATE REPORT - OPTION 3

DETAIL REPORT

OPTION 3 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM							DATE: 5/28/2015		
2800 N. TERMINAL ROAD			--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 3		
HOUSTON, TX							PROJECT: OPTION 3 - APM CONTROL STATION		
			PROJECT				HOUSTON, TX		
PREPARED BY:			ESTIMATE						
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
	02-EXISTING CONDITIONS								
2060	BUILDING DEMOLITION								
1	RENOVATE EXISTING BUILDING	500	SF				\$236.25	\$118,125	
	TOTAL OF BUILDING DEMOLITION							\$118,125	
	TOTAL OF 02-EXISTING CONDITIONS							\$118,125	
	03-CONCRETE								
3304	FOUNDATION SYSTEMS								
1	CONCRETE PEIRS AND FOUNDATIONS	3,224	SF				\$21.60	\$69,638	
2	CONCRETE PEIRS AND FOUNDATIONS (INCREASE FOR ELEVATED STRUCTURE)	0	SF				NaN		
	TOTAL OF FOUNDATION SYSTEMS							\$69,638	
	TOTAL OF 03-CONCRETE							\$69,638	
	04-MASONRY								
4220	CONCRETE MASONRY UNIT								
1	STONE AND UNIT MASONRY	3,224	SF				\$13.50	\$43,524	
	TOTAL OF CONCRETE MASONRY UNIT							\$43,524	
	TOTAL OF 04-MASONRY							\$43,524	
	05-METALS								
5120	STRUCTURAL STEEL								
1	STRUCTURAL STEEL	3,224	SF				\$31.05	\$100,105	
2	STRUCTURAL STEEL (INCREASE FOR ELEVATED STRUCTURE)	0	SF				NaN		
	TOTAL OF STRUCTURAL STEEL							\$100,105	
5510	METAL STAIRS								
1	STAIRCASE	2	FLHT				\$13,500.00	\$27,000	
	TOTAL OF METAL STAIRS							\$27,000	
	TOTAL OF 05-METALS							\$127,105	

APPENDIX B - COST ESTIMATE REPORT - OPTION 3

OPTION 3 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 3	
HOUSTON, TX								PROJECT: OPTION 3 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
	07-THERMAL & WATERPROOF- ING								
7110	THERMAL & MEMBRANE WATERPROOF- ING								
1	THERMAL/MOISTURE PROTECTION	3,224	SF				\$31.05	\$100,105	
	TOTAL OF THERMAL & MEMBRANE WA- TERPROOFING							\$100,105	
	TOTAL OF 07-THERMAL & WATERPROOF- ING							\$100,105	
	08-OPENINGS								
8110	STEEL DOORS								
1	DOORS AND WINDOWS	3,224	SF				\$20.25	\$65,286	
	TOTAL OF STEEL DOORS							\$65,286	
	TOTAL OF 08-OPENINGS							\$65,286	
	09-FINISHES								
9100	INTERIOR FINISH OUT								
1	FINISHES	3,224	SF				\$27.00	\$87,048	
	TOTAL OF INTERIOR FINISH OUT							\$87,048	
	TOTAL OF 09-FINISHES							\$87,048	
	14-CONVEYING SYSTEM								
14200	ELEVATORS								
1	ELEVATOR	2	STOP				\$27,000.00	\$54,000	
2	ELEVATOR (INCREASED HEIGHT)	0	ALLO				NaN		
	TOTAL OF ELEVATORS							\$54,000	
	TOTAL OF 14-CONVEYING SYSTEM							\$54,000	

APPENDIX B - COST ESTIMATE REPORT - OPTION 3

OPTION 3 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 3	
HOUSTON, TX				PROJECT				PROJECT: OPTION 3 - APM CONTROL STATION	
PREPARED BY:				ESTIMATE				HOUSTON, TX	
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
21-FIRE SUPPERSSION									
21501	SPRINKLER SYSTEMS								
1	WET AUTOMATIC SPRINKLER SYSTEM ALLOWANCE	3,224	SF				\$5.40	\$17,410	
	TOTAL OF SPRINKLER SYSTEMS							\$17,410	
	TOTAL OF 21-FIRE SUPPERSSION							\$17,410	
22-PLUMBING									
22420	PLUMBING SYSTEMS								
1	PLUMBING SYSTEM	3,224	SF				\$13.50	\$43,524	
2	PLUMBING SYSTEM (ADDITIONAL RESTROOMS)	3,224	SF				\$13.50	\$43,524	
	TOTAL OF PLUMBING SYSTEMS							\$87,048	
	TOTAL OF 22-PLUMBING							\$87,048	
23-HVAC									
23650	HVAC SYSTEM								
1	MECHANICAL/HVAC SYSTEM	3,224	SF				\$47.25	\$152,334	
	TOTAL OF HVAC SYSTEM							\$152,334	
	TOTAL OF 23-HVAC							\$152,334	
26-ELECTRICAL									
26001	ELECTRICAL SYSTEM								
1	ELECTRICAL SYSTEM	3,224	SF				\$40.50	\$130,572	
	TOTAL OF ELECTRICAL SYSTEM							\$130,572	
	TOTAL OF 26-ELECTRICAL							\$130,572	
27-COMMUNICATIONS									
27005	COMMUNICATIONS SYSTEMS								
1	DATA, COMMUNICATIONS, IT, CCTV, AND SECURITY	3,224	SF				\$40.50	\$130,572	
	TOTAL OF COMMUNICATIONS SYSTEMS							\$130,572	
	TOTAL OF 27-COMMUNICATIONS							\$130,572	

APPENDIX B - COST ESTIMATE REPORT - OPTION 3

OPTION 3 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM							DATE: 5/28/2015		
2800 N. TERMINAL ROAD			--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 3		
HOUSTON, TX							PROJECT: OPTION 3 - APM CONTROL STATION		
			PROJECT				HOUSTON, TX		
PREPARED BY:			ESTIMATE						
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
	TOTAL DIRECT COST							\$1,182,767	
	GENERAL CONDITIONS	15.00000%						\$177,415	
	OVERHEAD AND PROFIT	7.00000%						\$95,213	
	TESTING	2.00000%						\$29,108	
	BOND/INSURANCE	3.00000%						\$44,535	
	DESIGN FEES	10.00000%						\$152,904	
	OWNER CONTINGENCY	10.00000%						\$168,194	
	TOTAL OF APM CONTROL CENTER - OPTION 3							\$1,850,136	

APPENDIX B - COST ESTIMATE REPORT - OPTION 3A

PROJECT		
COST ESTIMATE		
REPORT		
	PROJECT:	OPTION 3A - APM CONTROL STATION
	JOB NO.:	AMP CONT STA - OPT 3A
	DESCRIPTION:	OPTION 3A - APM CONTROL STATION
	CLIENT:	HOUSTON AIRPORT SYSTEM
	ESTIMATOR:	SUNLAND GROUP
	ESTIMATE LOCATION:	SAN ANTONIO, TX
	REPORT DATE:	5/28/2015

NOTE REGARDING THE PREPARATION OF THIS ESTIMATE:
THIS OPTION IS BASED ON THE REQUIREMENTS AND RECOMMENDATIONS INCLUDED IN THE NEW CONTROL CENTER FOR AUTOMATED PEOPLE MOVER SYSTEM DRAFT REV.3 DATED MAY 27, 2015.

APPENDIX B - COST ESTIMATE REPORT - OPTION 3A

SUMMARY REPORT

OPTION 3A - APM CONTROL STATION 5/28/2015				
--SUMMARY REPORT--				
SUMMARY OF APM CONTROL CENTER - OPTION 3A			HOUSTON AIRPORT SYSTEM	
OPTION 3A - APM CONTROL STATION			JOB No.: AMP CONT STA - OPT 3A	
2800 N. TERMINAL ROAD				
		TOTAL SF	COST PER/ SF	TOTAL COST
APM CONTROL CENTER - OPTION 3A		3177	\$580.76	\$1,845,085
DIVISION			UNIT PRICE	TOTAL
02-EXISTING CONDITIONS			\$37.18	\$118,125
03-CONCRETE			\$21.60	\$68,623
04-MASONRY			\$13.50	\$42,890
05-METALS			\$48.05	\$152,646
07-THERMAL & WATERPROOFING			\$31.05	\$98,646
08-OPENINGS			\$20.25	\$64,334
09-FINISHES			\$27.00	\$85,779
14-CONVEYING SYSTEM			\$25.50	\$81,000
21-FIRE SUPPERSSION			\$5.40	\$17,156
22-PLUMBING			\$13.50	\$42,890
23-HVAC			\$47.25	\$150,113
26-ELECTRICAL			\$40.50	\$128,669
27-COMMUNICATIONS			\$40.50	\$128,669
Direct Cost			\$371.27	\$1,179,538
GENERAL CONDITIONS	15.00000%			\$176,931
OVERHEAD AND PROFIT	7.00000%			\$94,953
TESTING	2.00000%			\$29,028
BOND/INSURANCE	3.00000%			\$44,414
DESIGN FEES	10.00000%			\$152,486
OWNER CONTINGENCY	10.00000%			\$167,735
TOTAL OF APM CONTROL CENTER - OPTION 3A			\$580.76	\$1,845,085

APPENDIX B - COST ESTIMATE REPORT - OPTION 3A

DETAIL REPORT

OPTION 3A - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 3A	
HOUSTON, TX								PROJECT: OPTION 3A - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
02-EXISTING CONDITIONS									
2060	BUILDING DEMOLITION								
1	RENOVATE EXISTING BUILDING	500	SF					\$236.25	\$118,125
	TOTAL OF BUILDING DEMOLITION								\$118,125
	TOTAL OF 02-EXISTING CONDITIONS								\$118,125
03-CONCRETE									
3304	FOUNDATION SYSTEMS								
1	CONCRETE PEIRS AND FOUNDATIONS	3,177	SF					\$21.60	\$68,623
2	CONCRETE PEIRS AND FOUNDATIONS (INCREASE FOR ELEVATED STRUCTURE)	0	SF					NaN	
	TOTAL OF FOUNDATION SYSTEMS								\$68,623
	TOTAL OF 03-CONCRETE								\$68,623
04-MASONRY									
4220	CONCRETE MASONRY UNIT								
1	STONE AND UNIT MASONRY	3,177	SF					\$13.50	\$42,890
	TOTAL OF CONCRETE MASONRY UNIT								\$42,890
	TOTAL OF 04-MASONRY								\$42,890
05-METALS									
5120	STRUCTURAL STEEL								
1	STRUCTURAL STEEL	3,177	SF					\$31.05	\$98,646
2	STRUCTURAL STEEL (INCREASE FOR ELEVATED STRUCTURE)	0	SF					NaN	
	TOTAL OF STRUCTURAL STEEL								\$98,646
5510	METAL STAIRS								
1	STAIRCASE	4	FLHT					\$13,500.00	\$54,000
	TOTAL OF METAL STAIRS								\$54,000
	TOTAL OF 05-METALS								\$152,646

APPENDIX B - COST ESTIMATE REPORT - OPTION 3A

OPTION 3A - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD					--DETAIL REPORT--			JOB NO.: AMP CONT STA - OPT 3A	
HOUSTON, TX								PROJECT: OPTION 3A - APM CONTROL STATION	
					PROJECT			HOUSTON, TX	
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
	07-THERMAL & WATERPROOF- ING								
7110	THERMAL & MEMBRANE WATERPROOF- ING								
1	THERMAL/MOISTURE PROTECTION	3,177	SF					\$31.05	\$98,646
	TOTAL OF THERMAL & MEMBRANE WA- TERPROOFING								\$98,646
	TOTAL OF 07-THERMAL & WATERPROOF- ING								\$98,646
	08-OPENINGS								
8110	STEEL DOORS								
1	DOORS AND WINDOWS	3,177	SF					\$20.25	\$64,334
	TOTAL OF STEEL DOORS								\$64,334
	TOTAL OF 08-OPENINGS								\$64,334
	09-FINISHES								
9100	INTERIOR FINISH OUT								
1	FINISHES	3,177	SF					\$27.00	\$85,779
	TOTAL OF INTERIOR FINISH OUT								\$85,779
	TOTAL OF 09-FINISHES								\$85,779
	14-CONVEYING SYSTEM								
14200	ELEVATORS								
1	ELEVATOR	3	STOP					\$27,000.00	\$81,000
2	ELEVATOR (INCREASED HEIGHT)	0	ALLO					NaN	
	TOTAL OF ELEVATORS								\$81,000
	TOTAL OF 14-CONVEYING SYSTEM								\$81,000
	21-FIRE SUPPERSSION								
21501	SPRINKLER SYSTEMS								
1	WET AUTOMATIC SPRINKLER SYSTEM ALLOWANCE	3,177	SF					\$5.40	\$17,156
	TOTAL OF SPRINKLER SYSTEMS								\$17,156
	TOTAL OF 21-FIRE SUPPERSSION								\$17,156

APPENDIX B - COST ESTIMATE REPORT - OPTION 3A

OPTION 3A - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM					DATE: 5/28/2015				
2800 N. TERMINAL ROAD					--DETAIL REPORT--				
HOUSTON, TX					JOB NO.: AMP CONT STA - OPT 3A				
					PROJECT: OPTION 3A - APM CONTROL STATION				
					PROJECT				
					HOUSTON, TX				
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
22-PLUMBING									
22420	PLUMBING SYSTEMS								
1	PLUMBING SYSTEM	3,177	SF					\$13.50	\$42,890
2	PLUMBING SYSTEM (ADDITIONAL RE-STROOMS)	0	SF					NaN	
TOTAL OF PLUMBING SYSTEMS									\$42,890
TOTAL OF 22-PLUMBING									\$42,890
23-HVAC									
23650	HVAC SYSTEM								
1	MECHANICAL/HVAC SYSTEM	3,177	SF					\$47.25	\$150,113
TOTAL OF HVAC SYSTEM									\$150,113
TOTAL OF 23-HVAC									\$150,113
26-ELECTRICAL									
26001	ELECTRICAL SYSTEM								
1	ELECTRICAL SYSTEM	3,177	SF					\$40.50	\$128,669
TOTAL OF ELECTRICAL SYSTEM									\$128,669
TOTAL OF 26-ELECTRICAL									\$128,669
27-COMMUNICATIONS									
27005	COMMUNICATIONS SYSTEMS								
1	DATA, COMMUNICATIONS, IT, CCTV, AND SECURITY	3,177	SF					\$40.50	\$128,669
TOTAL OF COMMUNICATIONS SYSTEMS									\$128,669
TOTAL OF 27-COMMUNICATIONS									\$128,669

APPENDIX B - COST ESTIMATE REPORT - OPTION 3A

OPTION 3A - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM							DATE: 5/28/2015		
2800 N. TERMINAL ROAD			--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 3A		
HOUSTON, TX							PROJECT: OPTION 3A - APM CONTROL STATION		
			PROJECT				HOUSTON, TX		
PREPARED BY:			ESTIMATE						
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
	TOTAL DIRECT COST							\$1,179,538	
	GENERAL CONDITIONS	15.00000%						\$176,931	
	OVERHEAD AND PROFIT	7.00000%						\$94,953	
	TESTING	2.00000%						\$29,028	
	BOND/INSURANCE	3.00000%						\$44,414	
	DESIGN FEES	10.00000%						\$152,486	
	OWNER CONTINGENCY	10.00000%						\$167,735	
	TOTAL OF APM CONTROL CENTER - OPTION 3A							\$1,845,085	

APPENDIX B - COST ESTIMATE REPORT - OPTION 4

PROJECT		
COST ESTIMATE		
REPORT		
	PROJECT:	OPTION 4 - APM CONTROL STATION
	JOB NO.:	AMP CONT STA - OPT 4
	DESCRIPTION:	OPTION 4 - APM CONTROL STATION
	CLIENT:	HOUSTON AIRPORT SYSTEM
	ESTIMATOR:	SUNLAND GROUP
	ESTIMATE LOCATION:	SAN ANTONIO, TX
	REPORT DATE:	5/28/2015

NOTE REGARDING THE PREPARATION OF THIS ESTIMATE:
THIS OPTION IS BASED ON THE REQUIREMENTS AND RECOMMENDATIONS INCLUDED IN THE NEW CONTROL CENTER FOR AUTOMATED PEOPLE MOVER SYSTEM DRAFT REV.3 DATED MAY 27, 2015.

APPENDIX B - COST ESTIMATE REPORT - OPTION 4

SUMMARY REPORT

OPTION 4 - APM CONTROL STATION 5/28/2015				
--SUMMARY REPORT--				
SUMMARY OF APM CONTROL CENTER - OPTION 4			HOUSTON AIRPORT SYSTEM	
OPTION 4 - APM CONTROL STATION			JOB No.: AMP CONT STA - OPT 4	
2800 N. TERMINAL ROAD				
	TOTAL SF	COST PER/ SF	TOTAL COST	
APM CONTROL CENTER - OPTION 4	4046	\$607.93	\$2,459,703	
DIVISION			UNIT PRICE	TOTAL
02-EXISTING CONDITIONS			\$29.20	\$118,125
03-CONCRETE			\$37.80	\$152,939
04-MASONRY			\$13.50	\$54,621
05-METALS			\$61.01	\$246,850
07-THERMAL & WATERPROOFING			\$31.05	\$125,628
08-OPENINGS			\$20.25	\$81,932
09-FINISHES			\$27.00	\$109,242
14-CONVEYING SYSTEM			\$21.69	\$87,750
21-FIRE SUPPERSSION			\$5.40	\$21,848
22-PLUMBING			\$13.50	\$54,621
23-HVAC			\$47.25	\$191,174
26-ELECTRICAL			\$40.50	\$163,863
27-COMMUNICATIONS			\$40.50	\$163,863
Direct Cost			\$388.64	\$1,572,455
GENERAL CONDITIONS	15.00000%			\$235,868
OVERHEAD AND PROFIT	7.00000%			\$126,583
TESTING	2.00000%			\$38,698
BOND/INSURANCE	3.00000%			\$59,208
DESING FEE	10.00000%			\$203,281
OWNER CONTINGENCY	10.00000%			\$223,609
TOTAL OF APM CONTROL CENTER - OPTION 4			\$607.93	\$2,459,703

APPENDIX B - COST ESTIMATE REPORT - OPTION 4

DETAIL REPORT

OPTION 4 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 4	
HOUSTON, TX								PROJECT: OPTION 4 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
02-EXISTING CONDITIONS									
2060	BUILDING DEMOLITION								
1	RENOVATE EXISTING BUILDING	500	SF				\$236.25	\$118,125	
	TOTAL OF BUILDING DEMOLITION							\$118,125	
	TOTAL OF 02-EXISTING CONDITIONS							\$118,125	
03-CONCRETE									
3304	FOUNDATION SYSTEMS								
1	CONCRETE PEIRS AND FOUNDATIONS	4,046	SF				\$21.60	\$87,394	
2	CONCRETE PEIRS AND FOUNDATIONS (INCREASE FOR ELEVATED STRUCTURE)	4,046	SF				\$16.20	\$65,545	
	TOTAL OF FOUNDATION SYSTEMS							\$152,939	
	TOTAL OF 03-CONCRETE							\$152,939	
04-MASONRY									
4220	CONCRETE MASONRY UNIT								
1	STONE AND UNIT MASONRY	4,046	SF				\$13.50	\$54,621	
	TOTAL OF CONCRETE MASONRY UNIT							\$54,621	
	TOTAL OF 04-MASONRY							\$54,621	
05-METALS									
5120	STRUCTURAL STEEL								
1	STRUCTURAL STEEL	4,046	SF				\$31.05	\$125,628	
2	STRUCTURAL STEEL (INCREASE FOR ELEVATED STRUCTURE)	4,046	SF				\$23.29	\$94,221	
	TOTAL OF STRUCTURAL STEEL							\$219,850	
5510	METAL STAIRS								
1	STAIRCASE	2	FLHT				\$13,500.00	\$27,000	
	TOTAL OF METAL STAIRS							\$27,000	
	TOTAL OF 05-METALS							\$246,850	

APPENDIX B - COST ESTIMATE REPORT - OPTION 4

OPTION 4 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD					--DETAIL REPORT--			JOB NO.: AMP CONT STA - OPT 4	
HOUSTON, TX								PROJECT: OPTION 4 - APM CONTROL STATION	
					PROJECT			HOUSTON, TX	
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
	07-THERMAL & WATERPROOF- ING								
7110	THERMAL & MEMBRANE WATERPROOF- ING								
1	THERMAL/MOITURE PROTECTION	4,046	SF				\$31.05	\$125,628	
	TOTAL OF THERMAL & MEMBRANE WA- TERPROOFING							\$125,628	
	TOTAL OF 07-THERMAL & WATERPROOF- ING							\$125,628	
	08-OPENINGS								
8110	STEEL DOORS								
1	DOORS AND WINDOWS	4,046	SF				\$20.25	\$81,932	
	TOTAL OF STEEL DOORS							\$81,932	
	TOTAL OF 08-OPENINGS							\$81,932	
	09-FINISHES								
9100	INTERIOR FINISH OUT								
1	FINISHES	4,046	SF				\$27.00	\$109,242	
	TOTAL OF INTERIOR FINISH OUT							\$109,242	
	TOTAL OF 09-FINISHES							\$109,242	
	14-CONVEYING SYSTEM								
14200	ELEVATORS								
1	ELEVATOR	2	STOP				\$27,000.00	\$54,000	
2	ELEVATOR (INCREASED HEIGHT)	1	ALLO				\$33,750.00	\$33,750	
	TOTAL OF ELEVATORS							\$87,750	
	TOTAL OF 14-CONVEYING SYSTEM							\$87,750	
	21-FIRE SUPPERSSION								
21501	SPRINKLER SYSTEMS								
1	WET AUTOMATIC SPRINKLER SYSTEM ALLOWANCE	4,046	SF				\$5.40	\$21,848	
	TOTAL OF SPRINKLER SYSTEMS							\$21,848	
	TOTAL OF 21-FIRE SUPPERSSION							\$21,848	

APPENDIX B - COST ESTIMATE REPORT - OPTION 4

OPTION 4 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD				--DETAIL REPORT--				JOB NO.: AMP CONT STA - OPT 4	
HOUSTON, TX								PROJECT: OPTION 4 - APM CONTROL STATION	
				PROJECT				HOUSTON, TX	
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY					UNIT PRICE	TOTAL	
22-PLUMBING									
22420	PLUMBING SYSTEMS								
1	PLUMBING SYSTEM	4,046	SF				\$13.50	\$54,621	
2	PLUMBING SYSTEM (ADDITIONAL RE-STROOMS)	0	SF				NaN		
TOTAL OF PLUMBING SYSTEMS								\$54,621	
TOTAL OF 22-PLUMBING								\$54,621	
23-HVAC									
23650	HVAC SYSTEM								
1	MECHANICAL/HVAC SYSTEM	4,046	SF				\$47.25	\$191,174	
TOTAL OF HVAC SYSTEM								\$191,174	
TOTAL OF 23-HVAC								\$191,174	
26-ELECTRICAL									
26001	ELECTRICAL SYSTEM								
1	ELECTRICAL SYSTEM	4,046	SF				\$40.50	\$163,863	
TOTAL OF ELECTRICAL SYSTEM								\$163,863	
TOTAL OF 26-ELECTRICAL								\$163,863	
27-COMMUNICATIONS									
27005	COMMUNICATIONS SYSTEMS								
1	DATA, COMMUNICATIONS, IT, CCTV, AND SECURITY	4,046	SF				\$40.50	\$163,863	
TOTAL OF COMMUNICATIONS SYSTEMS								\$163,863	
TOTAL OF 27-COMMUNICATIONS								\$163,863	

APPENDIX B - COST ESTIMATE REPORT - OPTION 4

OPTION 4 - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 5/28/2015	
2800 N. TERMINAL ROAD					--DETAIL REPORT--			JOB NO.: AMP CONT STA - OPT 4	
HOUSTON, TX								PROJECT: OPTION 4 - APM CONTROL STATION	
					PROJECT			HOUSTON, TX	
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY						UNIT PRICE	TOTAL
	TOTAL DIRECT COST								\$1,572,455
	GENERAL CONDITIONS	15.00000%							\$235,868
	OVERHEAD AND PROFIT	7.00000%							\$126,583
	TESTING	2.00000%							\$38,698
	BOND/INSURANCE	3.00000%							\$59,208
	DESING FEE	10.00000%							\$203,281
	OWNER CONTINGENCY	10.00000%							\$223,609
	TOTAL OF APM CONTROL CENTER - OPTION 4								\$2,459,703

APPENDIX B - COST ESTIMATE REPORT - REMODEL EXISTING

PROJECT		
COST ESTIMATE		
REPORT		
	PROJECT:	REMODEL EXISTING - APM CONTROL STATION
	JOB NO.:	AMP CONT STA - REMOD EXIST
	DESCRIPTION:	REMODEL EXISTING - APM CONTROL STATION
	CLIENT:	HOUSTON AIRPORT SYSTEM
	ESTIMATOR:	SUNLAND GROUP
	ESTIMATE LOCATION:	SAN ANTONIO, TX
	REPORT DATE:	6/15/2015

NOTE REGARDING THE PREPARATION OF THIS ESTIMATE:

THIS ESTIMATE IS BASED ON THE HAS EXISTING AUTOMATED PEOPLE MOVER CONTROL CENTER RENOVATION- DRAFT 1, DATED 09-JUNE-2015. HVAC DUCTWORK INCLUDES CLEANING OF THE EXISTING DUCTWORK AND REALIGNMENT OF THE IR DEVICES TO THE NEW CEILING GRID. EXCLUDES REPLACEMENT OF THE EXISTING MECHANICAL EQUIPMENT AND THE REPLACEMENT OF THE EXISTING TRUNK LINES.

APPENDIX B - COST ESTIMATE REPORT - REMODEL EXISTING

SUMMARY REPORT

REMODEL EXISTING - APM CONTROL STATION 6/16/2015					
--SUMMARY REPORT--					
SUMMARY OF APM CONTROL CENTER - REMODEL EXISTING			HOUSTON AIRPORT SYSTEM		
REMODEL EXISTING - APM CONTROL STATION			JOB No.: AMP CONT STA - REMOD EXIST		
2800 N. TERMINAL ROAD					
	TOTAL SF	COST PER/ SF		TOTAL COST	
APM CONTROL CENTER - REMODEL EXISTING	985	\$82.67		\$81,433	
DIVISION	LABOR	MATL/EQUIP	UNIT PRICE	TOTAL	
01-GENERAL REQUIREMENTS	\$15,000		\$15.23	\$15,000	
09-FINISHES	\$8,111	\$9,162	\$17.54	\$17,273	
23-HVAC	\$3,750	\$5,875	\$9.77	\$9,625	
26-ELECTRICAL	\$3,830	\$5,063	\$9.03	\$8,893	
Direct Cost	\$30,692	\$20,099	\$51.56	\$50,791	
GENERAL CONDITIONS	15.00000%			\$7,619	
OVERHEAD AND PROFIT	7.00000%			\$4,089	
BOND/INSURANCE	3.00000%			\$1,875	
DESIGN FEES	15.00000%			\$9,656	
OWNER CONTINGENCY	10.00000%			\$7,403	
TOTAL OF APM CONTROL CENTER - REMODEL EXISTING			\$82.67	\$81,433	

APPENDIX B - COST ESTIMATE REPORT - REMODEL EXISTING

DETAIL REPORT

REMODEL EXISTING - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM								DATE: 6/15/2015	
2800 N. TERMINAL ROAD					--DETAIL REPORT--			JOB NO.: AMP CONT STA - REMOD EXIST	
HOUSTON, TX								PROJECT: REMODEL EXISTING - APM CONTROL STATION	
					PROJECT			HOUSTON, TX	
PREPARED BY:					ESTIMATE				
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY		UNIT LABOR	TOTAL LABOR	UNIT MATL	TOTAL MATL	UNIT PRICE	TOTAL
	APM CONTROL CENTER - REMODEL EXISTING								
	01-GENERAL REQUIREMENTS								
1020	ALLOWANCES								
1	ALLOWANCE FOR DELAYS DUE TO FACILITES 24/7 OPERATION	1	ALOW	\$7,500.00	\$7,500			\$7,500.00	\$7,500
2	ALLOWANCE TO MOVE AND RESET FURNITURE, FILE CABINTES, ETC.	1	ALOW	\$7,500.00	\$7,500			\$7,500.00	\$7,500
	TOTAL OF ALLOWANCES				\$15,000				\$15,000
	TOTAL OF 01-GENERAL REQUIREMENTS				\$15,000				\$15,000
	09-FINISHES								
9510	ACOUSTICAL CEILINGS								
1	2-0x2-0 SUSP ACOUSTIC CEILING 5/8" MINERAL TILE	985	SF	\$1.64	\$1,610	\$3.90	\$3,843	\$5.54	\$5,453
2	REMOVE SUSP ACOUSTIC CEILING SYS	985	SF	\$0.60	\$591			\$0.60	\$591
	TOTAL OF ACOUSTICAL CEILINGS				\$2,201		\$3,843		\$6,044
9650	RESILIENT FLOORING								
1	STATIC RESISTANT FLOORING	985	SF	\$6.00	\$5,910	\$5.40	\$5,319	\$11.40	\$11,229
	TOTAL OF RESILIENT FLOORING				\$5,910		\$5,319		\$11,229
	TOTAL OF 09-FINISHES				\$8,111		\$9,162		\$17,273
	23-HVAC								
23650	HVAC SYSTEM								
1	CLEAN EXISTING DUCTWORK	1	SUM			\$2,500.00	\$2,500	\$2,500.00	\$2,500
2	RECONFIGURE AND REALIGN AIR DEVICES WITH NEW CELIING GRID LAYOUT	1	SUM	\$3,750.00	\$3,750	\$3,375.00	\$3,375	\$7,125.00	\$7,125
	TOTAL OF HVAC SYSTEM				\$3,750		\$5,875		\$9,625
	TOTAL OF 23-HVAC				\$3,750		\$5,875		\$9,625

APPENDIX B - COST ESTIMATE REPORT - REMODEL EXISTING

REMODEL EXISTING - APM CONTROL STATION									
HOUSTON AIRPORT SYSTEM							DATE: 6/15/2015		
2800 N. TERMINAL ROAD				--DETAIL REPORT--			JOB NO.: AMP CONT STA - REMOD EXIST		
HOUSTON, TX							PROJECT: REMODEL EXISTING - APM CONTROL STATION		
				PROJECT			HOUSTON, TX		
PREPARED BY:				ESTIMATE					
SUNLAND GROUP									
SAN ANTONIO, TX									
CODE	DESCRIPTION	QTY		UNIT LABOR	TOTAL LABOR	UNIT MATL	TOTAL MATL	UNIT PRICE	TOTAL
26-ELECTRICAL									
26511	FLUORESCENT FIXTURES								
1	2FTx4FT FLUORESCENT FIXTURE RECESSED TROFFER	30	EA	\$74.24	\$2,227	\$168.75	\$5,063	\$242.99	\$7,290
2	REMOVE LAY IN FLUOR FIXTURE	30	EA	\$53.45	\$1,603			\$53.45	\$1,603
	TOTAL OF FLUORESCENT FIXTURES				\$3,830		\$5,063		\$8,893
	TOTAL OF 26-ELECTRICAL				\$3,830		\$5,063		\$8,893
	TOTAL DIRECT COST				\$30,692		\$20,099		\$50,791
	GENERAL CONDITIONS	15.00000%			\$4,604		\$3,015		\$7,619
	OVERHEAD AND PROFIT	7.00000%			\$2,471		\$1,618		\$4,089
	BOND/INSURANCE	3.00000%			\$1,133		\$742		\$1,875
	DESIGN FEES	15.00000%			\$5,835		\$3,821		\$9,656
	OWNER CONTINGENCY	10.00000%			\$4,473		\$2,930		\$7,403
	TOTAL OF APM CONTROL CENTER - RE-MODEL EXISTING				\$49,208		\$32,225		\$81,433