



# Rhode Island Airport Corporation

**Second Quarter 2020**

**Outfall Sampling**

**T.F. Green Airport**

Prepared by:  
Rhode Island Airport Corporation

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## **Background**

The RIPDES permit identifies a total of 16 perimeter outfalls at PVD. Outfalls 001A, 002A, 003A, 004A and 013A discharge to tributaries of Warwick Pond. Outfalls, 006A, 006B, 006C, 006D, 007A, 007B, 008A and 009A discharge to tributaries of Buckeye Brook downstream of Warwick Pond. Outfalls 010A, 011A, and 012A discharge to Tuscatucket Brook. Major outfalls, 002A, 003A, 008A, and 010A, are those outfalls which receive or may receive drainage from areas where aircraft deicing fluid is applied. Sampling for these major outfalls is defined at Part I.A.1 of the permit. Minor outfalls drain taxiways, runways and other paved services. Outfall 005A was combined with Outfall 006A during construction of Runway 34 Safety Area Improvements. Sampling for these minor outfalls is defined at Part I.A.2. of the permit. Additional sampling requirements are defined at Part I.A.5. and Parts I.C. and I.D. Table 1 lists parameters sampled.

Part I.B.4.h describes water quality monitoring requirements for receiving water bodies. Stream monitoring is to be conducted at four locations: the inlet to Warwick Pond at Lake Shore Drive; the outlet to Warwick Pond at the south end of Lake Shore Drive; Buckeye Brook at West Shore Road; and Old Mill Creek at Tidewater Drive. These sample locations were identified as BB-02, BB-03, BB-04 and BB-07 (respectively) to maintain consistency with previous sampling studies in the Buckeye Brook watershed. Figure 1 identifies outfall and in-stream sampling locations.

Industrial activities at PVD with the potential to impact stormwater quality include the use of glycol-based Aircraft Deicing and Anti-icing Fluids (ADFs/AAFs) and pavement deicers. Only propylene glycol (PG)-based ADFs/AAFs are used at PVD. Pavement deicers used at PVD include solid sodium formate, and liquid potassium acetate. No aircraft or pavement deicing chemicals were used during this sampling event.

## **Summary of Storm**

Second Quarter (January 1 through March 31) sampling consists of major outfalls (002A, 003A, 008A and 010A) sample collection hourly for twelve hours. The sampling began upon a precipitation event of sufficient magnitude and subsequent to aircraft deicing as specified in the RIPDES permit.

A total of 0.33" of precipitation fell on May 15, 2020, however only 0.11" fell prior to completion of sampling. Sampling commenced at 6:00 AM subsequent to measurable accumulation and continued until approximately 5:00 PM.

A total of 0.33" inches of precipitation (as water equivalent) was measured at PVD on May 15, 2020, however only 0.11" fell prior to completion of sampling. Precipitation data is summarized in Table 2.

## **Summary of Flow**

Flow meters are installed at three of the major outfalls: OF-002A, OF-003A, and OF-008A. Continuous flow measurements during the 12 hours of sampling were made using these Isco 2150 area velocity meters programmed to measure level and velocity at 15 minute increments. No flow meters are installed at minor outfalls or at outfall 010A, as it is off airport property.

Maximum daily and average monthly flows for the major outfalls were calculated using measured data. Estimated runoff volumes calculated using drainage area and depth of precipitation for all outfalls are presented in Table 3.

## **Sample Collection**

For the Second Quarter the major outfalls (002A, 003A, 008A, and 010A) were sampled hourly for twelve hours, beginning at 6:00 AM on May 15, 2020.

All samples were collected and decanted into sample bottles. The bottles were then placed in ice in a cooler for transport to the laboratory for analysis. Because of the short sample holding time for Fecal Coliform, all samples collected in the first three hours were transported to the laboratory immediately following the third hour of sampling.

At the major outfalls sampling measurements for temperature, pH, dissolved oxygen (DO), and specific conductance were taken and recorded in the field.

## **Sampling Results**

A summary of sampling results for major outfalls are presented in Tables 4 and 5.

**TABLE 1  
LABRATORY ANALYTICAL PARAMETERS  
T.F. GREEN AIRPORT  
WARWICK, RHODE ISLAND  
SECOND QUARTER 2020**

Sample Identification	Hours 1-3	Hours 4-12
OF-002A, OF-003A, OF-008A, OF-010A	<ul style="list-style-type: none"> <li>• Fecal coliform</li> <li>• BOD, TSS, Surfactants</li> <li>• COD, TOC</li> <li>• Oil &amp; grease -1664</li> <li>• Propylene glycol</li>   <li>• Dissolved Potassium and Sodium</li> <li>• Total Metals (aluminum, chromium, copper, iron, lead, and zinc)</li> </ul>	<ul style="list-style-type: none"> <li>• BOD</li> <li>• COD, TOC</li> <li>• Propylene glycol</li> <li>• Dissolved Potassium and Sodium</li> <li>• Total Metals (aluminum, chromium, copper, iron, lead, and zinc)</li> </ul>

BOD -biological oxygen demand

COD -chemical oxygen demand

TOC -total organic carbon

TSS -total suspended solids

**TABLE 2  
PRECIPITATION AMOUNTS  
T.F. GREEN AIRPORT  
WARWICK, RHODE ISLAND  
SECOND QUARTER 2020**

Date	Total Precipitation (water equivalent, in inches)	Snowfall (inches)
May 12, 2020	0	0
May 13, 2020	0	0
May 14, 2020	0	0
May 15, 2020	0.33	0

Sampling commenced at 06:00 on May 15, 2020  
Major outfall sampling ended at 17:00 on May 15, 2020  
Only 0.11" fell prior to completion of sampling

**TABLE 3  
PVD RUNOFF VOLUME CALCULATION  
T.F. GREEN AIRPORT  
WARWICK, RHODE ISLAND  
SECOND QUARTER 2020**

Precip  
5/15/2020 (inches): 0.11

Drainage Basin ID	PVD Storm Water Discharge	Receiving Water	Drainage Area (ac)	gal precip
1	Outfall 001A	Warwick Pond	5.9	17,622
2	Outfall 002A	Warwick Pond	93.4	278,964
3	Outfall 003A	Warwick Pond	119.8	357,814
4	Outfall 004A	Warwick Pond	30.1	89,902
6	Outfall 006A	Buckeye Brook	10.7	31,958
6B	Outfall 006B	Buckeye Brook	1.5	4,480
6C	Outfall 006C	Buckeye Brook	0.8	2,389
6D	Outfall 006D	Buckeye Brook	0.7	2,091
7	Outfall 007A	Buckeye Brook	9.6	28,673
7B	Outfall 007B	Buckeye Brook	1.2	3,584
8	Outfall 008A	Buckeye Brook	240.6	718,615
9	Outfall 009A	Buckeye Brook	38.4	114,692
10	Outfall 010A	Tuscatucket Brook	26	77,656
11	Outfall 011A	Tuscatucket Brook	14	41,815
12	Outfall 012A	Tuscatucket Brook	46.4	138,586
13	Outfall 013A	Warwick Pond	28	83,629
			<b>667.1</b>	<b>1,992,470</b>



<sup>1</sup> Results reported as average monthly were determined using the arithmetic average of measurement made every 15 minutes during the 12 hours of sampling. Results reported as maximum daily was the maximum flow measurements over the 12 hours of sampling. Both reported values were converted from GPM to GPD reflecting a 24 hour day

<sup>2</sup> Results reported as maximum daily were the maximum of the 12 samples collected during the 12 hours of sampling.

<sup>3</sup> Results reported as average monthly were determined using the arithmetic average of the 12 samples collected during the 12 hours of sampling.

<sup>4</sup> Results reported as average monthly were determined using the arithmetic average of the 3 samples collected (when available) during the first 3 hours of sampling.

<sup>5</sup> Results reported as maximum daily were the maximum of the 3 samples collected (when available) during the first 3 hours of sampling

<sup>6</sup> Results reported as average monthly were determined by using a flow-weighted average of the 12 samples collected during the 12 hours of sampling.

<sup>7</sup> Results reported as average monthly were determined by using a geometric mean of the 3 samples collected (when available) during the 3 hours of sampling

<sup>8</sup> Outfall 010A does not have a flow meter installed. Therefore, flow was calculated arithmetically utilizing the Outfall drainage area, storm intensity, and duration.

BOD<sub>5</sub> Biological oxygen demand 5-day test

COD Chemical oxygen demand

TOC Total organic carbon

TSS Total suspended solids

gpd gallons per day

mg/l milligrams per liter

ug/l micrograms per liter

ND - Non-Detect



**TABLE 5  
FIELD ANALYTICAL RESULTS  
MAJOR OUTFALLS  
T.F. GREEN AIRPORT  
WARWICK, RHODE ISLAND  
SECOND QUARTER 2020**

Parameter	Major Outfalls							
	Outfall 002A		Outfall 003A		Outfall 008A		Outfall 010A	
	Minimum Daily <sup>1</sup>	Maximum Daily <sup>2</sup>	Minimum Daily <sup>1</sup>	Maximum Daily <sup>2</sup>	Minimum Daily <sup>1</sup>	Maximum Daily <sup>2</sup>	Minimum Daily <sup>1</sup>	Maximum Daily <sup>2</sup>
pH	6.5	6.8	6.7	6.9	6.7	7.0	6.5	6.7
Temperature (°F)		55.6		54.0		58.6		57.5

Reported values are from laboratory analysis. Field pH measurements were taken but not used for this report

- <sup>1</sup> results reported as minimum daily were the minimum of the samples collected during the 12 hours of sampling.  
<sup>2</sup> results reported as maximum daily were the maximum of the samples collected during the 12 hours of sampling.