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Automated Report

Technical Report for

Alfred Ward & Son

Blomenkamp Lease

SGS Job Number: DA31691

Sampling Date: 12/30/20

Report to:

**Alfred Ward & Son
P.O. Box 737
Ogallala, NE 69153
randy@wardoil.com**

ATTN: Randy Ward

Total number of pages in report: 68



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.



**Jason Savoie
General Manager**

Client Service contact: Elizabeth Sutcliffe 303-425-6021

Certifications: CO (CO00049), NE (NE-OS-06-04), ND (R-027), UT (NELAP CO00049)
LA (LA150028), TX (T104704511), WY (8TMS-L)

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Test results relate only to samples analyzed.

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Sample Summary

Alfred Ward & Son
Blomenkamp Lease

Job No: DA31691

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
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This report contains results reported as ND = Not detected. The following applies:
Organics ND = Not detected above the MDL

DA31691-1	12/30/20	13:00	RW	01/08/21	SO Soil	4 F BTM
DA31691-1A	12/30/20	13:00	RW	01/08/21	SO Soil	4 F BTM
DA31691-2	12/30/20	13:00	RW	01/08/21	SO Soil	4 EST WL
DA31691-2A	12/30/20	13:00	RW	01/08/21	SO Soil	4 EST WL
DA31691-3	12/30/20	13:00	RW	01/08/21	SO Soil	4 WS WL
DA31691-3A	12/30/20	13:00	RW	01/08/21	SO Soil	4 WS WL
DA31691-4	12/30/20	13:00	RW	01/08/21	SO Soil	WORK PIT
DA31691-4A	12/30/20	13:00	RW	01/08/21	SO Soil	WORK PIT

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Summary of Hits

Job Number: DA31691
Account: Alfred Ward & Son
Project: Blomenkamp Lease
Collected: 12/30/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
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DA31691-1 4 F BTM

Benzo(a)anthracene ^a	15.3 J	20	12	ug/kg	SW846 8270C BY SIM
TPH-DRO (C10-C28)	137	11	11	mg/kg	SW846-8015D
Specific Conductivity	1040	1.0		umhos/cm	SM 2510B-2011 MOD
pH ^b	8.27			su	SW846 9045D

DA31691-1A 4 F BTM

Calcium	121	2.0		mg/l	SW846 6010C
Magnesium	29.3	1.0		mg/l	SW846 6010C
Sodium	65.9	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio ^c	1.39			ratio	USDA HANDBOOK 60

DA31691-2 4 EST WL

TPH-DRO (C10-C28)	137	12	11	mg/kg	SW846-8015D
Specific Conductivity	575	1.0		umhos/cm	SM 2510B-2011 MOD
pH ^b	8.59			su	SW846 9045D

DA31691-2A 4 EST WL

Calcium	56.8	2.0		mg/l	SW846 6010C
Magnesium	16.1	1.0		mg/l	SW846 6010C
Sodium	37.9	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio ^c	1.14			ratio	USDA HANDBOOK 60

DA31691-3 4 WS WL

TPH-DRO (C10-C28)	119	11	11	mg/kg	SW846-8015D
Specific Conductivity	339	1.0		umhos/cm	SM 2510B-2011 MOD
pH ^b	8.94			su	SW846 9045D

DA31691-3A 4 WS WL

Calcium	33.0	2.0		mg/l	SW846 6010C
Magnesium	8.84	1.0		mg/l	SW846 6010C
Sodium	18.2	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio ^c	0.726			ratio	USDA HANDBOOK 60

DA31691-4 WORK PIT

TPH-DRO (C10-C28)	15.2	11	10	mg/kg	SW846-8015D
Specific Conductivity	404	1.0		umhos/cm	SM 2510B-2011 MOD
pH ^b	8.70			su	SW846 9045D

Summary of Hits

Job Number: DA31691
Account: Alfred Ward & Son
Project: Blomenkamp Lease
Collected: 12/30/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Analyte						

DA31691-4A WORK PIT

Calcium	21.1	2.0	mg/l	SW846 6010C
Magnesium	3.25	1.0	mg/l	SW846 6010C
Sodium	361	2.0	mg/l	SW846 6010C
Sodium Adsorption Ratio ^c	19.3		ratio	USDA HANDBOOK 60

- (a) Dilution required due to matrix interference. Internal standard failure without dilution.
(b) Field parameter analyzed by the laboratory upon request.
(c) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]



Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Method:	SW846 8260B		
Project:	Blomenkamp Lease		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V58411.D	1	01/11/21 11:40	DC	n/a	n/a	V5V2980
Run #2							

	Initial Weight	Final Volume
Run #1	5.08 g	5.0 ml
Run #2		

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.1	0.56	ug/kg	
108-88-3	Toluene	ND	2.3	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	2.3	0.56	ug/kg	
1330-20-7	Xylene (total)	ND	2.3	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		70-131%
2037-26-5	Toluene-D8	93%		70-130%
460-00-4	4-Bromofluorobenzene	102%		70-130%
17060-07-0	1,2-Dichloroethane-D4	106%		70-130%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Method:	SW846 8270C BY SIM SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	3G45395.D	4	01/11/21 18:12	DC	01/11/21	OP19731	E3G2264
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	20	15	ug/kg	
120-12-7	Anthracene	ND	20	9.6	ug/kg	
56-55-3	Benzo(a)anthracene	15.3	20	12	ug/kg	J
205-99-2	Benzo(b)fluoranthene	ND	20	12	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	20	9.6	ug/kg	
50-32-8	Benzo(a)pyrene	ND	20	13	ug/kg	
218-01-9	Chrysene	ND	20	9.6	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	23	21	ug/kg	
206-44-0	Fluoranthene	ND	20	13	ug/kg	
86-73-7	Fluorene	ND	20	13	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	31	27	ug/kg	
91-20-3	Naphthalene	ND	20	14	ug/kg	
129-00-0	Pyrene	ND	20	9.6	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	51%		9-130%
321-60-8	2-Fluorobiphenyl	58%		5-130%
1718-51-0	Terphenyl-d14	63%		28-130%

(a) Dilution required due to matrix interference. Internal standard failure without dilution.

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Method:	SW846 8015D		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA54144.D	1	01/11/21 20:12	JB	n/a	n/a	GGA2446
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.0 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	13	6.4	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	96%		60-140%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Method:	SW846-8015D SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH053933.D	1	01/11/21 21:20	GN	01/11/21	OP19732	GFH2149
Run #2							

Run #	Initial Weight	Final Volume
Run #1	20.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	137	11	11	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	66%		25-141%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	87.3		%	1	01/10/21	SR	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	1040	1.0	umhos/cm	1	01/08/21	SR	SM 2510B-2011 MOD
pH ^a	8.27		su	1	01/08/21 14:47	SR	SW846 9045D

(a) Field parameter analyzed by the laboratory upon request.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Project:	Blomenkamp Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	121	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Magnesium	29.3	1.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Sodium	65.9	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²

(1) Instrument QC Batch: MA13504
(2) Prep QC Batch: MP31982

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 F BTM	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-1A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	87.3
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	1.39		ratio	1	01/12/21 22:01	JD	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Method:	SW846 8260B		
Project:	Blomenkamp Lease		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V58419.D	1	01/11/21 14:47	DC	n/a	n/a	V5V2980
Run #2							

	Initial Weight	Final Volume
Run #1	5.06 g	5.0 ml
Run #2		

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.1	0.57	ug/kg	
108-88-3	Toluene	ND	2.3	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	2.3	0.57	ug/kg	
1330-20-7	Xylene (total)	ND	2.3	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		70-131%
2037-26-5	Toluene-D8	97%		70-130%
460-00-4	4-Bromofluorobenzene	103%		70-130%
17060-07-0	1,2-Dichloroethane-D4	106%		70-130%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Method:	SW846 8270C BY SIM SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	3G45396.D	4	01/11/21 18:38	DC	01/11/21	OP19731	E3G2264
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	20	15	ug/kg	
120-12-7	Anthracene	ND	20	9.7	ug/kg	
56-55-3	Benzo(a)anthracene	ND	20	12	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	20	12	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	20	9.7	ug/kg	
50-32-8	Benzo(a)pyrene	ND	20	14	ug/kg	
218-01-9	Chrysene	ND	20	9.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	23	22	ug/kg	
206-44-0	Fluoranthene	ND	20	13	ug/kg	
86-73-7	Fluorene	ND	20	13	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	31	28	ug/kg	
91-20-3	Naphthalene	ND	20	14	ug/kg	
129-00-0	Pyrene	ND	20	9.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	54%		9-130%
321-60-8	2-Fluorobiphenyl	61%		5-130%
1718-51-0	Terphenyl-d14	69%		28-130%

(a) Dilution required due to matrix interference. Internal standard failure without dilution.

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Method:	SW846 8015D		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA54147.D	1	01/11/21 21:59	JB	n/a	n/a	GGA2446
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	13	6.4	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	101%		60-140%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Method:	SW846-8015D SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH053935.D	1	01/11/21 21:42	GN	01/11/21	OP19732	GFH2149
Run #2							

Run #	Initial Weight	Final Volume
Run #1	20.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	137	12	11	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	66%		25-141%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	86.8		%	1	01/10/21	SR	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	575	1.0	umhos/cm	1	01/08/21	SR	SM 2510B-2011 MOD
pH ^a	8.59		su	1	01/08/21 14:47	SR	SW846 9045D

(a) Field parameter analyzed by the laboratory upon request.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Project:	Blomenkamp Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	56.8	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Magnesium	16.1	1.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Sodium	37.9	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²

- (1) Instrument QC Batch: MA13504
(2) Prep QC Batch: MP31982

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 EST WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-2A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	86.8
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	1.14		ratio	1	01/12/21 22:07	JD	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Method:	SW846 8260B		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V58420.D	1	01/11/21 15:10	DC	n/a	n/a	V5V2980
Run #2							

Run #	Initial Weight	Final Volume
Run #1	5.00 g	5.0 ml
Run #2		

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.1	0.56	ug/kg	
108-88-3	Toluene	ND	2.2	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	2.2	0.56	ug/kg	
1330-20-7	Xylene (total)	ND	2.2	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	102%		70-131%
2037-26-5	Toluene-D8	97%		70-130%
460-00-4	4-Bromofluorobenzene	100%		70-130%
17060-07-0	1,2-Dichloroethane-D4	111%		70-130%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Method:	SW846 8270C BY SIM SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	3G45397.D	4	01/11/21 19:04	DC	01/11/21	OP19731	E3G2264
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	19	15	ug/kg	
120-12-7	Anthracene	ND	19	9.4	ug/kg	
56-55-3	Benzo(a)anthracene	ND	19	12	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	19	12	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	19	9.4	ug/kg	
50-32-8	Benzo(a)pyrene	ND	19	13	ug/kg	
218-01-9	Chrysene	ND	19	9.4	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	22	21	ug/kg	
206-44-0	Fluoranthene	ND	19	13	ug/kg	
86-73-7	Fluorene	ND	19	12	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	30	27	ug/kg	
91-20-3	Naphthalene	ND	19	13	ug/kg	
129-00-0	Pyrene	ND	19	9.4	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	59%		9-130%
321-60-8	2-Fluorobiphenyl	64%		5-130%
1718-51-0	Terphenyl-d14	69%		28-130%

(a) Dilution required due to matrix interference. Internal standard failure without dilution.

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Method:	SW846 8015D		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA54148.D	1	01/11/21 22:35	JB	n/a	n/a	GGA2446
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.0 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	12	6.2	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	101%		60-140%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Method:	SW846-8015D SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH053937.D	1	01/11/21 22:03	GN	01/11/21	OP19732	GFH2149
Run #2							

Run #	Initial Weight	Final Volume
Run #1	20.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	119	11	11	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	57%		25-141%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	88.9		%	1	01/10/21	SR	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	339	1.0	umhos/cm	1	01/08/21	SR	SM 2510B-2011 MOD
pH ^a	8.94		su	1	01/08/21 14:47	SR	SW846 9045D

(a) Field parameter analyzed by the laboratory upon request.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Project:	Blomenkamp Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	33.0	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Magnesium	8.84	1.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Sodium	18.2	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²

- (1) Instrument QC Batch: MA13504
(2) Prep QC Batch: MP31982

RL = Reporting Limit

Report of Analysis

Client Sample ID:	4 WS WL	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-3A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	88.9
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	0.726		ratio	1	01/12/21 22:31	JD	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WORK PIT	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-4	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	93.2
Method:	SW846 8260B		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	5V58421.D	1	01/11/21 15:33	DC	n/a	n/a	V5V2980
Run #2							

Run #	Initial Weight	Final Volume
Run #1	5.04 g	5.0 ml
Run #2		

Purgeable Aromatics

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.1	0.53	ug/kg	
108-88-3	Toluene	ND	2.1	1.1	ug/kg	
100-41-4	Ethylbenzene	ND	2.1	0.53	ug/kg	
1330-20-7	Xylene (total)	ND	2.1	1.1	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	103%		70-131%
2037-26-5	Toluene-D8	98%		70-130%
460-00-4	4-Bromofluorobenzene	101%		70-130%
17060-07-0	1,2-Dichloroethane-D4	110%		70-130%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WORK PIT	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-4	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	93.2
Method:	SW846 8270C BY SIM SW846 3546		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G45392.D	1	01/11/21 16:55	DC	01/11/21	OP19731	E3G2264
Run #2							

Run #	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

COGCC Table 910-1 PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	4.6	3.6	ug/kg	
120-12-7	Anthracene	ND	4.6	2.3	ug/kg	
56-55-3	Benzo(a)anthracene	ND	4.6	2.8	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	4.6	2.8	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	4.6	2.3	ug/kg	
50-32-8	Benzo(a)pyrene	ND	4.6	3.1	ug/kg	
218-01-9	Chrysene	ND	4.6	2.3	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.4	5.0	ug/kg	
206-44-0	Fluoranthene	ND	4.6	3.1	ug/kg	
86-73-7	Fluorene	ND	4.6	3.0	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	7.2	6.4	ug/kg	
91-20-3	Naphthalene	ND	4.6	3.2	ug/kg	
129-00-0	Pyrene	ND	4.6	2.3	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	44%		9-130%
321-60-8	2-Fluorobiphenyl	47%		5-130%
1718-51-0	Terphenyl-d14	58%		28-130%

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WORK PIT	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-4	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	93.2
Method:	SW846 8015D		
Project:	Blomenkamp Lease		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GA54149.D	1	01/11/21 23:11	JB	n/a	n/a	GGA2446
Run #2							

Run #	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	11	5.7	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
120-82-1	1,2,4-Trichlorobenzene	103%		60-140%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WORK PIT	
Lab Sample ID:	DA31691-4	Date Sampled: 12/30/20
Matrix:	SO - Soil	Date Received: 01/08/21
Method:	SW846-8015D SW846 3546	Percent Solids: 93.2
Project:	Blomenkamp Lease	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH053939.D	1	01/11/21 22:25	GN	01/11/21	OP19732	GFH2149
Run #2							

	Initial Weight	Final Volume
Run #1	20.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	15.2	11	10	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits		
84-15-1	o-Terphenyl	58%		25-141%		

ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	WORK PIT	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-4	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	93.2
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	93.2		%	1	01/10/21	SR	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	404	1.0	umhos/cm	1	01/08/21	SR	SM 2510B-2011 MOD
pH ^a	8.70		su	1	01/08/21 14:47	SR	SW846 9045D

(a) Field parameter analyzed by the laboratory upon request.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WORK PIT	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-4A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	93.2
Project:	Blomenkamp Lease		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	21.1	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Magnesium	3.25	1.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²
Sodium	361	2.0	mg/l	1	01/12/21	01/12/21 JD	SW846 6010C ¹	SW846 3010A/M ²

- (1) Instrument QC Batch: MA13504
(2) Prep QC Batch: MP31982

RL = Reporting Limit

Report of Analysis

Client Sample ID:	WORK PIT	Date Sampled:	12/30/20
Lab Sample ID:	DA31691-4A	Date Received:	01/08/21
Matrix:	SO - Soil	Percent Solids:	93.2
Project:	Blomenkamp Lease		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio ^a	19.3		ratio	1	01/12/21 22:37	JD	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Misc. Forms**Custody Documents and Other Forms**

Includes the following where applicable:

- Chain of Custody

SGS Sample Receipt Summary

Job Number: DA31691

Client: ALFRED WARD & SON

Project: BLOMENKAMP

Date / Time Received: 1/8/2021 9:30:00 AM

Delivery Method:

Airbill #'s: FX

Cooler Temps (Initial/Adjusted): #1: (5.8/5.8):

Cooler Security

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

- | | | |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | IR Gun; | |
| 3. Cooler media: | Ice (Bag) | |
| 4. No. Coolers: | 1 | |

Quality Control Preservation

Y or N N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

Sample Integrity - Documentation

Y or N

- | | | |
|--|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Condition

Y or N

- | | | |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample: | Intact | |

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume recvd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

DA31691: Chain of Custody

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MS Volatiles

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QC Data Summaries

Includes the following where applicable:

- **Method Blank Summaries**
- **Blank Spike Summaries**
- **Matrix Spike and Duplicate Summaries**

Method Blank Summary

Page 1 of 1

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2980-MB	5V58409.D	1	01/11/21	DC	n/a	n/a	V5V2980

The QC reported here applies to the following samples:

Method: SW846 8260B

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	50	25	ug/kg	
100-41-4	Ethylbenzene	ND	100	25	ug/kg	
108-88-3	Toluene	ND	100	50	ug/kg	
1330-20-7	Xylene (total)	ND	100	50	ug/kg	

CAS No.	Surrogate Recoveries	Limits
1868-53-7	Dibromofluoromethane	96% 70-131%
2037-26-5	Toluene-D8	100% 70-130%
460-00-4	4-Bromofluorobenzene	102% 70-130%
17060-07-0	1,2-Dichloroethane-D4	97% 70-130%

Method Blank Summary

Page 1 of 1

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2980-MB	5V58410.D	1	01/11/21	DC	n/a	n/a	V5V2980

The QC reported here applies to the following samples:

Method: SW846 8260B

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	1.0	0.50	ug/kg	
100-41-4	Ethylbenzene	ND	2.0	0.50	ug/kg	
108-88-3	Toluene	ND	2.0	1.0	ug/kg	
1330-20-7	Xylene (total)	ND	2.0	1.0	ug/kg	

CAS No.	Surrogate Recoveries	Limits
1868-53-7	Dibromofluoromethane	99% 70-131%
2037-26-5	Toluene-D8	95% 70-130%
460-00-4	4-Bromofluorobenzene	100% 70-130%
17060-07-0	1,2-Dichloroethane-D4	101% 70-130%

Blank Spike Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V5V2980-BS	5V58407.D	1	01/11/21	DC	n/a	n/a	V5V2980

The QC reported here applies to the following samples: Method: SW846 8260B

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
71-43-2	Benzene	50	45.5	91	68-130
100-41-4	Ethylbenzene	50	48.2	96	69-130
108-88-3	Toluene	50	47.1	94	65-130
1330-20-7	Xylene (total)	150	144	96	69-130

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	98%	70-131%
2037-26-5	Toluene-D8	98%	70-130%
460-00-4	4-Bromofluorobenzene	101%	70-130%
17060-07-0	1,2-Dichloroethane-D4	102%	70-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blumenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
DA31691-1MS	5V58412.D	1	01/11/21	DC	n/a	n/a	V5V2980
DA31691-1MSD	5V58413.D	1	01/11/21	DC	n/a	n/a	V5V2980
DA31691-1	5V58411.D	1	01/11/21	DC	n/a	n/a	V5V2980

The QC reported here applies to the following samples: Method: SW846 8260B

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	DA31691-1 ug/kg	Spike Q ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	ND	57	46.7	82	57.3	46.4	81	1	48-130/30
100-41-4	Ethylbenzene	ND	57	42.7	75	57.3	44.2	77	3	25-144/30
108-88-3	Toluene	ND	57	43.3	76	57.3	46.8	82	8	34-130/30
1330-20-7	Xylene (total)	ND	171	127	74	172	131	76	3	24-143/30

CAS No.	Surrogate Recoveries	MS	MSD	DA31691-1	Limits
1868-53-7	Dibromofluoromethane	104%	102%	101%	70-131%
2037-26-5	Toluene-D8	95%	102%	93%	70-130%
460-00-4	4-Bromofluorobenzene	100%	101%	102%	70-130%
17060-07-0	1,2-Dichloroethane-D4	104%	105%	106%	70-130%

* = Outside of Control Limits.

MS Semi-volatiles**QC Data Summaries**

Includes the following where applicable:

- **Method Blank Summaries**
- **Blank Spike Summaries**
- **Matrix Spike and Duplicate Summaries**

Method Blank Summary

Page 1 of 1

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP19731-MB	3G45383.D	1	01/11/21	DC	01/11/21	OP19731	E3G2264

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	4.3	3.3	ug/kg	
120-12-7	Anthracene	ND	4.3	2.1	ug/kg	
56-55-3	Benzo(a)anthracene	ND	4.3	2.6	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	4.3	2.6	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	4.3	2.1	ug/kg	
50-32-8	Benzo(a)pyrene	ND	4.3	2.9	ug/kg	
218-01-9	Chrysene	ND	4.3	2.1	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	5.0	4.7	ug/kg	
206-44-0	Fluoranthene	ND	4.3	2.9	ug/kg	
86-73-7	Fluorene	ND	4.3	2.8	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	6.7	6.0	ug/kg	
91-20-3	Naphthalene	ND	4.3	3.0	ug/kg	
129-00-0	Pyrene	ND	4.3	2.1	ug/kg	

CAS No.	Surrogate Recoveries	Limits
4165-60-0	Nitrobenzene-d5	80% 9-130%
321-60-8	2-Fluorobiphenyl	77% 5-130%
1718-51-0	Terphenyl-d14	94% 28-130%

Blank Spike Summary

Page 1 of 1

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP19731-BS	3G45384.D	1	01/11/21	DC	01/11/21	OP19731	E3G2264

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	83.3	75.5	91	48-130
120-12-7	Anthracene	83.3	82.6	99	66-132
56-55-3	Benzo(a)anthracene	83.3	83.1	100	61-133
205-99-2	Benzo(b)fluoranthene	83.3	88.7	106	68-130
207-08-9	Benzo(k)fluoranthene	83.3	86.1	103	70-130
50-32-8	Benzo(a)pyrene	83.3	90.5	109	66-133
218-01-9	Chrysene	83.3	80.8	97	63-130
53-70-3	Dibenzo(a,h)anthracene	83.3	85.0	102	52-132
206-44-0	Fluoranthene	83.3	79.3	95	66-130
86-73-7	Fluorene	83.3	75.0	90	51-130
193-39-5	Indeno(1,2,3-cd)pyrene	83.3	85.4	102	52-138
91-20-3	Naphthalene	83.3	71.9	86	48-130
129-00-0	Pyrene	83.3	88.8	107	60-131

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	78%	9-130%
321-60-8	2-Fluorobiphenyl	75%	5-130%
1718-51-0	Terphenyl-d14	89%	28-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP19731-MS	3G45388.D	1	01/11/21	DC	01/11/21	OP19731	E3G2264
OP19731-MSD	3G45389.D	1	01/11/21	DC	01/11/21	OP19731	E3G2264
DA31691-1 ^a	3G45395.D	4	01/11/21	DC	01/11/21	OP19731	E3G2264

The QC reported here applies to the following samples:

Method: SW846 8270C BY SIM

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	DA31691-1 ug/kg	Spike Q ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND	95.5	51.4	54	95.5	70.1	73	31* ^b	5-139/30
120-12-7	Anthracene	ND	95.5	53.4	56	95.5	70.0	73	27	15-156/30
56-55-3	Benzo(a)anthracene	15.3	J 95.5	56.0	43	95.5	72.7	60	26	13-152/30
205-99-2	Benzo(b)fluoranthene	ND	95.5	58.4	61	95.5	80.1	84	31* ^b	5-150/30
207-08-9	Benzo(k)fluoranthene	ND	95.5	55.1	58	95.5	72.0	75	27	8-152/30
50-32-8	Benzo(a)pyrene	ND	95.5	57.0	40	95.5	75.6	60	28	9-150/30
218-01-9	Chrysene	ND	95.5	67.6	55	95.5	95.4	84	34* ^b	5-171/30
53-70-3	Dibenzo(a,h)anthracene	ND	95.5	50.6	53	95.5	58.2	61	14	5-144/30
206-44-0	Fluoranthene	ND	95.5	57.3	60	95.5	75.2	79	27	5-179/30
86-73-7	Fluorene	ND	95.5	72.1	76	95.5	107	112	39* ^b	16-130/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND	95.5	51.1	54	95.5	56.9	60	11	5-173/30
91-20-3	Naphthalene	ND	95.5	42.2	44	95.5	61.4	64	37* ^b	5-138/30
129-00-0	Pyrene	ND	95.5	69.3	73	95.5	95.0	100	31* ^b	5-183/30

CAS No.	Surrogate Recoveries	MS	MSD	DA31691-1	Limits
4165-60-0	Nitrobenzene-d5	40%	60%	51%	9-130%
321-60-8	2-Fluorobiphenyl	42%	58%	58%	5-130%
1718-51-0	Terphenyl-d14	52%	74%	63%	28-130%

(a) Dilution required due to matrix interference. Internal standard failure without dilution.

(b) Variability of recovery may be due to sample matrix/nonhomogeneity.

* = Outside of Control Limits.

GC Volatiles**QC Data Summaries**

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Includes the following where applicable:

- **Method Blank Summaries**
- **Blank Spike Summaries**
- **Matrix Spike and Duplicate Summaries**

Method Blank Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA2446-MB	GA54143.D	1	01/11/21	JB	n/a	n/a	GGA2446

The QC reported here applies to the following samples: Method: SW846 8015D

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	10	5.0	mg/kg	

CAS No.	Surrogate Recoveries	Limits
120-82-1	1,2,4-Trichlorobenzene	98% 60-140%

Blank Spike Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGA2446-BS	GA54142.D	1	01/11/21	JB	n/a	n/a	GGA2446

The QC reported here applies to the following samples: Method: SW846 8015D

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-GRO (C6-C10)	110	85.7	78	54-139

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	107%	60-140%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
DA31691-1MS	GA54145.D	1	01/11/21	JB	n/a	n/a	GGA2446
DA31691-1MSD	GA54146.D	1	01/11/21	JB	n/a	n/a	GGA2446
DA31691-1	GA54144.D	1	01/11/21	JB	n/a	n/a	GGA2446

The QC reported here applies to the following samples: Method: SW846 8015D

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	DA31691-1 mg/kg	Spike Q mg/kg	MS mg/kg	MS %	Spike mg/kg	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	ND	141	112	79	141	112	79	0	36-145/30

CAS No.	Surrogate Recoveries	MS	MSD	DA31691-1	Limits
120-82-1	1,2,4-Trichlorobenzene	97%	94%	96%	60-140%

* = Outside of Control Limits.

GC/LC Semi-volatiles**QC Data Summaries**

Includes the following where applicable:

- **Method Blank Summaries**
- **Blank Spike Summaries**
- **Matrix Spike and Duplicate Summaries**

Method Blank Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP19732-MB	FH053901.D	1	01/11/21	GN	01/11/21	OP19732	GFH2149

The QC reported here applies to the following samples: Method: SW846-8015D

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	10	9.5	mg/kg	

CAS No.	Surrogate Recoveries	Limits
84-15-1	o-Terphenyl	84% 25-141%

Blank Spike Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP19732-BS	FH053903.D	1	01/11/21	GN	01/11/21	OP19732	GFH2149

The QC reported here applies to the following samples: Method: SW846-8015D

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	250	152	61	49-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	74%	25-141%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: DA31691
Account: ALFWSNEO Alfred Ward & Son
Project: Blomenkamp Lease

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP19732-MS	FH053905.D	1	01/11/21	GN	01/11/21	OP19732	GFH2149
OP19732-MSD	FH053907.D	1	01/11/21	GN	01/11/21	OP19732	GFH2149
DA31692-1	FH053909.D	1	01/11/21	GN	01/11/21	OP19732	GFH2149

The QC reported here applies to the following samples: Method: SW846-8015D

DA31691-1, DA31691-2, DA31691-3, DA31691-4

CAS No.	Compound	DA31692-1 mg/kg	Spike mg/kg	MS mg/kg	MS %	Spike mg/kg	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	149	265	244	36	265	267	45	9	10-149/30

CAS No.	Surrogate Recoveries	MS	MSD	DA31692-1	Limits
84-15-1	o-Terphenyl	66%	68%	63%	25-141%

* = Outside of Control Limits.

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA31691
Account: ALFWSNEO - Alfred Ward & Son
Project: Blumenkamp Lease

QC Batch ID: MP31982
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 01/12/21

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	55	75		
Antimony	150	11	34		
Arsenic	130	19	23		
Barium	50	1	6.5		
Beryllium	50	4.5	6.5		
Boron	250	4	32		
Cadmium	50	1	6.5		
Calcium	2000	12	250	43.5	<2000
Chromium	50	1.5	6.5		
Cobalt	25	2.5	3.2		
Copper	50	4	6.5		
Iron	350	7.5	60		
Lead	250	11	32		
Lithium	25	2	6.5		
Magnesium	1000	34	130	35.0	<1000
Manganese	25	2.5	3.2		
Molybdenum	50	2	14		
Nickel	150	2.5	19		
Phosphorus	500	75	80		
Potassium	5000	500	630		
Selenium	250	36	110		
Silicon	250	24	75		
Silver	150	1.5	19		
Sodium	2000	37	250	294	<2000
Strontium	25	.05	3.2		
Thallium	50	9	22		
Tin	300	60	260		
Titanium	50	.5	6.5		
Uranium	250	15	43		
Vanadium	50	2	6.5		
Zinc	150	2	19		

Associated samples MP31982: DA31691-1A, DA31691-2A, DA31691-3A, DA31691-4A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA31691
Account: ALFWSNEO - Alfred Ward & Son
Project: Blumenkamp Lease

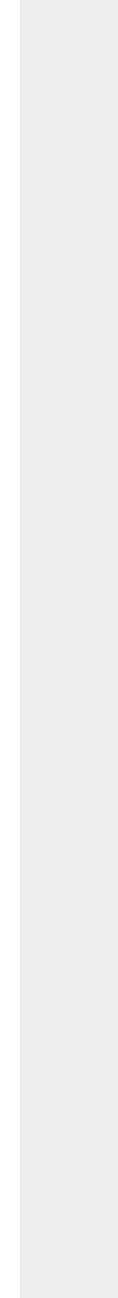
QC Batch ID: MP31982
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 01/12/21

Metal	RL	IDL	MDL	MB raw	final
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(anr) Analyte not requested



MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA31691
 Account: ALFWSNEO - Alfred Ward & Son
 Project: Blumenkamp Lease

QC Batch ID: MP31982
 Matrix Type: AQUEOUS

Methods: SW846 6010C
 Units: ug/l

Prep Date: 01/12/21

Metal	DA31692-1A Original MS		Spikelot ICPAL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	78700	199000	125000	96.2	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	13100	125000	125000	89.5	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	366000	367000	125000	0.8N (a)	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP31982: DA31691-1A, DA31691-2A, DA31691-3A, DA31691-4A

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA31691
 Account: ALFWSNEO - Alfred Ward & Son
 Project: Blumenkamp Lease

QC Batch ID: MP31982
 Matrix Type: AQUEOUS

Methods: SW846 6010C
 Units: ug/l

Prep Date: 01/12/21

Metal	DA31692-1A Original MS	SpikeLot ICPALL2	% Rec	QC Limits
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(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA31691
Account: ALFWSNEO - Alfred Ward & Son
Project: Blumenkamp Lease

QC Batch ID: MP31982
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 01/12/21

Metal	DA31692-1A Original MSD		Spikelot ICPALL2 % Rec		MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	78700	200000	125000	97.0	0.5	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	13100	128000	125000	91.9	2.4	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	366000	371000	125000	4.0N (a)	1.1	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP31982: DA31691-1A, DA31691-2A, DA31691-3A, DA31691-4A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA31691
 Account: ALFWSNEO - Alfred Ward & Son
 Project: Blumenkamp Lease

QC Batch ID: MP31982
 Matrix Type: AQUEOUS

Methods: SW846 6010C
 Units: ug/l

Prep Date: 01/12/21

Metal	DA31692-1A Original MSD	Spikelot ICPALL2 % Rec	MSD RPD	QC Limit
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(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA31691
 Account: ALFWSNEO - Alfred Ward & Son
 Project: Blumenkamp Lease

QC Batch ID: MP31982
 Matrix Type: AQUEOUS

Methods: SW846 6010C
 Units: ug/l

Prep Date: 01/12/21

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	128000	125000	102.4	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	118000	125000	94.4	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	119000	125000	95.2	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP31982: DA31691-1A, DA31691-2A, DA31691-3A, DA31691-4A

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA31691

Account: ALFWSNEO - Alfred Ward & Son

Project: Blumenkamp Lease

QC Batch ID: MP31982

Methods: SW846 6010C

Matrix Type: AQUEOUS

Units: ug/l

Prep Date:

01/12/21

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
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(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: DA31691
 Account: ALFWSNEO - Alfred Ward & Son
 Project: Blumenkamp Lease

QC Batch ID: MP31982
 Matrix Type: AQUEOUS

Methods: SW846 6010C
 Units: ug/l

Prep Date: 01/12/21

Metal	DA31692-1A Original SDL 1:5		%DIF	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	15700	14700	6.3	0-10
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	2630	1970	25.3*(a)	0-10
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	73200	50400	31.2*(a)	0-10
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP31982: DA31691-1A, DA31691-2A, DA31691-3A, DA31691-4A

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: DA31691
Account: ALFWSNEO - Alfred Ward & Son
Project: Blumenkamp Lease

QC Batch ID: MP31982
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 01/12/21

	DA31692-1A		QC
Metal	Original SDL 1:5	%DIF	Limits

(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA31691
Account: ALFWSNEO - Alfred Ward & Son
Project: Blumenkamp Lease

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP28374/GN52214			umhos/cm	xxxxxxxx	987	98.9	90-110%

Associated Samples:
Batch GP28374: DA31691-1, DA31691-2, DA31691-3, DA31691-4
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA31691
Account: ALFWSNEO - Alfred Ward & Son
Project: Blomenkamp Lease

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Solids, Percent	GN52212	DA31701-8	%	75.5	77.5	2.6	0-10%
Specific Conductivity	GP28374/GN52214	DA31692-4	umhos/cm	1710	1680	1.3	0-20%

Associated Samples:
Batch GN52212: DA31691-1, DA31691-2, DA31691-3, DA31691-4
Batch GP28374: DA31691-1, DA31691-2, DA31691-3, DA31691-4
(*) Outside of QC limits