Subject: Fwd: Diffuser Report (0709001)
From: "FO1.Notify, DNR" <fo1.notify@dnr.iowa.gov>
To: Michele Smith <michele.smith@dnr.iowa.gov>
Date Sent: Friday, January 30, 2026 12:31:36 PM GMT-06:00
Date Received: Friday, January 30, 2026 12:31:36 PM GMT-06:00
Attachments: CF Diffuser Cover Letter 2026.pdf,Plume 600' Downstream.jpg,Diffuser Overview.jpg,Diffuser Ports.jpg,Plume 100' Downstream.jpg,Plume 200' Downstream.jpg,Cedar Falls WRF 2025 Annual Diffuser Performace Analysis.docx

---------- Forwarded message ---------
From: **Tyler Griffin** <Tyler.Griffin@cedarfalls.com>
Date: Thu, Jan 29, 2026 at 11:10AM
Subject: Diffuser Report (0709001)
To: Ian Willard <ian.willard@dnr.iowa.gov>, npdes.mail@dnr.iowa.gov <npdes.mail@dnr.iowa.gov>
Cc: fo1.notify@dnr.iowa.gov <fo1.notify@dnr.iowa.gov>

Please see the attached documents and images regarding the 2025 Diffuser Performance Analysis and Report. Please let me know if you have any further questions.

Tyler J. Griffin

Water Reclamation Manager

City of Cedar Falls

501 East 4th Street

Cedar Falls, IA 50613

319-268-5559

DEPARTMENT OF PUBLIC WORKS

City of Cedar Falls
2200 Technology Parkway
Cedar Falls, Iowa 50613

Administration Division
Phone: 319-273-8629 Fax: 319-273-8632

Engineering Division
Phone: 319-268-5161 Fax: 319-268-5197

Water Reclamation Division
Phone: 319-273-8633 Fax: 319-273-8632

January 30th, 2026

Ian Willard
NPDES Section
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, Iowa 50319

RE: Annual Diffuser Performance & Bathymetric Analysis

Dear Ian:

Along with this letter please find the included attachments documenting our 2025 Annual Diffuser Performance Analysis.

A diffuser dye test was performed on December 9th, 2025. The river depth as recorded at the Cedar River gauge located approximately 1,600 feet upstream from the diffuser pipe was 79.13 feet with a recorded flow of 1,550 cubic feet per second. A fluorescent yellow/green liquid concentrate dye was injected into our effluent stream, and a drone was used to video the mixing in the river.

Six of the seven ports were found to be functioning (see images attached to the email). Mixing rates appear to be uniform with the dye dispersing evenly throughout the main flow channel within the first 100 feet.

Past hydrologic events have caused one or more of these ports to be silted in and opened back up over time due to the movement of a sandbar in the river. For instance, the 2021 dye test showed only 4 ports open while the 2022 and 2023 dye tests both showed all seven ports to be back open.

An annual Bathymetric Analysis was performed by the USGS on August 13th, 2025. At the time of this report this analysis was at “Bureau Level Review” with no timeline for delivery to the City of Cedar Falls. Previous reports show the main channel to be approximately 200 feet wide just off the east bank of the river. The seven diffuser ports are located within this main channel, spaced 10 feet apart.

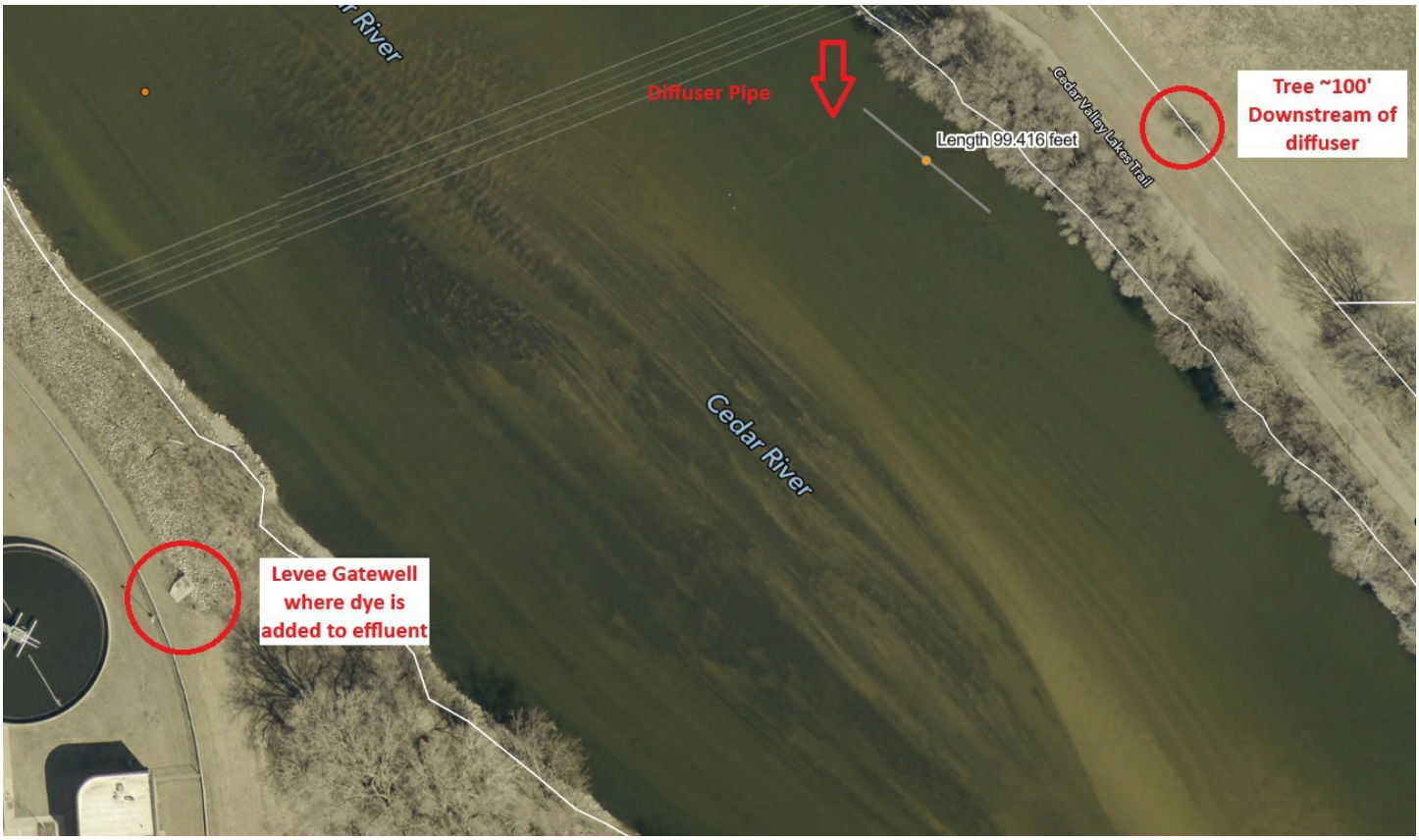
We will continue to monitor the diffuser functionality and mixing on an annual basis and if required will take action to address this issue as part of our WRF upgrades project slated for construction from 2028-2031. Please let me know if you have any questions.

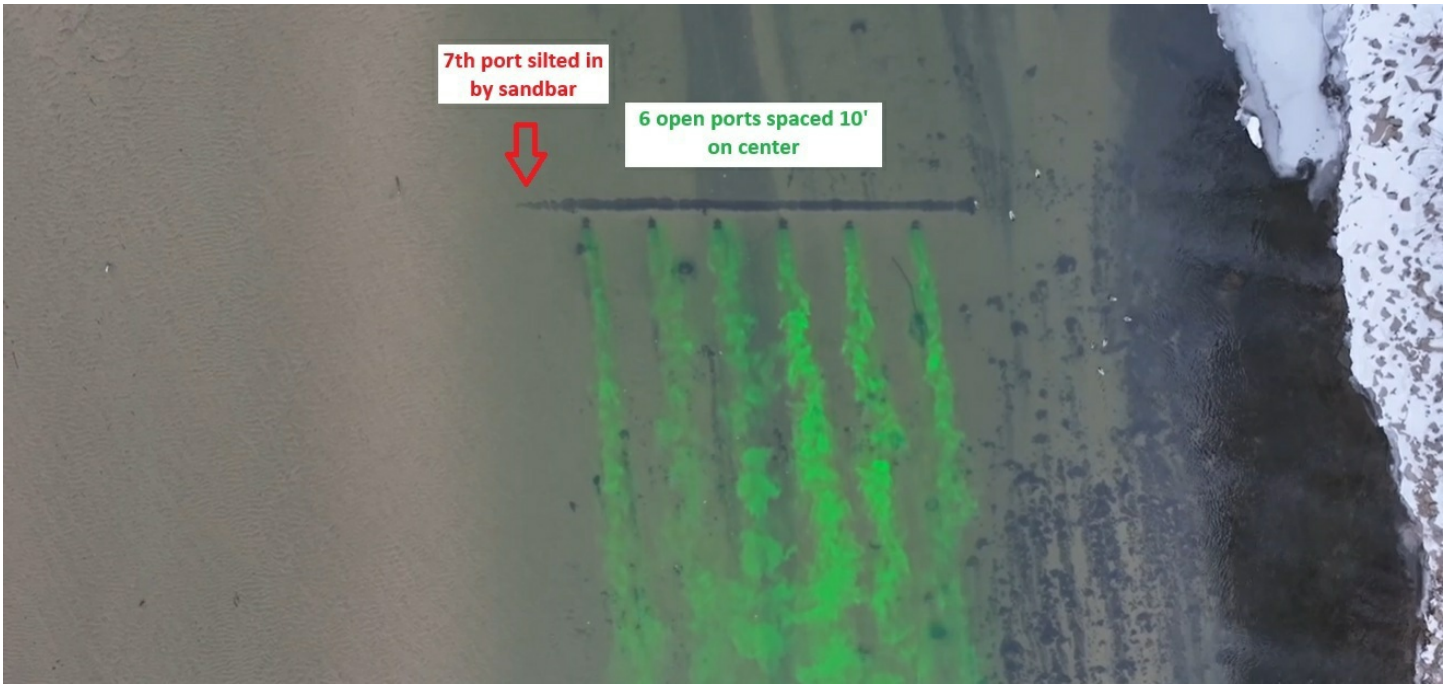
Sincerely,

Tyler J. Griffin
Cedar Falls Water Reclamation Manager

c: DNR, Field Office 1


Levee Gatewell where dye was added to effluent
Diffuser Pipe
Tree ~100' downstream of diffuser


Diffuser Pipe
Length 99.416 feet
Cedar Valley Lakes Trail
Tree ~100' Downstream of diffuser
Cedar River
Levee Gatewell where dye is added to effluent


7th port silted in by sandbar
6 open ports spaced 10' on center


Diffuser Pipe
Tree ~ 100' Downstream of Diffuser


Levee Gatewell where dye was added to effluent
Diffuser Pipe
Tree ~ 100' downstream of diffuser

DNR Diffuser Mixing Zone Study Guidelines

The following information should be gathered, as appropriate, when conducting a diffuser mixing zone study analysis. Diffuser mixing zone studies should be conducted at low flow conditions (generally less than 20 times of the 7Q10 flow). Prior to completing a diffuser mixing zone study, it is strongly recommended that a diffuser mixing zone study plan be submitted to the DNR for approval to ensure that all data collection and analysis will be applicable to the wasteload allocation (WLA) calculations. For a dye study, dye may only be added to the effluent prior to discharge; no dye may be added to the stream downstream of the outfall. If for any reason the data and analysis are not usable, then default values for the WLA are used. Sections 1 – 10 outline the requirements for a Diffuser Performance Analysis (typically required annually). Section 11 outlines the requirements for a Bathymetric Analysis (typically required once every five years).

GENERAL INFORMATION

1. Applicant Information (who conducted the diffuser mixing zone study)					
First Name:	Tyler	Last Name:	Griffin		
Title:	Water Reclamation Manager				
Street Address:	501 East 4th St.				
City:	Cedar Falls	State:	IA	Zip:	50613
Phone #:	319-273-8633	Fax #:			
E-mail:	Tyler.griffin@cedarfalls.com				
Report submittal date:	1/30/2026	MZ study date:	12/9/2025		

2. Facility Information					
Facility Name:	Cedar Falls Water Reclamation Facility				
NPDES Permit No.:	0709001				
Treatment Type:	Three Stage Trickling Filter with UV Disinfection				
Design Flows:	ADW (MGD):	7.68 MGD	AWW (MGD):	8.80 MGD	
Street Address:	501 East 4th St.				
City:	Cedar Falls	State:	IA	Zip:	50613
Phone #:	319-273-8633	Fax #:			
E-mail:	Tyler.griffin@cedarfalls.com				

MIXING ZONE INFORMATION

3. Approach Used (check all that apply):

☒ Dye Study ☐ Modeling ☐ Tracer Study (identify the tracer) *Enter Here*

4. Dye Study Approval and Notification:

If a dye study is used, is authorization of using the dye approved by DNR?
☒ Yes ☐ No (authorization before the dye study is required)

Has the corresponding DNR field office been informed at least 48 hours in advance of the study?
☒ Yes ☐ No (notification of the field office prior to the dye study is required)

5. Effluent Information			
Discharge Flow Rate (MGD):	3.50 MGD	Discharge Velocity (if available) (ft/s):	unknown
List of pollutants that the diffuser mixing zone study is conducted for:			

6. Diffuser Information			
Latitude/Longitude of Outfall in **either** *decimal degrees* **or** *degrees, minutes, seconds*			
Latitude:	42.535009	Longitude:	92.437914
Lat/Long Coordinate Source: ☒Internet ☐Map ☐GPS/Survey (identify datum used)			
Diffuser connects to the left or right shore (as facing downstream):	Right		
Discharge Pipe Diameter or Dimensions (in):	30”		
Number Of Total Diffuser Ports:	7		
Number Of Active Diffuser Ports:	6		
Total Length of Diffuser:	490’		
Active Length of Diffuser:	60’, 7 ports spaced 10’ on center		
Is the diffuser submerged or above the water surface? ☒ Submerged ☐ Above the water surface			
Height of diffuser ports above water surface or depth below the water surface (ft):	Roughly 2.5-3’ below water surface		
Photo: *Attach at least one photo illustrating the location of the diffuser and its relationship to the receiving water body*		☒ Attached	

7. Receiving Water Body Information

Stream Name:	Cedar River

Beneficial Uses (check all that apply):

Aquatic Life: ☐BWW1 ☐BWW2 ☐BWW3 ☐BCW1 ☐BCW2 ☐BLW

Other Uses: ☐Primary Contact ☐Secondary Contact ☐Human Health ☐Drinking Water

Describe the following from 200 feet upstream of the diffuser to 100 feet downstream of the diffuser:

Describe the stream substrate (sand, silt, gravel, cobble, etc.)	Sand and silt
Describe stream features that may affect mixing (dams, riffles, pools, snags, sand bars, etc.)	Sand Bar

Map: *Attach plan view map showing location of the discharge(s), other NPDES discharges, public water supply intakes, any established recreational area, juncture of two perennial streams, which are within 100 feet of the facility's diffuser. Note any features that may affect mixing (dams, diversions, riffles, pools, snags, sand bars, tributaries)*	☒ Attached

Is there an established recreational area such as public beaches, state, county and local parks near the diffuser? ☐YES ☒NO

If yes, distance from the diffuser (ft): Gateway Water Trail ~1,000' ☒upstream ☐

Is there a surface drinking water intake near the diffuser? ☐YES ☒NO

If yes, distance from the diffuser (ft): ☐upstream ☐downstream

Is there a juncture of two perennial streams near the diffuser? ☐YES ☒NO

If yes, distance from the diffuser (ft): ☐upstream ☐downstream

Are there NPDES discharges near the diffuser? ☐YES ☒NO

If yes, distance from the diffuser (ft): ☐upstream ☐downstream

Low-Flow Design Discharge Conditions (cfs) Source: ☒WLA ☐StreamStats ☐USGS gage ☐Other	1Q10: 317	7Q10: 358	30Q10:
Width of stream at the diffuser:			440'
Total stream flow on the date of the diffuser mixing zone study (cfs): ☒above diffuser ☐at downstream boundary of MZ per NWSLI: CEDI4 River Guage			1,550 CFS
Calculation of flow*: attach the calculations used in determining the stream flow*			☐ Attached

8. Mixing Zone Size & Configuration:	
Note: For diffusers, the mixing zone is used as both the mixing zone and the zone of initial dilution due to the short, rapid mixing that diffusers provide	
What is the mixing zone length (ft)? (maximum of 100 feet, distance to limitation specified in 567 IAC 61.2(4) "b" & "e" (2))	100'
Lay out a downstream station location marker along the shoreline at the end of the mixing zone (typically 100 feet below the diffuser)	
Is complete mixing achieved at the downstream boundary of the mixing zone? ☐YES ☒NO	
If complete mixing is not achieved at the downstream boundary of the mixing zone: What is the measured stream flow in the effluent plume at the downstream boundary of the mixing zone (cfs)?	unknown
Calculation of flow: attach the calculations of the stream flow in the plume	☐ Attached
Photo/video (dye study only): Attach at least one photo/video clearly illustrating the end of the mixing zone (showing both banks of the receiving stream) and showing the marker at the end of the mixing zone (distance from diffuser marked, dye visible, little to no glare)	☒ Attached

9. Mixing Zone Calculations

Calculate the percentage of stream flow in the mixing zone as follows:

Note: if complete mixing is observed at the boundary of the mixing zone, the MZ % is 100% and no calculation is required.

$$MZ\ \% = \ 100 * \frac{Flow\ in\ the\ dye\ plume\ at\ MZ\ boundary - Discharge\ flow}{Total\ \ stream\ flow\ upstream\ of\ discharge}$$

Or

$$MZ\ \% = \ 100 * \frac{Flow\ in\ the\ dye\ plume\ at\ MZ\ boundary - Discharge\ flow}{Total\ stream\ flow\ at\ MZ\ boundary - \ Discharge\ flow}$$

MZ %:	NA
Map: *Attach plan view map that depicts the effluent plume including the downstream boundaries of the mixing zone*	☒ Attached
Calculations: *Attached the calculations of the MZ%*	☐ Attached

10. Model/Dye Study Information (If Models are Used)			
Are any models used? ☐YES ☒NO If yes, provide the name of the model used:			
Models can be used to estimate the MZ percentages when site-specific information is used. In addition, models are available to project the percentages of mixing obtained during field flow conditions to design low flow regime. On an attached sheet, describe the input values not included on this form, the assumptions, and the outcome of the model used. Specific stream conditions may warrant a modified MZ study plan. Models are available to project the percentages of mixing obtained during field flow conditions to design low flow regime. The following shows the MZ based on modeling results.			
% MZ:		Attach the modeling results:	☐ Attached

11. Bathymetric Analysis performed by USGS 8/13/2025; results not yet received	
Is a Bathymetric Analysis completed in addition to the Diffuser Performance Analysis? ☒YES ☐	
For a Bathymetric Analysis, stream depth measurements shall be taken at equidistant intervals across the entire width of the receiving stream at the diffuser	
Number of stream depth measurements taken (minimum of 20):	
Stream depth measurements attached:	☐ Attached

Subject: Re: Diffuser Report (0709001)
From: "Smith, Michele" <michele.smith@dnr.iowa.gov>
To: "FO1.Notify, DNR" <fo1.notify@dnr.iowa.gov>
Date Sent: Friday, January 30, 2026 12:31:03 PM GMT-06:00
Date Received: Friday, January 30, 2026 12:31:42 PM GMT-06:00

Yes, please. It would go as an assist and the documents labeled as Diffuser Report 2026

On Fri, Jan 30, 2026 at 11:19 AM FO1.Notify, DNR <fo1.notify@dnr.iowa.gov> wrote:

> Just a fyi-
>
> Michele,
> Do you want this attached in focd?
>
> ---------- Forwarded message ---------
> From: **Tyler Griffin** <Tyler.Griffin@cedarfalls.com>
> Date: Thu, Jan 29, 2026 at 11:10 AM
> Subject: Diffuser Report (0709001)
> To: Ian Willard <ian.willard@dnr.iowa.gov>, npdes.mail@dnr.iowa.gov <npdes.mail@dnr.iowa.gov>
> Cc: fo1.notify@dnr.iowa.gov <fo1.notify@dnr.iowa.gov>
>
> Please see the attached documents and images regarding the 2025 Diffuser Performance Analysis and Report. Please let me know if you have any further questions.
>
> # Tyler J. Griffin
>
> **Water Reclamation Manager**
>
> City of Cedar Falls
>
> 501 East 4th Street
>
> Cedar Falls, IA 50613
>
> 319-268-5559



--
Michele Smith
Environmental Specialist Senior
Field Services and Compliance Bureau, Field Office 1
1101 Commercial Court, Suite 10, Manchester, IA 52057
563-920-1580
michele.smith@dnr.iowa.gov
www.iowadnr.gov



Subject: Re: Diffuser Report (0709001)
From: "FO1.Notify, DNR" <fo1.notify+canned.response@dnr.iowa.gov>
To: michele.smith@dnr.iowa.gov
Date Sent: Friday, January 30, 2026 12:31:45 PM GMT-06:00
Date Received: Friday, January 30, 2026 12:31:45 PM GMT-06:00

We have received your email. We will contact you if we have any questions.

Subject: Re: Diffuser Report (0709001)
From: "Willard, Ian" <ian.willard@dnr.iowa.gov>
To: Tyler Griffin <Tyler.Griffin@cedarfalls.com>
Cc: "npdes.mail@dnr.iowa.gov" <npdes.mail@dnr.iowa.gov>, "fo1.notify@dnr.iowa.gov" <fo1.notify@dnr.iowa.gov>
Date Sent: Friday, January 30, 2026 11:50:14 AM GMT-06:00
Date Received: Friday, January 30, 2026 11:50:27 AM GMT-06:00

Hi Tyler,

Thanks for sending this over and for the update on the diffuser performance.

We'll take a look at the report and the images and get back to you.

Ian

Ian Willard, P.E.
Environmental Engineer Senior
Water Quality Monitoring and Assessment Section
Department of Natural Resources
6200 Park Ave. Ste. 200, Des Moines, IA 50321
515-954-6450
ian.willard@dnr.iowa.gov
www.iowadnr.gov

IOWA | DNR
IOWA DEPARTMENT OF NATURAL RESOURCES

On Thu, Jan 29, 2026 at 11:10 AM Tyler Griffin <Tyler.Griffin@cedarfalls.com> wrote:

> Please see the attached documents and images regarding the 2025 Diffuser Performance Analysis and Report. Please let me know if you have any further questions.
>
> # Tyler J. Griffin
>
> **Water Reclamation Manager**
>
> City of Cedar Falls
>
> 501 East 4th Street
>
> Cedar Falls, IA 50613
>
> 319-268-5559


C·E·D·A·R
F·A·L·L·S
Iowa

Subject: Re: Diffuser Report (0709001)
From: "FO1.Notify, DNR" <fo1.notify+canned.response@dnr.iowa.gov>
To: ian.willard@dnr.iowa.gov
Date Sent: Friday, January 30, 2026 11:50:30 AM GMT-06:00
Date Received: Friday, January 30, 2026 11:50:30 AM GMT-06:00

We have received your email. We will contact you if we have any questions.

Subject: Fwd: Diffuser Report (0709001)
From: "FO1.Notify, DNR" <fo1.notify@dnr.iowa.gov>
To: Matthew Calvert <matt.calvert@dnr.iowa.gov>,Michele Smith <michele.smith@dnr.iowa.gov>,Manda Mattoon <manda.mattoon@dnr.iowa.gov>,Brett Meyers <brett.meyers@dnr.iowa.gov>,Jeffrey Schwierjohann <jeffrey.schwierjohann@dnr.iowa.gov>
Date Sent: Friday, January 30, 2026 11:18:49 AM GMT-06:00
Date Received: Friday, January 30, 2026 11:18:49 AM GMT-06:00
Attachments: CF Diffuser Cover Letter 2026.pdf,Plume 600' Downstream.jpg,Diffuser Overview.jpg,Diffuser Ports.jpg,Plume 100' Downstream.jpg,Plume 200' Downstream.jpg,Cedar Falls WRF 2025 Annual Diffuser Performace Analysis.docx

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From: **Tyler Griffin** <Tyler.Griffin@cedarfalls.com>
Date: Thu, Jan 29, 2026 at 11:10AM
Subject: Diffuser Report (0709001)
To: Ian Willard <ian.willard@dnr.iowa.gov>, npdes.mail@dnr.iowa.gov <npdes.mail@dnr.iowa.gov>
Cc: fo1.notify@dnr.iowa.gov <fo1.notify@dnr.iowa.gov>

Please see the attached documents and images regarding the 2025 Diffuser Performance Analysis and Report. Please let me know if you have any further questions.

Tyler J. Griffin

Water Reclamation Manager

City of Cedar Falls

501 East 4th Street

Cedar Falls, IA 50613

319-268-5559


C·E·D·A·R
F·A·L·L·S
Iowa

DEPARTMENT OF PUBLIC WORKS

City of Cedar Falls
2200 Technology Parkway
Cedar Falls, Iowa 50613

Administration Division
Phone: 319-273-8629 Fax: 319-273-8632

Engineering Division
Phone: 319-268-5161 Fax: 319-268-5197

Water Reclamation Division
Phone: 319-273-8633 Fax: 319-273-8632

January 30th, 2026

Ian Willard
NPDES Section
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, Iowa 50319

RE: Annual Diffuser Performance & Bathymetric Analysis

Dear Ian:

Along with this letter please find the included attachments documenting our 2025 Annual Diffuser Performance Analysis.

A diffuser dye test was performed on December 9th, 2025. The river depth as recorded at the Cedar River gauge located approximately 1,600 feet upstream from the diffuser pipe was 79.13 feet with a recorded flow of 1,550 cubic feet per second. A fluorescent yellow/green liquid concentrate dye was injected into our effluent stream, and a drone was used to video the mixing in the river.

Six of the seven ports were found to be functioning (see images attached to the email). Mixing rates appear to be uniform with the dye dispersing evenly throughout the main flow channel within the first 100 feet.

Past hydrologic events have caused one or more of these ports to be silted in and opened back up over time due to the movement of a sandbar in the river. For instance, the 2021 dye test showed only 4 ports open while the 2022 and 2023 dye tests both showed all seven ports to be back open.

An annual Bathymetric Analysis was performed by the USGS on August 13th, 2025. At the time of this report this analysis was at “Bureau Level Review” with no timeline for delivery to the City of Cedar Falls. Previous reports show the main channel to be approximately 200 feet wide just off the east bank of the river. The seven diffuser ports are located within this main channel, spaced 10 feet apart.

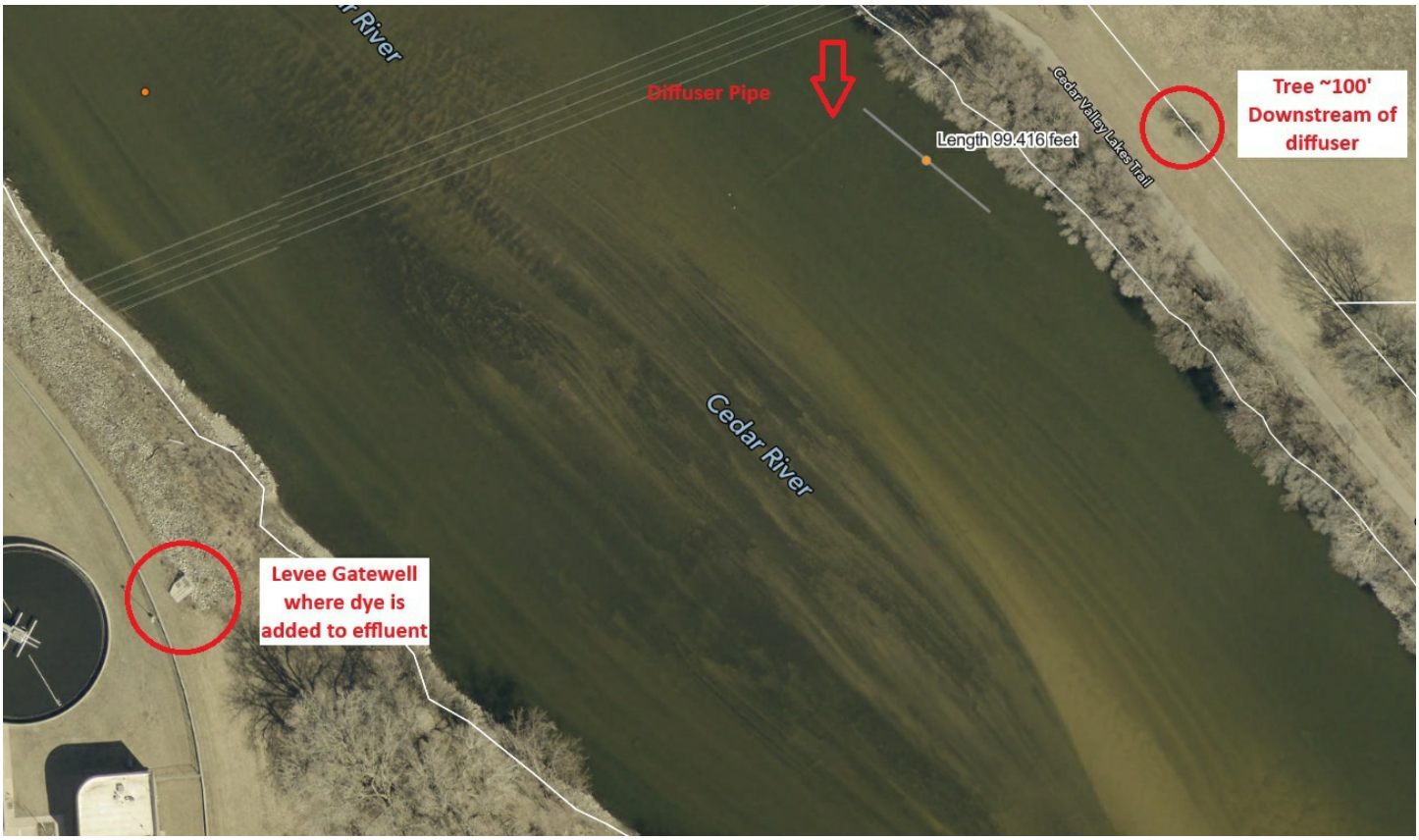
We will continue to monitor the diffuser functionality and mixing on an annual basis and if required will take action to address this issue as part of our WRF upgrades project slated for construction from 2028-2031. Please let me know if you have any questions.

Sincerely,

Tyler J. Griffin
Cedar Falls Water Reclamation Manager

c: DNR, Field Office 1


Levee Gatewell where dye was added to effluent
Diffuser Pipe
Tree ~100' downstream of diffuser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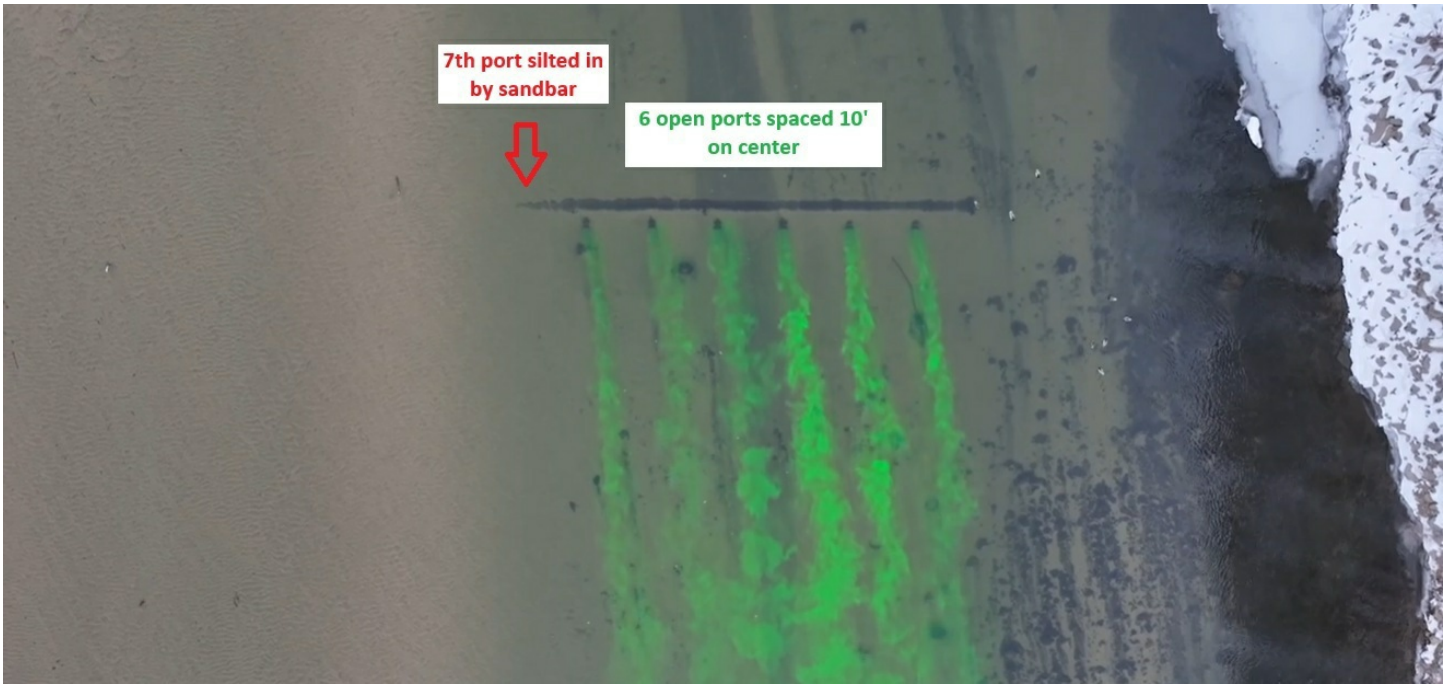
Length 99.416 feet
Cedar Valley Lakes Trail
Tree ~100' Downstream of diffuser
Cedar River
Levee Gatewell where dye is added to effluent


7th port silted in by sandbar
6 open ports spaced 10' on center


Diffuser Pipe
Tree ~ 100' Downstream of Diffuser


Levee Gatewell where dye was added to effluent
Diffuser Pipe
Tree ~ 100' downstream of diffuser

DNR Diffuser Mixing Zone Study Guidelines

The following information should be gathered, as appropriate, when conducting a diffuser mixing zone study analysis. Diffuser mixing zone studies should be conducted at low flow conditions (generally less than 20 times of the 7Q10 flow). Prior to completing a diffuser mixing zone study, it is strongly recommended that a diffuser mixing zone study plan be submitted to the DNR for approval to ensure that all data collection and analysis will be applicable to the wasteload allocation (WLA) calculations. For a dye study, dye may only be added to the effluent prior to discharge; no dye may be added to the stream downstream of the outfall. If for any reason the data and analysis are not usable, then default values for the WLA are used. Sections 1 – 10 outline the requirements for a Diffuser Performance Analysis (typically required annually). Section 11 outlines the requirements for a Bathymetric Analysis (typically required once every five years).

GENERAL INFORMATION

1. Applicant Information (who conducted the diffuser mixing zone study)					
First Name:	Tyler	Last Name:	Griffin		
Title:	Water Reclamation Manager				
Street Address:	501 East 4th St.				
City:	Cedar Falls	State:	IA	Zip:	50613
Phone #:	319-273-8633	Fax #:			
E-mail:	Tyler.griffin@cedarfalls.com				
Report submittal date:	1/30/2026	MZ study date:	12/9/2025		

2. Facility Information					
Facility Name:	Cedar Falls Water Reclamation Facility				
NPDES Permit No.:	0709001				
Treatment Type:	Three Stage Trickling Filter with UV Disinfection				
Design Flows:	ADW (MGD):	7.68 MGD	AWW (MGD):	8.80 MGD	
Street Address:	501 East 4th St.				
City:	Cedar Falls	State:	IA	Zip:	50613
Phone #:	319-273-8633	Fax #:			
E-mail:	Tyler.griffin@cedarfalls.com				

MIXING ZONE INFORMATION

3. Approach Used (check all that apply):

☒ Dye Study ☐ Modeling ☐ Tracer Study (identify the tracer) *Enter Here*

4. Dye Study Approval and Notification:

If a dye study is used, is authorization of using the dye approved by DNR?
☒ Yes ☐ No (authorization before the dye study is required)

Has the corresponding DNR field office been informed at least 48 hours in advance of the study?
☒ Yes ☐ No (notification of the field office prior to the dye study is required)

5. Effluent Information			
Discharge Flow Rate (MGD):	3.50 MGD	Discharge Velocity (if available) (ft/s):	unknown
List of pollutants that the diffuser mixing zone study is conducted for:			

6. Diffuser Information			
Latitude/Longitude of Outfall in **either** *decimal degrees* **or** *degrees, minutes, seconds*			
Latitude:	42.535009	Longitude:	92.437914
Lat/Long Coordinate Source: ☒Internet ☐Map ☐GPS/Survey (identify datum used)			
Diffuser connects to the left or right shore (as facing downstream):	Right		
Discharge Pipe Diameter or Dimensions (in):	30”		
Number Of Total Diffuser Ports:	7		
Number Of Active Diffuser Ports:	6		
Total Length of Diffuser:	490’		
Active Length of Diffuser:	60’, 7 ports spaced 10’ on center		
Is the diffuser submerged or above the water surface? ☒ Submerged ☐ Above the water surface			
Height of diffuser ports above water surface or depth below the water surface (ft):	Roughly 2.5-3’ below water surface		
Photo: *Attach at least one photo illustrating the location of the diffuser and its relationship to the receiving water body*		☒ Attached	

7. Receiving Water Body Information			
Stream Name:	Cedar River		
Beneficial Uses (check all that apply): Aquatic Life: ☐BWW1 ☐BWW2 ☐BWW3 ☐BCW1 ☐BCW2 ☐BLW			
Other Uses: ☐Primary Contact ☐Secondary Contact ☐Human Health ☐Drinking Water			
Describe the following from 200 feet upstream of the diffuser to 100 feet downstream of the diffuser:			
Describe the stream substrate (sand, silt, gravel, cobble, etc.)	Sand and silt		
Describe stream features that may affect mixing (dams, riffles, pools, snags, sand bars, etc.)	Sand Bar		
Map: *Attach plan view map showing location of the discharge(s), other NPDES discharges, public water supply intakes, any established recreational area, juncture of two perennial streams, which are within 100 feet of the facility's diffuser. Note any features that may affect mixing (dams, diversions, riffles, pools, snags, sand bars, tributaries)*	☒ Attached		
Is there an established recreational area such as public beaches, state, county and local parks near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): Gateway Water Trail ~1,000' ☒upstream ☐			
Is there a surface drinking water intake near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): ☐upstream ☐downstream			
Is there a juncture of two perennial streams near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): ☐upstream ☐downstream			
Are there NPDES discharges near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): ☐upstream ☐downstream			
Low-Flow Design Discharge Conditions (cfs) Source: ☒WLA ☐StreamStats ☐USGS gage ☐Other	1Q10: 317	7Q10: 358	30Q10:
Width of stream at the diffuser:			440'
Total stream flow on the date of the diffuser mixing zone study (cfs): ☒above diffuser ☐at downstream boundary of MZ per NWSLI: CEDI4 River Guage			1,550 CFS
Calculation of flow*: attach the calculations used in determining the stream flow*			☐ Attached

8. Mixing Zone Size & Configuration:	
Note: For diffusers, the mixing zone is used as both the mixing zone and the zone of initial dilution due to the short, rapid mixing that diffusers provide	
What is the mixing zone length (ft)? (maximum of 100 feet, distance to limitation specified in 567 IAC 61.2(4) "b" & "e" (2))	100'
Lay out a downstream station location marker along the shoreline at the end of the mixing zone (typically 100 feet below the diffuser)	
Is complete mixing achieved at the downstream boundary of the mixing zone? ☐YES ☒NO	
If complete mixing is not achieved at the downstream boundary of the mixing zone: What is the measured stream flow in the effluent plume at the downstream boundary of the mixing zone (cfs)?	unknown
Calculation of flow: attach the calculations of the stream flow in the plume	☐ Attached
Photo/video (dye study only): Attach at least one photo/video clearly illustrating the end of the mixing zone (showing both banks of the receiving stream) and showing the marker at the end of the mixing zone (distance from diffuser marked, dye visible, little to no glare)	☒ Attached

9. Mixing Zone Calculations

Calculate the percentage of stream flow in the mixing zone as follows:

Note: if complete mixing is observed at the boundary of the mixing zone, the MZ % is 100% and no calculation is required.

$$MZ\ \% = \ 100 * \frac{Flow\ in\ the\ dye\ plume\ at\ MZ\ boundary - Discharge\ flow}{Total\ \ stream\ flow\ upstream\ of\ discharge}$$

Or

$$MZ\ \% = \ 100 * \frac{Flow\ in\ the\ dye\ plume\ at\ MZ\ boundary - Discharge\ flow}{Total\ stream\ flow\ at\ MZ\ boundary - \ Discharge\ flow}$$

MZ %:	NA
Map: *Attach plan view map that depicts the effluent plume including the downstream boundaries of the mixing zone*	☒ Attached
Calculations: *Attached the calculations of the MZ%*	☐ Attached

10. Model/Dye Study Information (If Models are Used)			
Are any models used? ☐YES ☒NO If yes, provide the name of the model used:			
Models can be used to estimate the MZ percentages when site-specific information is used. In addition, models are available to project the percentages of mixing obtained during field flow conditions to design low flow regime. On an attached sheet, describe the input values not included on this form, the assumptions, and the outcome of the model used. Specific stream conditions may warrant a modified MZ study plan. Models are available to project the percentages of mixing obtained during field flow conditions to design low flow regime. The following shows the MZ based on modeling results.			
% MZ:		Attach the modeling results:	☐ Attached

11. Bathymetric Analysis performed by USGS 8/13/2025; results not yet received	
Is a Bathymetric Analysis completed in addition to the Diffuser Performance Analysis? ☒YES ☐	
For a Bathymetric Analysis, stream depth measurements shall be taken at equidistant intervals across the entire width of the receiving stream at the diffuser	
Number of stream depth measurements taken (minimum of 20):	
Stream depth measurements attached:	☐ Attached

Subject: Re: Diffuser Report (0709001)
From: "FO1.Notify, DNR" <fo1.notify+canned.response@dnr.iowa.gov>
To: Tyler.Griffin@cedarfalls.com
Date Sent: Thursday, January 29, 2026 11:12:22 AM GMT-06:00
Date Received: Thursday, January 29, 2026 11:12:22 AM GMT-06:00

We have received your email. We will contact you if we have any questions.

Subject: Diffuser Report (0709001)
From: Tyler Griffin <Tyler.Griffin@cedarfalls.com>
To: Ian Willard <ian.willard@dnr.iowa.gov>,"npdes.mail@dnr.iowa.gov" <npdes.mail@dnr.iowa.gov>
Cc: "fo1.notify@dnr.iowa.gov" <fo1.notify@dnr.iowa.gov>
Date Sent: Thursday, January 29, 2026 11:10:32 AM GMT-06:00
Date Received: Thursday, January 29, 2026 11:12:18 AM GMT-06:00
Attachments: CF Diffuser Cover Letter 2026.pdf,Plume 600' Downstream.jpg,Diffuser Overview.jpg,Diffuser Ports.jpg,Plume 100' Downstream.jpg,Plume 200' Downstream.jpg,Cedar Falls WRF 2025 Annual Diffuser Performace Analysis.docx

Please see the attached documents and images regarding the 2025 Diffuser Performance Analysis and Report. Please let me know if you have any further questions.

Tyler J. Griffin

Water Reclamation Manager
City of Cedar Falls
501 East 4th Street
Cedar Falls, IA 50613
319-268-5559

DEPARTMENT OF PUBLIC WORKS

City of Cedar Falls
2200 Technology Parkway
Cedar Falls, Iowa 50613

Administration Division
Phone: 319-273-8629 Fax: 319-273-8632

Engineering Division
Phone: 319-268-5161 Fax: 319-268-5197

Water Reclamation Division
Phone: 319-273-8633 Fax: 319-273-8632

January 30th, 2026

Ian Willard
NPDES Section
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, Iowa 50319

RE: Annual Diffuser Performance & Bathymetric Analysis

Dear Ian:

Along with this letter please find the included attachments documenting our 2025 Annual Diffuser Performance Analysis.

A diffuser dye test was performed on December 9th, 2025. The river depth as recorded at the Cedar River gauge located approximately 1,600 feet upstream from the diffuser pipe was 79.13 feet with a recorded flow of 1,550 cubic feet per second. A fluorescent yellow/green liquid concentrate dye was injected into our effluent stream, and a drone was used to video the mixing in the river.

Six of the seven ports were found to be functioning (see images attached to the email). Mixing rates appear to be uniform with the dye dispersing evenly throughout the main flow channel within the first 100 feet.

Past hydrologic events have caused one or more of these ports to be silted in and opened back up over time due to the movement of a sandbar in the river. For instance, the 2021 dye test showed only 4 ports open while the 2022 and 2023 dye tests both showed all seven ports to be back open.

An annual Bathymetric Analysis was performed by the USGS on August 13th, 2025. At the time of this report this analysis was at “Bureau Level Review” with no timeline for delivery to the City of Cedar Falls. Previous reports show the main channel to be approximately 200 feet wide just off the east bank of the river. The seven diffuser ports are located within this main channel, spaced 10 feet apart.

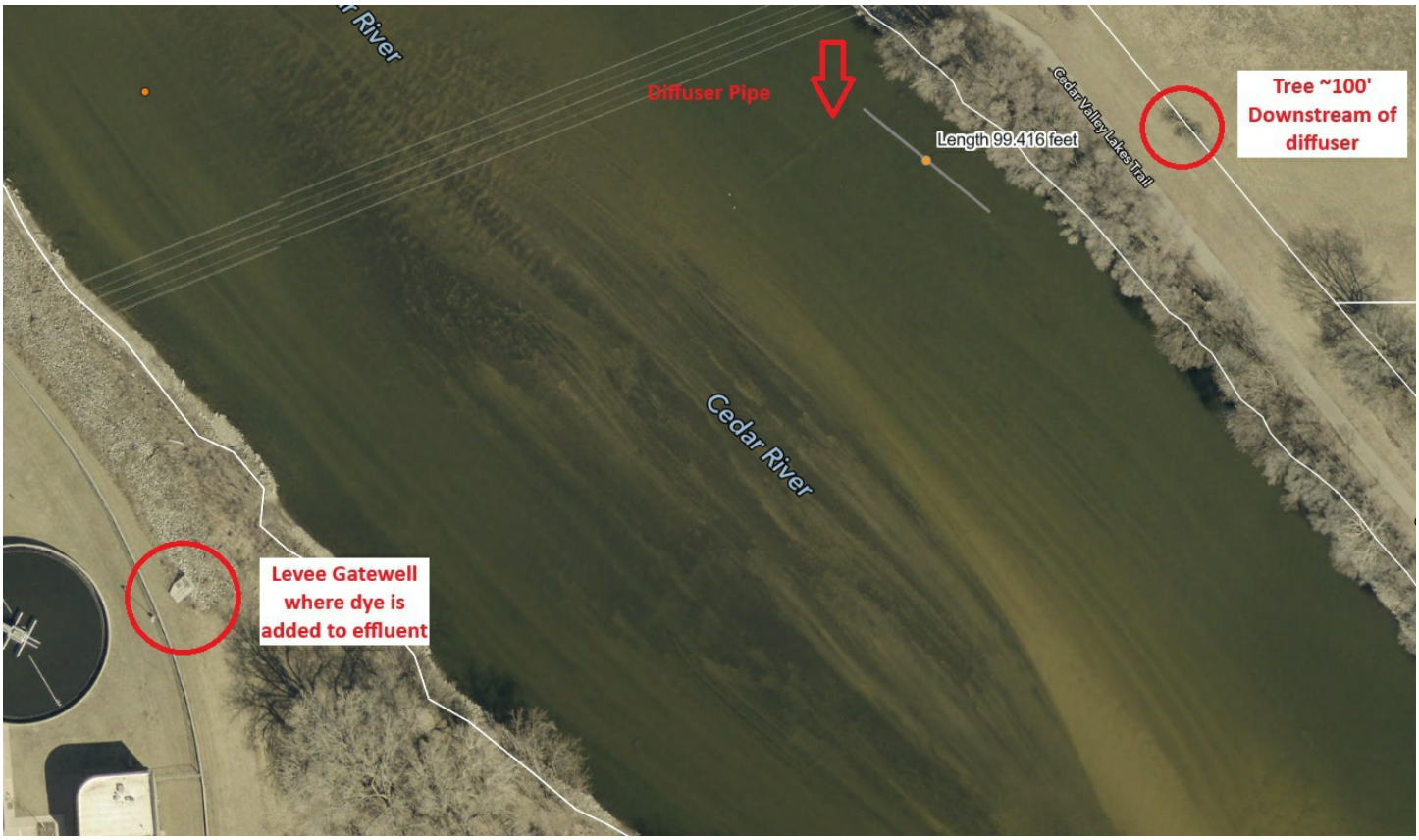
We will continue to monitor the diffuser functionality and mixing on an annual basis and if required will take action to address this issue as part of our WRF upgrades project slated for construction from 2028-2031. Please let me know if you have any questions.

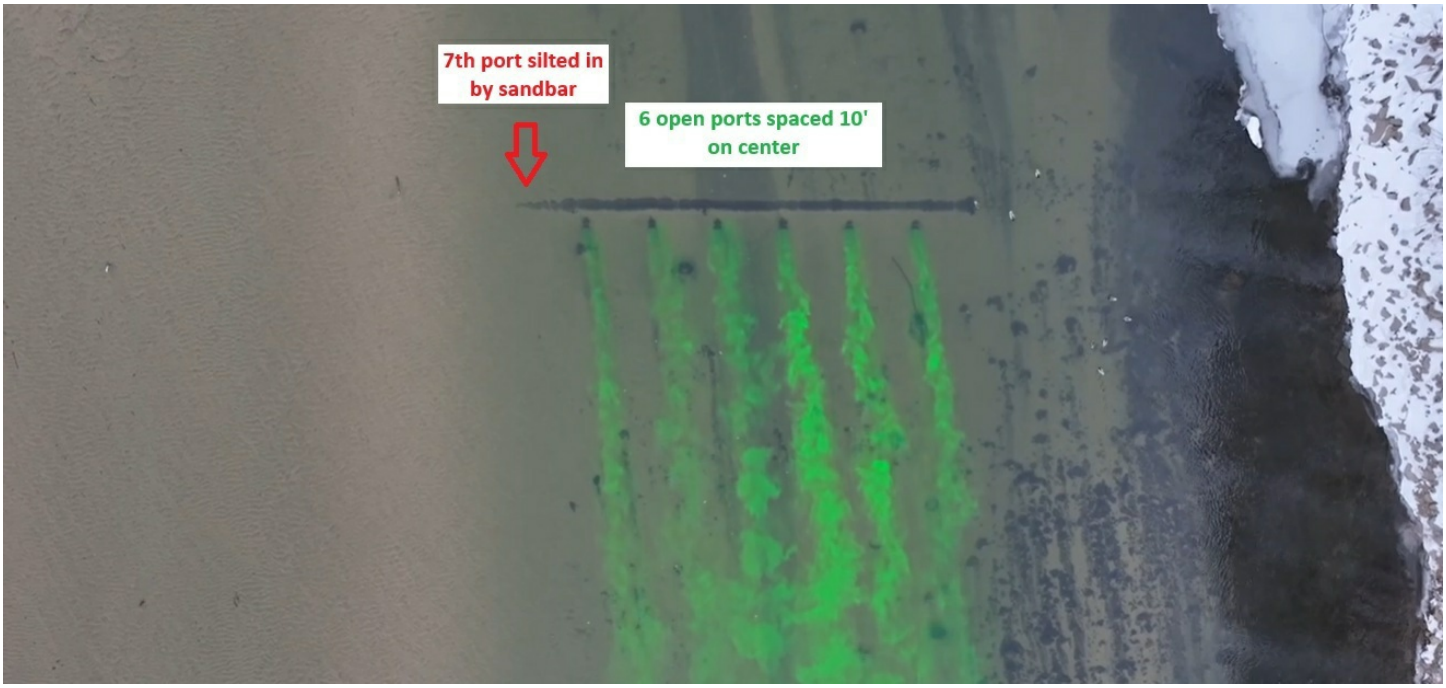
Sincerely,

Tyler J. Griffin
Cedar Falls Water Reclamation Manager

c: DNR, Field Office 1


Levee Gatewell where dye was added to effluent
Diffuser Pipe
Tree ~100' downstream of diffuser


Diffuser Pipe
Length 99.416 feet
Cedar Valley Lakes Trail
Tree ~100' Downstream of diffuser
Cedar River
Levee Gatewell where dye is added to effluent


7th port silted in by sandbar
6 open ports spaced 10' on center


Diffuser Pipe
Tree ~ 100' Downstream of Diffuser


Levee Gatewell where dye was added to effluent
Diffuser Pipe
Tree ~ 100' downstream of diffuser

DNR Diffuser Mixing Zone Study Guidelines

The following information should be gathered, as appropriate, when conducting a diffuser mixing zone study analysis. Diffuser mixing zone studies should be conducted at low flow conditions (generally less than 20 times of the 7Q10 flow). Prior to completing a diffuser mixing zone study, it is strongly recommended that a diffuser mixing zone study plan be submitted to the DNR for approval to ensure that all data collection and analysis will be applicable to the wasteload allocation (WLA) calculations. For a dye study, dye may only be added to the effluent prior to discharge; no dye may be added to the stream downstream of the outfall. If for any reason the data and analysis are not usable, then default values for the WLA are used. Sections 1 – 10 outline the requirements for a Diffuser Performance Analysis (typically required annually). Section 11 outlines the requirements for a Bathymetric Analysis (typically required once every five years).

GENERAL INFORMATION

1. Applicant Information (who conducted the diffuser mixing zone study)					
First Name:	Tyler	Last Name:	Griffin		
Title:	Water Reclamation Manager				
Street Address:	501 East 4th St.				
City:	Cedar Falls	State:	IA	Zip:	50613
Phone #:	319-273-8633	Fax #:			
E-mail:	Tyler.griffin@cedarfalls.com				
Report submittal date:	1/30/2026	MZ study date:	12/9/2025		

2. Facility Information					
Facility Name:	Cedar Falls Water Reclamation Facility				
NPDES Permit No.:	0709001				
Treatment Type:	Three Stage Trickling Filter with UV Disinfection				
Design Flows:	ADW (MGD):	7.68 MGD	AWW (MGD):	8.80 MGD	
Street Address:	501 East 4th St.				
City:	Cedar Falls	State:	IA	Zip:	50613
Phone #:	319-273-8633	Fax #:			
E-mail:	Tyler.griffin@cedarfalls.com				

MIXING ZONE INFORMATION

3. Approach Used (check all that apply):

☒ Dye Study ☐ Modeling ☐ Tracer Study (identify the tracer) *Enter Here*

4. Dye Study Approval and Notification:

If a dye study is used, is authorization of using the dye approved by DNR?
☒ Yes ☐ No (authorization before the dye study is required)

Has the corresponding DNR field office been informed at least 48 hours in advance of the study?
☒ Yes ☐ No (notification of the field office prior to the dye study is required)

5. Effluent Information			
Discharge Flow Rate (MGD):	3.50 MGD	Discharge Velocity (if available) (ft/s):	unknown
List of pollutants that the diffuser mixing zone study is conducted for:			

6. Diffuser Information			
Latitude/Longitude of Outfall in **either** *decimal degrees* **or** *degrees, minutes, seconds*			
Latitude:	42.535009	Longitude:	92.437914
Lat/Long Coordinate Source: ☒Internet ☐Map ☐GPS/Survey (identify datum used)			
Diffuser connects to the left or right shore (as facing downstream):	Right		
Discharge Pipe Diameter or Dimensions (in):	30”		
Number Of Total Diffuser Ports:	7		
Number Of Active Diffuser Ports:	6		
Total Length of Diffuser:	490’		
Active Length of Diffuser:	60’, 7 ports spaced 10’ on center		
Is the diffuser submerged or above the water surface? ☒ Submerged ☐ Above the water surface			
Height of diffuser ports above water surface or depth below the water surface (ft):	Roughly 2.5-3’ below water surface		
Photo: *Attach at least one photo illustrating the location of the diffuser and its relationship to the receiving water body*		☒ Attached	

7. Receiving Water Body Information			
Stream Name:	Cedar River		
Beneficial Uses (check all that apply): Aquatic Life: ☐BWW1 ☐BWW2 ☐BWW3 ☐BCW1 ☐BCW2 ☐BLW			
Other Uses: ☐Primary Contact ☐Secondary Contact ☐Human Health ☐Drinking Water			
Describe the following from 200 feet upstream of the diffuser to 100 feet downstream of the diffuser:			
Describe the stream substrate (sand, silt, gravel, cobble, etc.)	Sand and silt		
Describe stream features that may affect mixing (dams, riffles, pools, snags, sand bars, etc.)	Sand Bar		
Map: *Attach plan view map showing location of the discharge(s), other NPDES discharges, public water supply intakes, any established recreational area, juncture of two perennial streams, which are within 100 feet of the facility's diffuser. Note any features that may affect mixing (dams, diversions, riffles, pools, snags, sand bars, tributaries)*	☒ Attached		
Is there an established recreational area such as public beaches, state, county and local parks near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): Gateway Water Trail ~1,000' ☒upstream ☐			
Is there a surface drinking water intake near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): ☐upstream ☐downstream			
Is there a juncture of two perennial streams near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): ☐upstream ☐downstream			
Are there NPDES discharges near the diffuser? ☐YES ☒NO If yes, distance from the diffuser (ft): ☐upstream ☐downstream			
Low-Flow Design Discharge Conditions (cfs) Source: ☒WLA ☐StreamStats ☐USGS gage ☐Other	1Q10: 317	7Q10: 358	30Q10:
Width of stream at the diffuser:			440'
Total stream flow on the date of the diffuser mixing zone study (cfs): ☒above diffuser ☐at downstream boundary of MZ per NWSLI: CEDI4 River Guage			1,550 CFS
Calculation of flow: *attach the calculations used in determining the stream flow*			☐ Attached

8. Mixing Zone Size & Configuration:	
Note: For diffusers, the mixing zone is used as both the mixing zone and the zone of initial dilution due to the short, rapid mixing that diffusers provide	
What is the mixing zone length (ft)? (maximum of 100 feet, distance to limitation specified in 567 IAC 61.2(4) "b" & "e" (2))	100'
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Or

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MZ %:	NA
Map: *Attach plan view map that depicts the effluent plume including the downstream boundaries of the mixing zone*	☒ Attached
Calculations: *Attached the calculations of the MZ%*	☐ Attached

10. Model/Dye Study Information (If Models are Used)			
Are any models used? ☐YES ☒NO If yes, provide the name of the model used:			
Models can be used to estimate the MZ percentages when site-specific information is used. In addition, models are available to project the percentages of mixing obtained during field flow conditions to design low flow regime. On an attached sheet, describe the input values not included on this form, the assumptions, and the outcome of the model used. Specific stream conditions may warrant a modified MZ study plan. Models are available to project the percentages of mixing obtained during field flow conditions to design low flow regime. The following shows the MZ based on modeling results.			
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For a Bathymetric Analysis, stream depth measurements shall be taken at equidistant intervals across the entire width of the receiving stream at the diffuser	
Number of stream depth measurements taken (minimum of 20):	
Stream depth measurements attached:	☐ Attached