Pace Analytical Services, LLC
8 East Tower Circle
Ormond Beach, FL 32174
(386)672-5668

November 16, 2022

Glenn Walker
Brunswick County Water Systems
PO Box 249
Bolivia, NC 28422

RE: Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

Dear Glenn Walker:

Enclosed are the analytical results for sample(s) received by the laboratory on November 04, 2022. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Ormond Beach

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Bill White
bill.white@pacelabs.com
(386) 672-5668
Project Manager

Enclosures

cc: Billy Benton, BRUNSWICK COUNTY PUBLIC UTILITIES

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CERTIFICATIONS

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

Pace Analytical Services Ormond Beach
8 East Tower Circle, Ormond Beach, FL 32174
Alaska DEC- CS/UST/LUST
Alabama Certification #: 41320
Colorado Certification: FL NELAC Reciprocity
Connecticut Certification #: PH-0216
Delaware Certification: FL NELAC Reciprocity
Florida Certification #: E83079
Georgia Certification #: 955
Guam Certification: FL NELAC Reciprocity
Hawaii Certification: FL NELAC Reciprocity
Illinois Certification #: 200068
Indiana Certification: FL NELAC Reciprocity
Kansas Certification #: E-10383
Kentucky Certification #: 90050
Louisiana Certification #: FL NELAC Reciprocity
Louisiana Environmental Certificate #: 05007
Maine Certification #: FL01264
Maryland Certification: #346
Massachusetts Certification #: M-FL1264
Michigan Certification #: 9911
Mississippi Certification: FL NELAC Reciprocity
Missouri Certification #: 236
Montana Certification #: Cert 0074
Nebraska Certification: NE-OS-28-14
New Hampshire Certification #: 2958
New Jersey Certification #: FL022
New York Certification #: 11608
North Carolina Environmental Certificate #: 667
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Ohio DEP 87780
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity
US Virgin Islands Certification: FL NELAC Reciprocity
Virginia Environmental Certification #: 460165
West Virginia Certification #: 9962C
Wisconsin Certification #: 399079670
Wyoming (EPA Region 8): FL NELAC Reciprocity

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SAMPLE SUMMARY

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

Lab ID	Sample ID	Matrix	Date Collected	Date Received
35757747001	**110322S01**	Water	11/03/22 07:00	11/04/22 10:00
35757747002	**110322E01**	Drinking Water	11/03/22 07:00	11/04/22 10:00

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SAMPLE ANALYTE COUNT

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
35757747001	**110322S01**	EPA 522	BMH	2	PASI-O
35757747002	**110322E01**	EPA 522	BMH	2	PASI-O

PASI-O = Pace Analytical Services - Ormond Beach

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ANALYTICAL RESULTS

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

Sample: 110322S01 **Lab ID: 35757747001** Collected: 11/03/22 07:00 Received: 11/04/22 10:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
522 MSS 1,4 Dioxane	Analytical Method: EPA 522 Preparation Method: EPA 522 Pace Analytical Services - Ormond Beach								
1,4-Dioxane (p-Dioxane)	**2.9**	ug/L	0.19	0.11	1	11/13/22 14:30	11/14/22 10:24	123-91-1	
Surrogates									
1,4-Dioxane-d8 (S)	94	%	70-130		1	11/13/22 14:30	11/14/22 10:24		

Sample: 110322E01 **Lab ID: 35757747002** Collected: 11/03/22 07:00 Received: 11/04/22 10:00 Matrix: Drinking Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
522 MSS 1,4 Dioxane	Analytical Method: EPA 522 Preparation Method: EPA 522 Pace Analytical Services - Ormond Beach								
1,4-Dioxane (p-Dioxane)	**2.6**	ug/L	0.20	0.12	1	11/08/22 18:00	11/09/22 12:23	123-91-1	
Surrogates									
1,4-Dioxane-d8 (S)	89	%	70-130		1	11/08/22 18:00	11/09/22 12:23		

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QUALITY CONTROL DATA

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

QC Batch: 870288
QC Batch Method: EPA 522
Analysis Method: EPA 522
Analysis Description: 522 MSS 1,4 Dioxane
Laboratory: Pace Analytical Services - Ormond Beach
Associated Lab Samples: 35757747002

METHOD BLANK: 4789202 Matrix: Water
Associated Lab Samples: 35757747002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	0.12 U	0.20	0.12	11/09/22 08:22	
1,4-Dioxane-d8 (S)	%	96	70-130		11/09/22 08:22	

LABORATORY CONTROL SAMPLE: 4789203

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	20	18.3	91	70-130	
1,4-Dioxane-d8 (S)	%			84	70-130	

LABORATORY CONTROL SAMPLE: 4789204

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	0.2	0.18 I	89	50-150	
1,4-Dioxane-d8 (S)	%			90	70-130	

MATRIX SPIKE SAMPLE: 4789205

Parameter	Units	35757881006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	0.11 U	19.5	19.9	102	70-130	
1,4-Dioxane-d8 (S)	%				91	70-130	

SAMPLE DUPLICATE: 4789206

Parameter	Units	35757881007 Result	Dup Result	RPD	Max RPD	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	0.12 U	0.12 U		20	
1,4-Dioxane-d8 (S)	%	98	84			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

QC Batch: 871175
QC Batch Method: EPA 522
Analysis Method: EPA 522
Analysis Description: 522 MSS 1,4 Dioxane
Laboratory: Pace Analytical Services - Ormond Beach
Associated Lab Samples: 35757747001

METHOD BLANK: 4795023 Matrix: Water
Associated Lab Samples: 35757747001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	0.12 U	0.20	0.12	11/14/22 09:15	
1,4-Dioxane-d8 (S)	%	89	70-130		11/14/22 09:15	

LABORATORY CONTROL SAMPLE: 4795024

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	2	1.8	88	70-130	
1,4-Dioxane-d8 (S)	%			88	70-130	

LABORATORY CONTROL SAMPLE: 4795025

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	0.2	0.17 I	83	50-150	
1,4-Dioxane-d8 (S)	%			89	70-130	

MATRIX SPIKE SAMPLE: 4795026

Parameter	Units	35758911001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	<0.12	2	1.9	94	70-130	
1,4-Dioxane-d8 (S)	%				92	70-130	

SAMPLE DUPLICATE: 4795027

Parameter	Units	35758911002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,4-Dioxane (p-Dioxane)	ug/L	<0.12	0.12 U		20	
1,4-Dioxane-d8 (S)	%	91	92			

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Compound was analyzed for but not detected.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 1,4-Dioxane 522 (Weekly)
Pace Project No.: 35757747

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
35757747001	**110322S01**	EPA 522	871175	EPA 522	871224
35757747002	**110322E01**	EPA 522	870288	EPA 522	870446

WO# : 35757747

35757747

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:

Company:	Brunswick County Water Systems
Address:	PO Box 249
	Bolivia, NC 28422
Email To:	Glenn Walker
Phone:	910-371-3490 Fax:
Requested Due Date:	W007

Required Project Information:

Report To:	Glenn Walker
Copy To:	
Purchase Order #:	
Project Name:	1,4-Dx-522 (Weekly)
Project #:	

Section C
Invoice Information:

Attention:	Accounts Payable
Company Name:	See Section A
Address:	
Pace Quote:	
Pace Project Manager:	Lisa Harvey
Pace Profile #:	9551-1 (SO1) , -2 (EO1)

Regulatory Agency	NC
State / Location	NC

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Sodium sulfite and sodium bisulfate	Y/N	Analyses Test: 522 - 1,4 - Dioxane	522 - 1,4 - Dioxane	Residual Chlorine (Y/N)	
1	110322S01	WT	G	11/03/22	0700	11/03/22	0700		1								1		1			lire 1
2	110322E01	DW	G	11/03/22	0700	11/03/22	0700		1								1			1		lire 2
3																						
4																						
5																						
6																						

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Phil Mcculloch	11/03/22	1100	KAS PACE	11/4/22	1000	2 C	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Phillip Mcculloch

SIGNATURE of SAMPLER:

DATE Signed: 11/03/22

Temp in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SO1 is Raw Water (WT)

EO1 is Potable DWTR (DW)

Pace Container Order #705341

Addresses

Order By :		Ship To :		Return To:	
Company	Brunswick County Water System	Company	Brunswick County Water System	Company	Pace Analytical Ormond Beach
Contact	- Bottles, Glenn	Contact	- Bottles, Glenn	Contact	,
Email	glenn.walker@brunswickcountync.gov	Email	glenn.walker@brunswickcountync.gov	Email	lisa.harvey@pacelabs.com
Address	3954 Clearwell Dr NE	Address	3954 Clearwell Dr. NE	Address	8 East Tower Circle
Address 2		Address 2		Address 2	
City	Leland	City	Leland	City	Ormond Beach
State	NC Zip 28451	State	NC Zip 28451	State	FL Zip 32174
Phone	910-371-3490	Phone	910-371-3490	Phone	(386) 672-5668

Info

Project Name	1,4-Dx-522 (Weekly)	**Due Date**	10/05/2022	**Profile**	9551-1	**Quote**	
Project Manager	,	**Return Date**		**Carrier**	FedEx Ground	**Location**	NC

Trip Blanks

- [ ] Include Trip Blanks

Bottle Labels

- [ ] Blank
- [X] Pre-Printed No Sample IDs
- [ ] Pre-Printed With Sample IDs

Bottles

- [ ] Boxed Cases
- [X] Individually Wrapped
- [ ] Grouped By Sample ID/Matrix

Return Shipping Labels

- [ ] No Shipper
- [ ] With Shipper

COC Options

- [ ] Number of Blanks
- [X] Pre-Printed special

Misc

- [ ] Sampling Instructions
- [X] Custody Seal
- [X] Temp. Blanks
- [X] Coolers 1
- [ ] Syringes
- [ ] Extra Bubble Wrap
- [ ] Short Hold/Rush Stickers
- [ ] DI Water Liter(s)
- [ ] USDA Regulated Soils

# of Samples	Matrix	Test	Container	Total	# of	Lot #	Notes
2	WT	1,4-dioxane, method 522	1-1L Amber Glass, Sodium sulfite & Na bisulfate	2	0		

Hazard Shipping Placard In Place : NO

*Sample receiving hours are Mon-Fri 8:00am-6:00pm and Sat 10:00am-6:00pm unless special arrangements are made with your project manager.

*Pace Analytical reserves the right to return hazardous, toxic, or radioactive samples to you.

*Pace Analytical reserves the right to charge for unused bottles, as well as cost associated with sample storage/disposal.

*Payment term are net 30 days.

*Please include the proposal number on the chain of custody to insure proper billing.

LAB USE:

Ship Date :	10/06/22
Prepared By:	SB
Verified By:	

Sample

weekly sampling; 2-locations per week; ; Special COC attached; ;

CLIENT USE (Optional):

Date Rec'd:	
Received By:	
Verified By:	

Pace

Sample Condition Upon Receipt Form (SCUR)

Project # **WO#: 35757747**

Project Manager: **PM: WBW** **Due Date: 11/16/22**

Client: **CLIENT: BRUNCOWS**

Date and Initials of person:
Examining contents: MP
Label:
Deliver:
pH:

Thermometer Used: T-312 Date: 11/4/22 Time: 1015 Initials: KAS

State of Origin: ☐ For WV projects, all containers verified to ≤6 °C

Cooler #1 Temp.°C	1.9 (Visual)	+0.2 (Correction Factor)	2.0 (Actual)	☐ Samples on ice, cooling process has begun
Cooler #2 Temp.°C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #3 Temp.°C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #4 Temp.°C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #5 Temp.°C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Cooler #6 Temp.°C	(Visual)	(Correction Factor)	(Actual)	☐ Samples on ice, cooling process has begun
Recheck for OOT °C	(Visual)	(Correction Factor)	(Actual) Time: Initials:	

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other

Shipping Method: ☐ First Overnight ☐ Priority Overnight ☐ Standard Overnight ☐ Ground ☐ International Priority ☐ Other

Billing: ☐ Recipient ☐ Sender ☐ Third Party ☐ Credit Card ☑ Unknown

Tracking #

Custody Seal on Cooler/Box Present: ☑ Yes ☐ No **Seals intact:** ☑ Yes ☐ No **Ice:** Wet Blue Melted None

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other

Samples shorted to lab (If Yes, complete) Shorted Date: Shorted Time: Qty:

		Comments:
Chain of Custody Present	☑Yes ☐ No ☐N/A	
Chain of Custody Filled Out	☑Yes ☐ No ☐N/A	
Relinquished Signature & Sampler Name COC	☑Yes ☐ No ☐N/A	
Samples Arrived within Hold Time	☑Yes ☐ No ☐N/A	
Rush TAT requested on COC	☐Yes ☑ No ☐N/A	
Sufficient Volume	☑Yes ☐ No ☐N/A	
Correct Containers Used	☑Yes ☐ No ☐N/A	
Containers Intact (AP/MU)	☑Yes ☑ No ☐N/A	cap is cracked on 1
Sample Labels match COC (sample IDs & date/time of collection)	☑Yes ☐ No ☐N/A	
All containers needing acid/base preservation have been checked.	☑Yes ☐ No ☐N/A	Preservation Information:
All Containers needing preservation are found to be in compliance with EPA recommendation:	☑Yes ☐ No ☐N/A	Preservative: Lot #/Trace #: Date: Time: Initials:
Exceptions: Vials, Microbiology, O&G, PFAS		
Headspace in VOA Vials? (>6mm):	☐Yes ☐ No ☑N/A	
Trip Blank Present:	☐Yes ☐ No ☑N/A	

Comments/ Resolution (use back for additional comments):
COC on container & Replaced

Qualtrax Document ID: 33786