



October 19, 2019

Lila Barton  
15650 Colorado Boulevard  
Brighton, CO 80602

**RE: Baseline Groundwater Sampling Results – Barton-302202**

Dear Ms. Barton:

On July 31, 2019, A.G. Wassenaar, Inc. (AGW) collected a groundwater sample from your domestic water well and submitted the sample to Origins Laboratory, Inc. in Denver, Colorado and Dolan Integration Group in Westminster, Colorado for laboratory analysis. The sampling of this well was conducted to assist Great Western Operating Company, LLC (GWOC) in complying with the Colorado Oil and Gas Conservation Commission's Rule 318A.f. The purpose of the sampling was to collect a representative baseline water sample from your well. Prior to sampling, GWOC obtained verbal access approval from you.

The laboratory analytical results, compared to primary and secondary federal drinking water standards, are summarized on Table 1 included in Attachment A. Copies of the laboratory analytical reports are included in Attachment B.

For information regarding the groundwater that is supplied to you from your private water well, additional water well matters, water quality, and well maintenance, please refer to the How Well Do You Know Your Water Well pamphlet provided to you. Additional regulatory agency contacts are provided below:

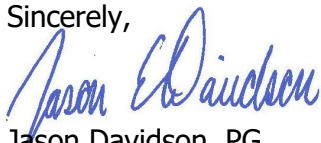
Colorado Division of Water Resources - 303-866-3581, [www.water.state.co.us](http://www.water.state.co.us)

Colorado Department of Public Health and Environment, Water Quality Control Division - 303-692-3500, [www.colorado.gov](http://www.colorado.gov)

Colorado Oil and Gas Conservation Commission - 303-894-2100, [www.cogcc.state.co.us](http://www.cogcc.state.co.us)

GWOC wants to thank you for your cooperation and time during this sampling program. If you have any questions or concerns, feel free to contact AGW at 303-759-8373 or Jason Davidson with GWOC at 720-595-2132.

Sincerely,



Jason Davidson, PG  
Senior EHS Supervisor

**ATTACHMENT A**  
**LABORATORY ANALYTICAL SUMMARY TABLE**

**Table 1**  
**Groundwater Analytical Results: Barton-302202, July 31, 2019**

Analyte	Analytical Results*	Drinking Water Standard**	Standard Type
Benzene	ND	0.005 mg/L	Primary
Toluene	ND	1.0 mg/L	Primary
Ethylbenzene	ND	0.7 mg/L	Primary
Total Xylenes	ND	10.0 mg/L	Primary
Gasoline Range Organics (GRO)	ND	No Standard	
Diesel Range Organics (DRO)	ND	No Standard	
Methane	5.350 mg/L	No Standard	
Ethane	0.0256 mg/L	No Standard	
Propane	0.585 mg/L	No Standard	
Alkalinity, Bicarbonate as CaCO3	478 mg/L	No Standard	
Alkalinity, Carbonate	60.3 mg/L	No Standard	
Alkalinity, Total as CaCO3	539 mg/L	No Standard	
Bromide	0.836 mg/L	No Standard	
Chloride	80.9 mg/L	250 mg/L	Secondary
Fluoride	1.97 mg/L	4.0 mg/L	Primary
Nitrogen, Nitrate	0.170 mg/L	10 mg/L	Primary
Nitrogen, Nitrite	ND	1 mg/L	Primary
Phosphorous, Total	0.187 mg/L	No Standard	
Total Dissolved Solids	710 mg/L	500 mg/L	Secondary
Specific Conductivity	1,190 umhos/cm	No Standard	
Sulfate	ND	250 mg/L	Secondary
pH	8.71 su	6.5-8.5 su	Secondary
Iron Related Bacteria	~35,000 CFU/mL	No Standard	
Slime Forming Bacteria	~2,500 CFU/mL	No Standard	
Sulfate Reducing Bacteria	~1,400 CFU/mL	No Standard	
Barium	0.0336 mg/L	2.0 mg/L	Primary
Boron	0.294 mg/L	No Standard	
Calcium	1.410 mg/L	No Standard	
Iron	ND	0.3 mg/L	Secondary
Magnesium	0.381 mg/L	No Standard	
Manganese	0.00783 mg/L	0.05 mg/L	Secondary
Potassium	1.180 mg/L	No Standard	
Selenium	ND	0.05 mg/L	Primary
Sodium	289.000 mg/L	No Standard	
Strontium	0.0565 mg/L	No Standard	

**Legend:**

\* Result units as follows: mg/L: Milligrams per liter, parts per million; umhos/cm: micromhos per centimeter; su: Standard Units; CFU/ml: Colony Forming Units per milliliter

\*\* Primary and Secondary Standards From Colorado Department of Public Health and Environment, Water Quality Control Commission - Regulation No. 11 - Colorado Primary Drinking Water Regulations (5 CCR 1002-11), effective December 31, 2018. Primary Standards are maximum contaminant levels (MCLs) for public water systems, not applicable to private wells, but presented as a guide to water quality. Secondary Standards are guidelines for contaminants that may cause cosmetic aesthetic effects in drinking water. There is no drinking water standard for dissolved methane. The Colorado Oil and Gas Conservation Commission established a threshold limit for additional analysis of 1.0 mg/L.

ND - Non detect: Not present at or above the laboratory Method Detection Limit (MDL).

**ATTACHMENT B**  
**LABORATORY ANALYTICAL RESULTS**



August 14, 2019

**A.G. Wassenaar**

**Rachel Peterson**

**2180 South Ivanhoe Street - Suite 5**

**Denver**

**CO 80222**

**Project Name - Tollway Baseline**

**Project Number - 190294**

Attached are your analytical results for Tollway Baseline received by Origins Laboratory, Inc. August 01, 2019. This project is associated with Origins project number Y908009-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.  
303.433.1322  
o-squad@oelabinc.com



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

A.G. Wassenaar

2180 South Ivanhoe Street - Suite 5

Denver CO 80222

Rachel Peterson

Project Number: 190294

Project: Tollway Baseline

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Barton-302202	Y908009-01	Water	July 31, 2019 14:00	08/01/2019 15:10

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Jen Pellegrini, Project Manager



A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

Origins Laboratory

F-012207-01-R1  
 Effective Date: 01/09/12

**Sample Receipt Checklist**

Origins Work Order: y908009 Client: AGW  
 Client Project ID: Tollway BC  
 Checklist Completed by: JG Shipped Via: HD  
 Date/time completed: 8/1/19 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Airbill #: N/A  
 Matrix(s) Received: (Check all that apply): X Soil/Solid X Water Other:  
 Cooler Number/Temperature: 1 / 0.1 °C / / °C / / °C (Describe)  
 Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? <b>If yes, contact client and note in narrative.</b>		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)(pH <2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH >10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

<sup>(1)</sup>If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) [Signature] Date/Time Reviewed 8/1/19

Origins Laboratory, Inc.

*Jefe Pellegrini*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Barton-302202**  
**7/31/2019 2:00:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

**GEL Laboratories, LLC**  
**Y908009-01 (Water)**

**Alkalinity by SM 2320B**

Alkalinity, Total as CaCO <sub>3</sub>	<b>539</b>	4.00	mg/L	1	1904197	RXB5	07/31/2019	08/07/2019	
Bicarbonate alkalinity (CaCO <sub>3</sub> )	<b>478</b>	4.00	"	"	"	RXB5	"	"	
Carbonate alkalinity (CaCO <sub>3</sub> )	<b>60.3</b>	4.00	"	"	"	RXB5	"	"	

**Anions by EPA 300.0**

Bromide	<b>0.836</b>	0.200	mg/L	1	1903076	LXA2	"	08/04/2019	
Chloride	<b>80.9</b>	2.00	"	10	"	LXA2	"	08/02/2019	
Fluoride	<b>1.97</b>	0.100	"	1	"	LXA2	"	08/04/2019	
Nitrate	<b>0.170</b>	0.100	"	"	"	LXA2	"	"	H
Nitrite	ND	0.100	"	"	"	LXA2	"	"	HU
Sulfate	ND	0.400	"	"	"	LXA2	"	"	U

**Bacterial Activity Reaction Tests**

Iron Related Bacteria	~35000		CFU/mL	1	11111	DJL	08/01/2019	08/01/2019	
Slime Forming Bacteria	~2500		"	"	"	DJL	"	"	
Sulfate Reducing Bacteria	~1400		"	"	"	DJL	"	"	

**BTEX by EPA 8260D**

Benzene	ND	1.00	ug/L	1	B9H0203	KDK	08/02/2019	08/03/2019	Ua
Toluene	ND	1.00	"	"	"	KDK	"	"	Ua

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Barton-302202**  
**7/31/2019 2:00:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

**Origins Laboratory, Inc.**  
**Y908009-01 (Water)**

**BTEX by EPA 8260D**

Ethylbenzene	ND	1.00	ug/L	1	B9H0203	KDK	08/02/2019	08/03/2019	Ua
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	Ua

Surrogate: 1,2-Dichloroethane-d4	90.9 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	109 %	70-130			"	"	"	"	

**Dissolved Gasses by RSK 175**

Ethane	25.6	10	ug/L	1	11111		07/31/2019	08/07/2019	
Methane	5350	10	"	"	"		"	"	E
n-Propane	585	20	"	"	"		"	"	

**Dissolved Metals by EPA 200.8**

Barium	33.6	4.00	ug/L	1	1903482	BAJ	08/04/2019	08/05/2019	
Boron	294	150	"	10	"	BAJ	"	08/06/2019	
Calcium	1410	200	"	1	"	BAJ	"	08/05/2019	
Iron	ND	100	"	"	"	BAJ	"	"	U
Magnesium	381	30.0	"	"	"	BAJ	"	"	
Manganese	7.83	5.00	"	"	"	BAJ	"	"	
Potassium	1180	300	"	"	"	BAJ	"	"	
Selenium	ND	5.00	"	"	"	BAJ	"	"	U
Sodium	289000	2500	"	10	"	BAJ	"	08/06/2019	

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Barton-302202**  
**7/31/2019 2:00:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

**GEL Laboratories, LLC**  
**Y908009-01 (Water)**

**Dissolved Metals by EPA 200.8**

Strontium	56.5	10.0	ug/L	1	1903482	BAJ	08/04/2019	08/05/2019	
-----------	------	------	------	---	---------	-----	------------	------------	--

**DRO by 8015C**

Diesel Range Organics	ND	190	ug/L	1	1904264	RXC1	08/07/2019	08/07/2019	U
-----------------------	----	-----	------	---	---------	------	------------	------------	---

<i>Surrogate: o-Terphenyl</i>	70 %	40-109				"	"	"	
-------------------------------	------	--------	--	--	--	---	---	---	--

**GRO by 8015C**

Gasoline Range Organics	ND	100	ug/L	1	24799	JJG	07/31/2019	08/05/2019	
-------------------------	----	-----	------	---	-------	-----	------------	------------	--

<i>Surrogate: Bromofluorobenzene</i>	107 %	70-130				"	"	"	
--------------------------------------	-------	--------	--	--	--	---	---	---	--

**Nitrate/Nitrite by EPA 353.2**

Nitrogen, Nitrate/Nitrite	ND	0.020	mg/L	1	1903758	KLP1	"	08/06/2019	U
---------------------------	----	-------	------	---	---------	------	---	------------	---

**pH in Water by EPA 9040C**

pH	8.71		pH Units	1	B9H0119	OLAB	08/01/2019	08/01/2019	
----	------	--	----------	---	---------	------	------------	------------	--

**Specific Conductance by Modified 9050A**

Specific Conductance (EC)	1190	5.00	uS/cm	"	B9H0120	KDK	08/01/2019	08/02/2019	
---------------------------	------	------	-------	---	---------	-----	------------	------------	--

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
2180 South Ivanhoe Street - Suite 5  
Denver CO 80222

Rachel Peterson  
Project Number: 190294  
Project: Tollway Baseline

**Barton-302202**  
**7/31/2019 2:00:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	--------------------	-------	----------	-------	---------	----------	----------	-------

**Origins Laboratory, Inc.**  
**Y908009-01 (Water)**

**TDS by SM 2540C**

Total Dissolved Solids	710	14.3	mg/L	1	1904051	KLP1	07/31/2019	08/06/2019	
------------------------	-----	------	------	---	---------	------	------------	------------	--

**Total Phosphorus by EPA 365.4**

Phosphorus, Total as P	0.187	0.050	mg/L	1	1903769	KLP1	08/05/2019	08/06/2019	
------------------------	-------	-------	------	---	---------	------	------------	------------	--

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch B9H0203 - EPA 5030B (Water)**

**Blank (B9H0203-BLK1)**

Prepared: 08/02/2019 Analyzed: 08/02/2019

Benzene	ND	1.00	ug/L							Ua
Toluene	ND	1.00	"							Ua
Ethylbenzene	ND	1.00	"							Ua
Xylenes, total	ND	1.00	"							Ua
<i>Surrogate: 1,2-Dichloroethane-d4</i>	63		"	62.5		101	70-130			
<i>Surrogate: Toluene-d8</i>	63		"	62.5		100	70-130			
<i>Surrogate: 4-Bromofluorobenzene</i>	62		"	62.5		99.9	70-130			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch B9H0203 - EPA 5030B (Water)**

**LCS (B9H0203-BS1)**

Prepared: 08/02/2019 Analyzed: 08/02/2019

Benzene	63.1	1.00	ug/L	50.0		126	70-130			
Toluene	63.6	1.00	"	50.0		127	70-130			
Ethylbenzene	62.0	1.00	"	50.0		124	70-130			
m,p-Xylene	126	2.00	"	100		126	70-130			
o-Xylene	62.6	1.00	"	50.0		125	70-130			
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		97.3	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Jen Pellegrini, Project Manager

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch B9H0203 - EPA 5030B (Water)**

<b>Matrix Spike (B9H0203-MS1)</b>	<b>Source: Y908018-05</b>			<b>Prepared: 08/02/2019 Analyzed: 08/02/2019</b>						
Benzene	65.0	1.00	ug/L	50.0	ND	130	70-130			
Toluene	65.1	1.00	"	50.0	ND	130	70-130			
Ethylbenzene	63.3	1.00	"	50.0	0.070	126	70-130			
m,p-Xylene	129	2.00	"	100	ND	129	70-130			
o-Xylene	63.5	1.00	"	50.0	ND	127	70-130			
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.1	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		102	70-130			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Volatile Organic Compounds by GC/MS SW846 8260D - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch B9H0203 - EPA 5030B (Water)**

Matrix Spike Dup (B9H0203-MSD1)	Source: Y908018-05			Prepared: 08/02/2019 Analyzed: 08/02/2019						
Benzene	62.5	1.00	ug/L	50.0	ND	125	70-130	3.98	20	
Toluene	62.8	1.00	"	50.0	ND	126	70-130	3.71	20	
Ethylbenzene	63.8	1.00	"	50.0	0.070	127	70-130	0.787	20	
m,p-Xylene	128	2.00	"	100	ND	128	70-130	0.585	20	
o-Xylene	62.8	1.00	"	50.0	ND	126	70-130	1.03	20	
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		97.1	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		103	70-130			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Alkalinity by SM 2320B - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1904197 -</b>										
<b>LCS (1204350130-BKS)</b>					Prepared: Analyzed: 08/07/2019					
Alkalinity, Total as CaCO3	108	4.00	mg/L	100		108	90-110			
<b>DUP (1204350131 D)</b>					Source: 486843001 Prepared: Analyzed: 08/07/2019					
Carbonate alkalinity (CaCO3)	ND	4.00	mg/L		<1.45		0-20	0	20	U
Bicarbonate alkalinity (CaCO3)	310	4.00	"		307		0-20	0.979	20	
Alkalinity, Total as CaCO3	310	4.00	"		307		0-20	0.979	20	
<b>DUP (1204350132 D)</b>					Source: 486843002 Prepared: Analyzed: 08/07/2019					
Bicarbonate alkalinity (CaCO3)	269	4.00	mg/L		268		0-20	0.374	20	
Alkalinity, Total as CaCO3	277	4.00	"		276		0-20	0.363	20	
Carbonate alkalinity (CaCO3)	8.04	4.00	"		8.04		0-20	0	20	
<b>MS (1204350133 S)</b>					Source: 486843001 Prepared: Analyzed: 08/07/2019					
Alkalinity, Total as CaCO3	412	4.00	mg/L	100	307	106	80-120			
<b>MS (1204350134 S)</b>					Source: 486843002 Prepared: Analyzed: 08/07/2019					
Alkalinity, Total as CaCO3	381	4.00	mg/L	100	276	105	80-120			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Anions by EPA 300.0 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 1903076 -**

**BLANK (1204347470-BLK)**

Prepared: Analyzed: 08/02/2019

Sulfate	ND	0.400	mg/L				-			U
Nitrite	ND	0.100	"				-			U
Nitrate	ND	0.100	"				-			U
Fluoride	ND	0.100	"				-			U
Chloride	ND	0.200	"				-			U
Bromide	ND	0.200	"				-			U

**LCS (1204347471-BKS)**

Prepared: Analyzed: 08/02/2019

Nitrite	2.44	0.100	mg/L	2.50		97.4	90-110			
Nitrate	2.41	0.100	"	2.50		96.3	90-110			
Fluoride	2.47	0.100	"	2.50		98.9	90-110			
Chloride	4.76	0.200	"	5.00		95.2	90-110			
Bromide	1.27	0.200	"	1.25		102	90-110			
Sulfate	9.73	0.400	"	10.0		97.3	90-110			

**DUP (1204347472 D)**

Source: 486458001

Prepared: Analyzed: 08/02/2019

Nitrite	ND	0.100	mg/L		<0.033		0-20	0	20	HU
Nitrate	17.9	1.00	"		17.8		0-20	0.269	20	H
Fluoride	0.415	0.100	"		0.439		0-20	5.5	20	
Chloride	17.0	2.00	"		16.9		0-20	0.0649	20	
Bromide	0.232	0.200	"		0.206		0-20	11.8	20	
Sulfate	64.3	4.00	"		64.0		0-20	0.522	20	

**PS (1204347473 S)**

Source: 486458001

Prepared: Analyzed: 08/03/2019

Bromide	1.46	0.200	mg/L	1.25		101	90-110			
Chloride	66.2	2.00	"	5.00		98.5	90-110			
Fluoride	2.91	0.100	"	2.50		99	90-110			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
2180 South Ivanhoe Street - Suite 5  
Denver CO 80222

Rachel Peterson  
Project Number: 190294  
Project: Tollway Baseline

**Anions by EPA 300.0 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 1903076 -

PS (1204347473 S)	Source: 486458001			Prepared: Analyzed: 08/03/2019						
Nitrate	43.7	1.00	mg/L	2.50	104	90-110				H
Nitrite	2.45	0.100	"	2.50	98.1	90-110				H
Sulfate	165	4.00	"	10.0	101	90-110				

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Jen Pellegrini, Project Manager

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Dissolved Metals by EPA 200.8 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 1903482 -**

**FLTB (1204347357-BLK)**

Prepared: 08/04/2019 Analyzed: 08/05/2019

Potassium	ND	300	ug/L				-			U
Strontium	ND	10.0	"				-			U
Sodium	ND	250	"				-			U
Calcium	ND	200	"				-			U
Iron	ND	100	"				-			U
Magnesium	ND	30.0	"				-			U
Manganese	ND	5.00	"				-			U
Selenium	ND	5.00	"				-			U
Barium	ND	4.00	"				-			U
Boron	ND	15.0	"				-			U

**BLANK (1204348453-BLK)**

Prepared: 08/04/2019 Analyzed: 08/05/2019

Strontium	ND	10.0	ug/L				-			U
Sodium	ND	250	"				-			U
Barium	ND	4.00	"				-			U
Selenium	ND	5.00	"				-			U
Manganese	ND	5.00	"				-			U
Magnesium	ND	30.0	"				-			U
Iron	ND	100	"				-			U
Calcium	ND	200	"				-			U
Boron	ND	15.0	"				-			U
Potassium	ND	300	"				-			U

**LCS (1204348454-BKS)**

Prepared: 08/04/2019 Analyzed: 08/05/2019

Magnesium	2110	30.0	ug/L	2000		105	85-115			
Boron	95.6	15.0	"	100		95.6	85-115			
Selenium	50.5	5.00	"	50.0		101	85-115			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Dissolved Metals by EPA 200.8 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 1903482 - EPA 200.2**

**LCS (1204348454-BKS)**

Prepared: 08/04/2019 Analyzed: 08/06/2019

Sodium	1890	250	ug/L	2000		94.3	85-115			
Strontium	47.5	10.0	"	50.0		95	85-115			
Potassium	1940	300	"	2000		97.2	85-115			
Manganese	49.9	5.00	"	50.0		99.7	85-115			
Calcium	1970	200	"	2000		98.7	85-115			
Barium	49.9	4.00	"	50.0		99.8	85-115			
Iron	2020	100	"	2000		101	85-115			

**DUP (1204348455 D)**

Source: 486309001

Prepared: 08/04/2019 Analyzed: 08/05/2019

Strontium	545	10.0	ug/L		514		0-20	5.94	20	
Sodium	896000	12500	"		833000		0-20	7.3	20	
Selenium	ND	5.00	"		<2.00		0-20	26.1	20	U
Potassium	23400	300	"		22200		0-20	5.48	20	
Manganese	15.6	5.00	"		15.4		0-20	1.57	20	
Magnesium	56.6	30.0	"		53.7		0-20	5.1	20	
Iron	1340	100	"		1300		0-20	3.02	20	
Calcium	4130	200	"		4050		0-20	2.04	20	
Boron	851	150	"		832		0-20	2.34	20	
Barium	219	4.00	"		213		0-20	2.83	20	

**MS (1204348456 S)**

Source: 486309001

Prepared: 08/04/2019 Analyzed: 08/05/2019

Strontium	594	10.0	ug/L	50.0	514	0	75-125			
Sodium	879000	12500	"	2000	833000	0	75-125			
Barium	262	4.00	"	50.0	213	0	75-125			
Boron	993	150	"	100	832	0	75-125			
Calcium	6010	200	"	2000	4050	97.8	75-125			
Iron	3060	100	"	2000	1300	88.1	75-125			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
2180 South Ivanhoe Street - Suite 5  
Denver CO 80222

Rachel Peterson  
Project Number: 190294  
Project: Tollway Baseline

**Dissolved Metals by EPA 200.8 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch 1903482 - EPA 200.2

MS (1204348456 S)	Source: 486309001			Prepared: 08/04/2019 Analyzed: 08/05/2019						
Potassium	25200	300	ug/L	2000	22200	0	75-125			
Magnesium	1870	30.0	"	2000	53.7	90.7	75-125			
Manganese	59.1	5.00	"	50.0	15.4	87.5	75-125			
Selenium	44.5	5.00	"	50.0	<2.00	87.2	75-125			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Jen Pellegrini, Project Manager

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**DRO by 8015C - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1904264 - SW846 3535A</b>										
<b>BLANK (1204350279-BLK)</b>					Prepared: 08/07/2019 Analyzed: 08/07/2019					
Diesel Range Organics	ND	200	ug/L				-			U
Surrogate: o-Terphenyl	13.0		"	20.0		65	40-109			
<b>LCS (1204350280-BKS)</b>					Prepared: 08/07/2019 Analyzed: 08/07/2019					
Diesel Range Organics	741	200	ug/L	1000		74	45-119			
Surrogate: o-Terphenyl	16.6		"	20.0		83	40-109			
<b>MS (1204350281 S)</b>					Source: 486457001 Prepared: 08/07/2019 Analyzed: 08/07/2019					
Diesel Range Organics	853	400	ug/L	1000	112	74	41-118			
Surrogate: o-Terphenyl	17.0		"	20.0	16.3	85	40-109			
<b>MSD (1204350282 SD)</b>					Source: 486457001 Prepared: 08/07/2019 Analyzed: 08/07/2019					
Diesel Range Organics	728	400	ug/L	1000	112	62	41-118	16	20	
Surrogate: o-Terphenyl	15.0		"	20.0	16.3	75	40-109			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Nitrate/Nitrite by EPA 353.2 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1903758 -</b>										
<b>BLANK (1204349147-BLK)</b>					Prepared: Analyzed: 08/06/2019					
Nitrogen, Nitrate/Nitrite	ND	0.020	mg/L				-			U
<b>LCS (1204349148-BKS)</b>					Prepared: Analyzed: 08/06/2019					
Nitrogen, Nitrate/Nitrite	0.937	0.020	mg/L	1.00		93.7	90-110			
<b>DUP (1204349149 D)</b>					Source: Y908009-01 Prepared: Analyzed: 08/06/2019					
Nitrogen, Nitrate/Nitrite	ND	0.020	mg/L		<0.007		0-20	10.9	20	U
<b>PS (1204349150 S)</b>					Source: Y908009-01 Prepared: Analyzed: 08/06/2019					
Nitrogen, Nitrate/Nitrite	0.940	0.020	mg/L	1.00		93.7	90-110			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**TDS by SM 2540C - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1904051 -</b>										
<b>BLANK (1204349786-BLK)</b>					Prepared: Analyzed: 08/06/2019					
Total Dissolved Solids	ND	14.3	mg/L				-			U
<b>LCS (1204349787-BKS)</b>					Prepared: Analyzed: 08/06/2019					
Total Dissolved Solids	297	14.3	mg/L	300		99	95-105			
<b>DUP (1204349788 D)</b>					Source: 486078002 Prepared: Analyzed: 08/06/2019					
Total Dissolved Solids	340	14.3	mg/L		333		0-5	2.12	5	

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
 2180 South Ivanhoe Street - Suite 5  
 Denver CO 80222

Rachel Peterson  
 Project Number: 190294  
 Project: Tollway Baseline

**Total Phosphorus by EPA 365.4 - Quality Control**  
**GEL Laboratories, LLC**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1903769 - EPA 365.4 Prep</b>										
<b>BLANK (1204349184-BLK)</b>					Prepared: 08/05/2019 Analyzed: 08/06/2019					
Phosphorus, Total as P	ND	0.050	mg/L				-			U
<b>LCS (1204349185-BKS)</b>					Prepared: 08/05/2019 Analyzed: 08/06/2019					
Phosphorus, Total as P	0.956	0.050	mg/L	1.00		95.6	80-124			
<b>DUP (1204349186 D)</b>					Source: 485973004 Prepared: 08/05/2019 Analyzed: 08/06/2019					
Phosphorus, Total as P	0.402	0.050	mg/L		0.421		0-41	4.62	41	
<b>MS (1204349187 S)</b>					Source: 485973004 Prepared: 08/05/2019 Analyzed: 08/06/2019					
Phosphorus, Total as P	1.24	0.050	mg/L	1.00	0.421	81.9	70-136			

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

A.G. Wassenaar  
2180 South Ivanhoe Street - Suite 5  
Denver CO 80222

Rachel Peterson  
Project Number: 190294  
Project: Tollway Baseline

---

**Notes and Definitions**

Ua Sample is Non-Detect.

U Result not detected above the detection limit

HU Holding time exceeded. Non detect.

H Holding time exceeded

E Analyte concentration exceeded the calibration range. The reported result is estimated.

~35000 ~35000

~2500 ~2500

~1400 ~1400

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

---

Jen Pellegrini, Project Manager



**dig**  
Dolan Integration Group

Geochemistry for Energy

11025 Dover Street Unit 800  
Westminster, CO 80021  
p: 303.531.2030

**Hydrocarbon Gas Composition and Stable Isotopes  
Data and Interpretation**

**Job #:** 19082638  
**Lab #:** DIG-019958  
**Client:** Origins Laboratory  
**Sample Name(s):** Barton-302202

The analytical results, opinions, or interpretations contained in this report are based upon information and material supplied by the client for whose exclusive and confidential use this report has been made. The analytical results, opinions, or interpretations expressed represent the best judgment of Dolan Integration Group based on its experience, but any interpretation of test or other data, and any recommendation(s) based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions which are not infallible, and with respect to which professional engineers and analysts may differ. Accordingly, Dolan Integration Group makes no warranty or representation, expressed or implied, of any type, and expressly disclaims same as to the productivity, proper operations, or profitableness of any oil, gas, coal, or other mineral, property, well, or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced, in whole or in part, without the written approval of Dolan Integration Group.

Dolan Integration Group shall use commercially reasonable efforts to maintain the Samples it receives from Customer in the condition in which same were initially received, and shall store, free of charge, any portion(s) of the Sample(s) not consumed or altered in the course of testing and analysis for a period of 90 days after their initial receipt, after which time the Samples will be destroyed. At Customer's written request and expense, Dolan Integration Group shall return unused Samples to Customer. At Customer's written request, Dolan Integration Group will also store and maintain Customer's Samples beyond the Free Storage Period for a monthly fee in accordance with Dolan Integration Group's the current storage rates. If Customer fails to timely pay any applicable storage charges, Dolan Integration Group shall be free to destroy the Sample.

# Analytical Report



Job #: 19082638  
 Lab #: DIG-019958  
 Client: Origins Laboratory  
 Sample Name: Barton-302202  
 Date Sampled: 07/31/19  
 Time Sampled: 14:00  
 Sample Description: 1 L Bottle  
 Sampling Notes:  
 Date Received: 08/14/19  
 Date Analyzed: Gas Composition: 9/7/19  $\delta^{13}\text{C}$ : 8/27/19  $\delta\text{D}$ : 9/13/19  
 Date Reported: 09/13/19  
 Comments:

Measured Values:	Measured ppm	Analyte mol % <sup>a</sup>	HC mol %	$\delta^{13}\text{C}$ ‰ VPDB	$\delta\text{D}$ ‰ VSMOW	Comments
Nitrogen (N <sub>2</sub> )	461039	49.97	-	-	-	
Oxygen + Argon (O <sub>2</sub> +Ar)	137956	14.95	-	-	-	
Carbon Dioxide (CO <sub>2</sub> )	974	0.11	-	-	-	
Helium (He) <sup>b</sup>	na	na	-	-	-	Helium added to create headspace.
Hydrogen (H <sub>2</sub> )	nd	nd	-	-	-	
Methane (CH <sub>4</sub> )	322592	34.96	99.96	-71.3	-261	
Ethane (C <sub>2</sub> H <sub>6</sub> )	132	0.01	0.04		-	
Ethene (C <sub>2</sub> H <sub>4</sub> )	nd	nd	nd		-	
Propane (C <sub>3</sub> H <sub>8</sub> )	nd	nd	nd		-	
iso-Butane (C <sub>4</sub> H <sub>10</sub> )	nd	nd	nd		-	
n-Butane (C <sub>4</sub> H <sub>10</sub> )	nd	nd	nd		-	
iso-Pentane (C <sub>5</sub> H <sub>12</sub> )	nd	nd	nd		-	
n-Pentane (C <sub>5</sub> H <sub>12</sub> )	nd	nd	nd		-	
Hexanes + (C <sub>6</sub> H <sub>14</sub> )	nd	nd	nd		-	

Calculated Values:	
Total HCs (ppm)	322724
Gas Wetness (mol % C <sub>2</sub> +C <sub>1</sub> +) )	0.04
C <sub>1</sub> /(C <sub>2</sub> +C <sub>3</sub> ) (mol/mol)	2444

<sup>a</sup> Analyte concentrations normalized to 100% (Mol. % is approximately equal to Vol. % )

<sup>b</sup> Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

HC= Hydrocarbons

nd = not detected

na = not analyzed

Stable isotope results based on multi-point laboratory calibration

Error  $\delta^{13}\text{C}$  < 0.5 ‰

Error  $\delta\text{D}$  < 5.0 ‰

# Stable Isotope Interpretive Plots

