Midwest Laboratories, Inc.®
13611 B Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121 • www.midwestlabs.com

Lab # 8630404 **Report of Analysis** Report Number: 19-154-4032

Account: 27791	DOUG BULLOCK CITY OF RICHLAND PO BOX 190 RICHLAND WA 99352
Date Sampled:	2019-05-22
Date Received:	2019-05-24
Sample ID:	FC ROW 12-20-18

Robert Ferris
Account Manager
402-829-9871

CITY OF RICHLAND COMPOST FA

		Analysis (as rec'd)	Analysis (dry weight)	Total content, lbs per ton (as rec'd)
NUTRIENTS				
Nitrogen				
Total Nitrogen	%	1.21	2.27	24.2
Organic Nitrogen	%	1.11	2.09	22.2
Ammonium Nitrogen	%	0.100	0.188	2.0
Nitrate Nitrogen	%	< 0.01	----	----
Major and Secondary Nutrients				
Phosphorus	%	0.39	0.73	7.8
Phosphorus as P2O5	%	0.89	1.67	17.8
Potassium	%	0.61	1.15	12.2
Potassium as K2O	%	0.73	1.37	14.6
Sulfur	%	0.24	0.45	4.8
Calcium	%	1.61	3.03	32.2
Magnesium	%	0.36	0.68	7.2
Sodium	%	0.040	0.075	0.8
Micronutrients				
Iron	ppm	7020	13195	14.0
Manganese	ppm	160	301	0.3
Boron	ppm	< 100	----	----
OTHER PROPERTIES				
Moisture	%	46.80		
Total Solids	%	53.20		1064.0
Organic Matter	%	25.40	47.74	508.0
Ash	%	27.20	51.13	544.0
Total Carbon	%	12.79	24.04	
Chloride	%	0.18	0.34	
pH		6.7		
Conductivity 1:5 (Soluble Salts)	mS/cm	4.39		

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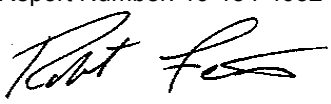
Lab # 8630404 **Biological & Physical Properties** Report Number: 19-154-4032

Account: 27791	DOUG BULLOCK CITY OF RICHLAND PO BOX 190 RICHLAND WA 99352
Date Sampled:	2019-05-22
Date Received:	2019-05-24
Sample ID:	FC ROW 12-20-18



Robert Ferris
Client Service Representative
402-829-9871

CITY OF RICHLAND COMPOST FA

	Analysis (as rec'd)	Analysis (dry weight)	Units	Detection Limit	Method
Biological Properties					
Germination	77.7		%	1	TMECC 05.05A
Germination Vigor	100		%	1	TMECC 05.05A
CO_2 OM Evolution	0.5		mgCO_2-C/gOM/day	0.01	TMECC 05.08B
CO_2 Solids Evolution	0.58		mgCO_2-C/gTS/day	0.01	TMECC 05.08B
Fecal Coliform		1	mpn/g	0.2	EPA 1681
Stability Rating	Stable		N/A	N/A	TMECC 05.08B
Physical Properties					
Bulk Density (Loose)	977		lbs/cu yard	1	WT/VOL
Bulk Density (Packed)	1213		lbs/cu yard	1	WT/VOL
Film Plastics	n.d.		%	0.25	Microscopic
Glass Fragments	n.d.		%	0.25	Microscopic
Hard Plastics	n.d.		%	0.25	Microscopic
Metal Fragment	n.d.		%	0.25	Microscopic
Sharps	Absent		---	---	Microscopic
Max. Particle Length		1.5	inches	N/A	TMECC Sieve
Sieve % Passing 3"		100	%	0.01	TMECC Sieve
Sieve % Passing 2"		100	%	0.01	TMECC Sieve
Sieve % Passing 1.5"		100	%	0.01	TMECC Sieve
Sieve % Passing 1"		100	%	0.01	TMECC Sieve
Sieve % Passing 3/4"		100	%	0.01	TMECC Sieve
Sieve % Passing 5/8"		100	%	0.01	TMECC Sieve
Sieve % Passing 3/8"		100	%	0.01	TMECC Sieve
Sieve % Passing 1/4"		89	%	0.01	TMECC Sieve

Compost Results Interpretations

Page 1

Report #:	19-154-4032
DATE RECEIVED:	2019-05-24

Organic Matter %

25.40 As Received

47.74 Dry Weight

Greater than 20% indicates a desirable range for compost on a dry weight basis.

Compost is a significant source of Organic Matter, which is an important supplier of carbon. Organic Matter improves soil and plant efficiency by improving soil physical properties, providing a source of energy to beneficial organisms, and enhancing the reservoir of soil nutrients.

C/N Ratio

10.6:1

20-30 indicates an ideal range for the initial compost process.

10-20 indicates an ideal range for a finished compost.

All organic matter is made up of substantial amounts of carbon with lesser amounts of nitrogen. The balance of these two elements is called the Carbon/Nitrogen Ratio. For the best performance, the compost pile requires the correct proportion of carbon for energy and nitrogen for protein production. If the C:N ratio is too high (excess carbon) decomposition slows down. If the C:N ratio is too low (excess Nitrogen) the compost pile could be difficult to manage.

Moisture %

46.80

<35% = Indicates overly dry compost

>55% = Indicates overly wet compost

Moisture Percent is the measure of water present in the compost and expressed as a percentage of total weight. Moisture present affects handling and transport. Overly dry will be light and dusty while overly wet will be heavy and clumpy. A desirable moisture content of finished compost will range between 40 to 50%.

Compost Results Interpretations

Page 2

Report #:	19-154-4032
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Conductivity or Soluble Salts measures the conductance of electrical current in a liquid compost slurry. Excessive soluble salt content in a compost can prevent or delay seed germination and proper root growth. Conductivity analysis is done on a 1:5 basis.

Conductivity 1:5
4.4

Conductivity Level	**Interpretation**
Greater than 10	Very High nutrient content. Use for Ag Applications
5 - 10	High nutrient content. Use for Ag Applications
3 - 5	Higher than desirable for salt sensitive plants, some loss of vigor
0.6 - 3	Desirable range for most plants
0.3 - 0.6	Ideal range for greenhouse growth media
0.0 - 0.3	Very Low: Indicates very low nutrient status: plants may show deficiencies.

Compost Results Interpretations

Page 3

Report #: 19-154-4032

DATE RECEIVED: 2019-05-24

pH Value

6.7

0 to 14 scale with 6 to 8 as normal pH levels for compost

A pH in the 6 to 8 pH range indicates a more mature compost

pH measures the acidity or alkalinity of the compost, and is a measurement of the hydrogen ion activity of a soil or compost on a logarithmic scale. The pH scale ranges from 0 to 14 and 7 indicates a neutral pH. Growing media with a higher pH or pH greater than 7 can benefit from a compost that has a more acidic pH or pH below 7. This type of application will possibly lower the soil pH making the soil more conducive to plants that thrive in a more acidic soil condition.

Nutrient Index (Ag Index)

>10

The Nutrient Index normally runs between 1 and 10.

The Nutrient Index is obtained by dividing the total nutrients (N,P,K) by the amount of salt (Sodium and Chloride). The higher the Nutrient Index the less chance of having a toxic buildup of Sodium (salt) in the soil.

AG INDEX CHART

salt injury possible	*use on soils with excellent drainage characteristics, good water quality and low salts*				*you may use on soils with poor drainage, poor water quality, or high salts*					*for all soils*
1	2	3	4	5	6	7	8	9	10	> 10

Nutrients (N+P205+K20)

5.32 Average Nutrient Content Dry Weight <2 = Low, >5 = High

1-1-0.5 Rating As Received

The most commonly used compost data is the amount of Nitrogen, Phosphate, and Potash (abbreviated as N,P,K) present and the information is similar to that found in common fertilizers. If a compost result has the rating 1-2-2 it means that the compost has 1% Nitrogen, 2% Phosphate and 2% Potash. Most compost tests will have a average nutrient level (N+P+K) of < 5%.

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CITY OF RICHLAND
DOUG BULLOCK
PO BOX 190
RICHLAND WA 99352

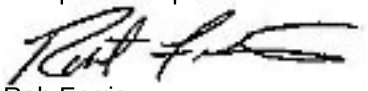
REPORT OF ANALYSIS

For: (27791) CITY OF RICHLAND
CITY OF RICHLAND COMPOST FACILITY

Analysis	Level Found As Received	Level Found Dry Weight	Units	Reporting Limit	Method	Analyst-Date	Verified-Date
Sample ID: **FC ROW 12-20-18** Lab Number: **8630404** Date Sampled: **2019-05-22**							
Cadmium (total)	n.d.	0.56	mg/kg	0.50	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Chromium (total)	10.5	19.7	mg/kg	1.00	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Mercury (total)	0.09	0.16	mg/kg	0.05	EPA 7471	ccm2-2019/05/29	bab2-2019/05/31
Lead (total)	n.d.	9.1	mg/kg	5.0	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Molybdenum (total)	3.6	6.7	mg/kg	1.0	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Nickel (total)	14.2	26.7	mg/kg	1.0	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Selenium (total)	n.d.	n.d.	mg/kg	10.0	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Zinc (total)	142.7	268.3	mg/kg	2.0	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Copper (total)	89.4	168	mg/kg	1	EPA 6010	ery3-2019/05/28	bab2-2019/05/31
Arsenic (total)	2.41	4.53	mg/kg	0.5	EPA 6020	trh1-2019/05/30	bab2-2019/05/31

EPA 1681 holding time of < 24 hours from sampling to laboratory set up of samples for biosolids and compost has been exceeded. Individual states enforce different holding times for compost or biosolids so please contact the regulatory body in your state for their requirements.
n.d. = not detected , ppm = parts per million, ppm = mg/kg

For questions please contact:



Rob Ferris
Account Manager
rferris@midwestlabs.com (402)829-9871

8630404-404
Samples: 1 Page: 1/3
Ashlyn Hinson 2019 05 23 10:26

US COMPOSTING COUNCIL

OFFICIAL Seal of Testing Assurance Compost Sample Chain of Custody Form

STA Laboratory: Midwest Laboratories Tel: (402) 334-1770
Address: 13611 "B" St. FAX: (402) 334-9121
Email:
City, State Zip code: Omaha, Nebraska 68144-3693

Client/Reporting Company: City of Richland Tel: (509) 942-7481
Contact Name: Steve Brewer FAX: (509) 942-7346
Billing Address: P.O. Box 190 MS #27 Email: SBREWER@CI.Richland.WA.US
City, State Zip code: Richland, Wa 99352
Send Results to: Steve Brewer
City, State Zip code: P.O. Box 190 MS#27 Richland, WA 99352
Name or Source of Sample(s): City of Richland Compost Facility
Name of Person(s), Sample Collector(s): DOUG BULLOCK

LABORATORY USE ONLY Storage Locations
Freezer ____ Cold Room ____ Storage Shelf ____
Sample Condition: ____
Temperature: ____ Malodor: ____ Moisture: ____
Sample Type: O POINT O COMPOSITE O STRATIFIED O INTERVAL
P.O. Number: ____
USCC Member: O YES O NO

SELECTION OF ANALYSIS. Refer to http://www.tmecc.org/cap/methods.html for details.
STA Suite; State DOT Tests (indicate State); A, B, C – Specify other tests in fields A through C. (e.g., tests required for regulated samples, etc.). NOTE! STA analytical results via the STA Compost Technical Data Sheet and this Chain of Custody form are submitted to STA program management.

A	B	C

Client Sample ID and Special Instructions	1. List Feedstocks 2. Check all that apply 3. List % by volume. (Optional)	Collection Date/Time	Sample Matrix	Composting Operation Type	Shipping Temperature	Indicate Compost Analysis Requirements (*identify state)	LAB USE ONLY Job Number & Sample Status
FC ROW 12-20-18	X Green waste, ___ Manure, ___ Food, X Biosolids, ___ MSW, ___ Wood; ___ Carcass, ___ Fish Waste, ___ Grease, Fats	Date: 5-22-19 Time: GRAB COMP Initials: DB	Compost ● Feedstock O Mulch O ___ O ___ O	Windrow ● Static pile O In-Vessel O ___ O ___ O	Ambient O Wet Ice ● Dry Ice O	STA Suite A B C; State DOT Identify State	8630404

INFORM THE STA LABORATORY AND SPECIFY THE REQUIRED LABORATORY TESTS WHEN SUBMITTING REGULATED COMPOST SAMPLES (please use spaces A, B and C provided above).

PLEASE PROVIDE SPECIFIC FEEDSTOCK AND OPERATIONAL DETAIL IN THE SPACE PROVIDED. ↳ WA. AND ORE.
YOUR VOLUNTEERED INFORMATION PROVIDES USCC STANDARDS AND PRACTICES COMMITTEE WITH CRUTIAL DATA NEEDED TO BETTER UNDERSTAND THE COMPOSTING PROCESS AND COMPOST END USES.

NO SALMONELLA PLEASE

		Date	Time			Date	Time
Releasing Signature 1	Doug Bullock	5-22-19	1200	Receiving Signature 1		5/23/19	1025
Releasing Signature 2		Date	Time	Receiving Signature 2		Date	Time
Releasing Signature 3		Date	Time	Receiving Signature 3		Date	Time
Releasing Signature 4		Date	Time	Receiving Signature 4		Date	Time

4.3°C
IR12

8639404-404
Samples: 1 Page: 2/3
Ashlyn Himma
2019 05 23 10:29

Regulatory

Midwest Laboratories®

This sheet **MUST** be filled out before samples can be processed. To ensure that holding times are met, it is your responsibility that a completed form comes attached to the Chain of Custody. Samples must be received on ice.

Is this sample for regulatory/permit reporting? ☒ Yes ☐ No

What city/state was your sample collected in? RICHLAND, WASH.

What agency/state are you reporting? US COMPOSTING COUNCIL

What type of sample? (Circle One)

Drinking Water For human consumption, 30 hr hold time	**Ground Water**	**Wastewater**
Soilid Waste	**Hazardous Waste**	**UST**
Storm Water	**Process Water**	**Livestock**

COMPOST

SEE REVERSE SIDE FOR SAMPLING INSTRUCTIONS

RC FORM 14-3 Effective 01.30.19

Midwest Laboratories®

8630404-404
Samples: 1 Page: 3/3
Ashlyn Himen
2019 05 23 10:29

Sample Acceptance Checklist

Document Number: RC CHKLIST 001
Revision No.: 4
Effective Date: 1/31/2019

Lab Number:

Thermometer Used: ☐ Therm Fisher IR 12

Sample Temperature (°C): +3°C

Cooler Intact: ☑ Yes ☐ No
Received on Ice: ☑ Yes ☐ No
Hand Delivered: ☐ Yes ☑ No

Date & Initials of person accepting samples: lm 5/23/19

							Comments
Chain of Custody present?	☑	Yes	☐	No	☐	N/A	
Sample ID(s):	☑	Yes	☐	No	☐	N/A	
Sample Location(s):	☑	Yes	☐	No	☐	N/A	
Client contact:	☑	Yes	☐	No	☐	N/A	
Analysis Requested:	☑	Yes	☐	No	☐	N/A	
Date & Time of collection:	☑	Yes	☐	No	☐	N/A	
Sampler name on COC?	☑	Yes	☐	No	☐	N/A	
Chain of custody relinquished with signature?	☑	Yes	☐	No	☐	N/A	
Chain of custody complete?	☑	Yes	☐	No	☐	N/A	
Sample labels match COC?	☑	Yes	☐	No	☐	N/A	
Written in indelible ink?	☑	Yes	☐	No	☐	N/A	
Labels indicate proper preservation?	☐	Yes	☑	No	☐	N/A	
Samples arrived within hold time?	☑	Yes	☐	No	☐	N/A	
Samples arrived within correct temperature?	☑	Yes	☐	No	☐	N/A	
Sufficient volume?	☑	Yes	☐	No	☐	N/A	
Appropriate containers used?	☑	Yes	☐	No	☐	N/A	
Filtered volume received for dissolved tests?	☐	Yes	☐	No	☑	N/A	
Headspace in VOA vials?	☐	Yes	☐	No	☑	N/A	
Trip Blank present?	☐	Yes	☑	No	☐	N/A	

Client Notification/Resolution: Date/Time Contacted: _____

Person Contacted: _____ Contacted By: _____

Comments/Resolution: _____