Summary of PFAS Analytical Results
February, July, & August 2018
L&RR Superfund Site OU 2 Remedial Investigation/Feasibility Study
North Smithfield, RI

				Upgradient	*Northeast Landfill Corner*						*Eastern Portion of Landfill*														*South Landfill*				
Sample Location	CAS Number	*USEPA Screening Levels*	*USEPA Health Advisories*	MW-201	CW-5B	CW-5B	CW-5B DUP	CW-5B	BH16-1 (131-136)	BH16-1 (131-136)	MW-102A	MW-102A	MW-102A	CW-6A	CW-6A	CW-6B	CW-6B	CW-6B	CW-6B DUP	CW-6C	CW-6C DUP	MW-104A	MW-104A	MW-104A	CW-7B	CW-7B	CW-7B	MW-103A	MW-103A
Sample Date				2/12/2018	2/12/2018	7/30/2018	2/12/2018	9/24/2018	8/3/2018	9/25/2018	2/12/2018	7/30/2018	9/25/2018	8/1/2018	9/24/2018	2/12/2018	8/29/2018	9/24/2018	9/24/2018	8/1/2018	8/1/2018	2/12/2018	7/30/2018	9/24/2018	2/12/2018	8/1/2018	9/24/2018	8/2/2018	9/25/2018
PFAS (ng/l)																													
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74 UJ	<1.84	<1.82	<1.85 UJ	<1.78 UJ	<1.74	<1.85	<1.86 UJ	<1.85 UJ	<1.79	<1.88 UJ	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85 UJ	<1.85 UJ	<1.92	**7.12**	<1.86	<1.84
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	40,110		<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	**14.7**	**20.8**	**19.9 J-**	**26.2**	**25.1**	**23.1**	<1.85	<1.85	**3.1 J-**	**6.32**	**8.75**	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluorodecanoic Acid (PFDA)	335-76-2			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluorododecanoic Acid (PFDoA)	307-55-1			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluoroheptanoic Acid (PFHpA)	375-85-9			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	**25.9**	**32.3**	**47.9 J-**	**49.1**	**67.1**	**60.5**	<1.85	<1.85	**10.7 J-**	**16.2**	**22.6**	**11.1 J-**	**10**	**11.1**	**50.4**	**53**
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	**29.6**	**36.4**	**64.2 J-**	**57.9**	**68.8**	**78.8**	<1.85	<1.85	**9.64 J-**	**17.2**	**25.9**	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluorohexanoic Acid (PFHxA)	307-24-4			<1.92	**1.76 J-**	<1.78	**1.73 J-**	<1.74	<1.84	**1.93**	**4.34 J-**	**4.55**	**4.58**	**91.9**	**111**	**165 J-**	**176**	**246**	**248**	<1.85	<1.85	**33 J-**	**62.6**	**89.8**	**9.26 J-**	**8.41**	**9.04**	**32.1**	**34.9**
Perfluorononanoic Acid (PFNA)	375-95-1			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	**9.93 J-**	**8.51**	**9.84**	**61.1**	**65**
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	40.1	70	<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	**6.71**	**6.97**	**5.71 J-**	**10.1**	**6.67**	**5.19**	<1.85	<1.85	<1.85 UJ	**2.49**	<1.85	**2.97 J-**	<1.92	**2.44**	<1.86	<1.84
Perfluorooctanoic Acid (PFOA)	335-67-1	40.1	70	<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	**1.97**	<1.82	**2.34 J-**	**5.07**	**1.9**	**86.1**	**103**	**155 J-**	**159**	**222**	**212**	<1.85	<1.85	**21.9 J-**	**35.4**	**48.6**	**11 J-**	**8.18**	**9.53**	**31.1**	**36.3**
Perfluorotetradecanoic Acid (PFTA)	376-06-7			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84 UJ	<1.82	<1.85 UJ	<1.78	<1.74 UJ	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Perfluoroundecanoic Acid (PFUnA)	2058-94-8			<1.92	<1.72 UJ	<1.78	<1.72 UJ	<1.74	<1.84	<1.82	<1.85 UJ	<1.78	<1.74	<1.85	<1.86	<1.85 UJ	<1.79	<1.88	<1.86	<1.85	<1.85	<1.85 UJ	<1.72	<1.85	<1.85 UJ	<1.92	<1.88	<1.86	<1.84
Total PFOA + PFOS			*70*	***0***	***0***	***0***	***0***	**0**	***1.97***	**0**	***2.34 J-***	***5.07***	**1.9**	***92.8***	**110**	***161 J-***	***169***	**229**	**217**	***0***	***0***	***21.9 J-***	***37.9***	**48.6**	***14 J-***	***8.18***	**11.97**	***31.1***	**36.3**

Notes:

Concentrations of Per- & Polyflourinated alykyl substances (PFAS) reported in nanograms per liter (ng/l) with a part-per-trillion equivalency.

Concentrations in BOLD indicate those detected above laboratory reporting limits.

USEPA Screening Levels were developed based on "site-specific" potential risks from PFOS, PFBS, and PFOA in groundwater. Screening Levels for residential children and adults were developed using USEPA's Regional Screening Levels (RSL) calculator as outlined in the following memo, *Groundwater site-specific screening levels for groundwater for PFOA, PFOS, and PFBS for the Landfill & Resource Recovery (L&RR) Site* , dated November 17, 2017.

Shaded concentrations indicate those exceeding the USEPA Health Advisories for PFOA, PFOS, or a combination of both compounds issued in May 2016.

< Indicates a concentration not detected above laboratorty reporting limits, provided.

A Modified Tier I+ validation was performed on the data in accordance with the October 2016 Interim Final Quality Assurance Project Plan (QAPP) and 2016 USEPA National Functional Guidelines for Organic Data Review.

Qualifiers applied include:

UJ = not detected, estimated due to detections in associated blank

J = concentration estimated

J- = concentration estimated, bias low

J+ = concentration estimated, bias high

Summary of PFAS Analytical Results
February, July, & August 2018
L&RR Superfund Site OU 2 Remedial Investigation/Feasibility Study
North Smithfield, RI

				East of CW-6B/MW-104B							*East of MW-102A*				*Near Receptor*											
Sample Location	CAS Number	*USEPA Screening Levels*	*USEPA Health Advisories*	BH16-3 (88-98)	BH16-3 (88-98)	BH16-3 (88-98)	BH16-3 (138-150)	BH16-3 (138-150)	MW-303D	MW-303D	BH16-2 (235-245)	BH16-2 (235-245)	MW-302B	MW-302B	BH14-1 (86)	BH14-1 (86)	MW-304A	MW-304A	BH16-4 (127-133)	BH16-4 (127-133)	MW-202	MW-202	BH16-5 (110)	BH16-5 (110)	MW-305B	MW-305B
Sample Date				2/12/2018	8/1/2018	9/25/2018	8/1/2018	9/25/2018	7/31/2018	9/25/2018	8/3/2018	9/25/2018	8/2/2018	9/25/2018	8/2/2018	9/24/2018	8/1/2018	9/24/2018	8/2/2018	9/24/2018	8/1/2018	9/24/2018	8/2/2018	9/24/2018	7/31/2018	9/24/2018
PFAS (ng/l)																										
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6			<1.85 UJ	<1.78	<1.89	<1.78	<1.82 UJ	<1.92	<1.85	<3.66	<1.78 UJ	<1.83	<1.75	<1.88	<1.75 UJ	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78 UJ	<1.77	<1.75	<1.85	<1.79 UJ
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9			<1.85 UJ	<1.78	<1.89	<1.78	<1.82	<1.92	<1.85	<3.66	<1.78	<1.83	<1.75	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	40,110		**11.2 J-**	**8.92**	**14.3**	<1.78	<1.82	**25.8**	**29.4**	<3.66	**3.41**	**2.38**	**2.67**	<1.88	<1.75	**2.11**	**2.38 J+**	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	**2.1**
Perfluorodecanoic Acid (PFDA)	335-76-2			<1.85 UJ	**5.44**	<1.89	<1.78	<1.82 UJ	<1.92	<1.85	<3.66	<1.78	<1.83	<1.75	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorododecanoic Acid (PFDoA)	307-55-1			<1.85 UJ	<1.78	<1.89	<1.78	<1.82	<1.92	<1.85	<3.66	<1.78	<1.83	<1.75	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluoroheptanoic Acid (PFHpA)	375-85-9			**28.9 J-**	**26**	**35.9**	**3.41**	**3.34**	**64.1**	**71.1**	**11 J**	**8.18**	**6.59**	**6.66**	<1.88	**2.94**	**2.47**	**3.47**	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4			**39.4 J-**	**25.6**	**42.8**	**3.34**	**2.73**	**68.4**	**77**	**10.6 J**	**6.88**	**5.51**	**4.82**	**2.33**	**2.36**	**3.01**	**3.61**	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorohexanoic Acid (PFHxA)	307-24-4			**106 J-**	**94.4**	**120**	**13.4**	**14.3**	**218**	**239**	**35.2 J**	**30.2**	**20.9**	**19.3**	**4.84**	**8.64**	**5.79**	**7.78**	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorononanoic Acid (PFNA)	375-95-1			<1.85 UJ	**2.26**	<1.89	<1.78	<1.82 UJ	<1.92	<1.85	<3.66	<1.78	<1.83	<1.75	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	40.1	70	**5.8 J-**	**5.89**	**6.77**	<1.78	<1.82	**5.67**	**4.57**	<3.66	**2.69**	**1.88**	<1.75	**2.61**	**3.6**	**6.27**	**4.98**	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	**5.47**	**3.64**
Perfluorooctanoic Acid (PFOA)	335-67-1	40.1	70	**92.3 J-**	**76.7**	**105**	**9.21**	**12.3 J-**	**273**	**309**	**40 J**	**30.5**	**37.6**	**36.4**	**11.1**	**21.4 J-**	**11.2**	**16.1**	<1.79	<1.76	**3.19**	**3.07**	<1.77	<1.75	**4.44**	**4.47**
Perfluorotetradecanoic Acid (PFTA)	376-06-7			<1.85 UJ	<1.78 UJ	<1.89	<1.78 UJ	<1.82 UJ	<1.92	<1.85	<3.66	<1.78 UJ	<1.83	<1.75 UJ	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78 UJ	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8			<1.85 UJ	<1.78	<1.89	<1.78	<1.82	<1.92	<1.85	<3.66	<1.78	<1.83	<1.75	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Perfluoroundecanoic Acid (PFUnA)	2058-94-8			<1.85 UJ	<1.78	<1.89	<1.78	<1.82 UJ	<1.92	<1.85	<3.66	<1.78	<1.83	<1.75	<1.88	<1.75	<1.85	<1.75	<1.79	<1.76	<1.78	<1.78	<1.77	<1.75	<1.85	<1.79
Total PFOA + PFOS			*70*	***98.1 J-***	***82.6***	**112**	***9.21***	**12.3**	***279***	**314**	***40***	**33.2**	***39.5***	**36.4**	***13.7***	**25**	***17.5***	**21.1**	***0***	**0**	***3.19***	**3.07**	***0***	**0**	***9.91***	**8.11**

Notes:

Concentrations of Per- & Polyflourinated alykyl substances (PFAS) reported in nanograms per liter (ng/l) with a part-per-trillion equivalency.

Concentrations in BOLD indicate those detected above laboratory reporting limits.

USEPA Screening Levels were developed based on "site-specific" potential risks from PFOS, PFBS, and PFOA in groundwater. Screening Levels for residential children and adults were developed using USEPA's Regional Screening Levels (RSL) calculator as outlined in the following memo, *Groundwater site-specific screening levels for groundwater for PFOA, PFOS, and PFBS for the Landfill & Resource Recovery (L&RR) Site*, dated November 17, 2017.

Shaded concentrations indicate those exceeding the USEPA Health Advisories for PFOA, PFOS, or a combination of both compounds issued in May 2016.

< Indicates a concentration not detected above laboratorty reporting limits, provided.

Equipment and field blanks collected using laboratory supplied PFAS-free water. One equipment blank was collected per piece of non-dedicated sampling equipment. One field blank was collected per each field sampling personnel.

A Modified Tier I+ validation was performed on the data in accordance with the October 2016 Interim Final Quality Assurance Project Plan (QAPP) and 2016 USEPA National Functional Guidelines for Organic Data Review.

UJ = not detected, estimated due to detections in associated blank

J = concentration estimated

J- = concentration estimated, bias low

J+ = concentration estimated, bias high

PFAS Quality Control Results
February, July, & August 2018
L&RR Superfund Site OU 2 Remedial Investigation/Feasibility Study
North Smithfield, RI

				February 2018 Quality Control Samples				*August 2018 Quality Control Samples*						*September 2018 Quality Control Samples*		
Sample Location	CAS Number	*USEPA Screening Levels*	*USEPA Health Advisories*	Equipment Blank	Field Blank	Field Blank	Trip Blank	Equipment Blank 1	Equipment Blank 2	Field Blank	Field Blank	Field Blank	Performance Evaluation	Equipment Blank 1	Equipment Blank 2	Field Blank
Sample Date				2/12/2018	2/12/2018	2/12/2018	2/12/2018	8/1/2018	8/2/2018	8/1/2018	8/3/2018	8/29/2018	8/7/2018	9/24/2018	9/24/2018	9/25/2018
PFAS (ng/l)																
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2991-50-6			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82 UJ
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2355-31-9			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluorobutanesulfonic Acid (PFBS)	375-73-5	40,110		<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluorodecanoic Acid (PFDA)	335-76-2			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluorododecanoic Acid (PFDoA)	307-55-1			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluoroheptanoic Acid (PFHpA)	375-85-9			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluorohexanesulfonic Acid (PFHxS)	355-46-4			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78 UJ	<1.77	<2	<1.7	<1.73	<1.82
Perfluorohexanoic Acid (PFHxA)	307-24-4			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78 UJ	<1.77	<2	<1.7	<1.73	<1.82
Perfluorononanoic Acid (PFNA)	375-95-1			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78 UJ	<1.77	<2	<1.7	<1.73	<1.82
Perfluorooctanesulfonic Acid (PFOS)	1763-23-1	40.1	70	<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	**33.3**	<1.7	<1.73	<1.82
Perfluorooctanoic Acid (PFOA)	335-67-1	40.1	70	<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78 UJ	<1.77	**84.5**	<1.7	<1.73	<1.82
Perfluorotetradecanoic Acid (PFTA)	376-06-7			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluorotridecanoic Acid (PFTrDA)	72629-94-8			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Perfluoroundecanoic Acid (PFUnA)	2058-94-8			<1.78	<1.78	<1.85	<1.72	<1.78	<1.78	<1.78	<1.78	<1.77	<2	<1.7	<1.73	<1.82
Total PFOA + PFOS			*70*	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***0***	***117.8***	**0**	**0**	**0**

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