

Abrams Creek and Lower Opequon Creek Combined Sediment and Bacteria TMDL Action Plan

PERMIT NUMBER VAR040053

Submitted to DEQ:

May 2020

CITY OF WINCHESTER, VIRGINIA - ABRAMS CREEK AND LOWER OPEQUON CREEK COMBINED SEDIMENT AND BACTERIA TMDL ACTION PLAN

INTRODUCTION

The City of Winchester has prepared this Abrams Creek and Lower Opequon Creek Combined Sediment and Bacteria TMDL Action Plan to address the Special Condition for approved local TMDLs (Part II.B) in the City's MS4 Permit. The City's approach for preparation of this Action Plan is based on the requirements listed in the MS4 General Permit and DEQ's Guidance Memo No. GM-16-2006 (dated November 21,2016). Each of the sections in this Action Plan will address one or more of the required action plan content items as listed on the DEQ Local TMDL Action Plan Guidance Document referenced above.

TMDL REPORT AND POLLUTANT IMPAIRMENTS

1. The name(s) of the Final TMDL report(s); 2. The pollutant(s) causing the impairment(s);

The City of Winchester was assigned aggregated Waste Load Allocations (WLAs) under the approved TMDL report entitled *Opequon Watershed TMDLs for Benthic Impairments: Abrams Creek and Lower Opequon Creek, Frederick and Clarke Counties, Virginia dated July 2003 and Revised October 2003.* Stream segments on Abrams Creek (Segment ID: VAV-B09R_ABR01A00) and the Lower Opequon Creek (Segment ID: VAV-B09R_OPE01A00) were both listed as impaired on Virginia's Section 303(d) Total Maximum Daily Load Priority List and Report due to water quality violations of the general standard (listed as a benthic impairment). Analyses of physical, chemical, biological, and observational data indicated that sediment was the most probable cause of the benthic impairments in both stream segments. TMDLs were therefore developed for sediment to address the benthic impairments in Abrams Creek and Lower Opequon Creek.

The City of Winchester was also assigned an aggregated WLA under the approved TMDL report entitled *Bacteria TMDLs for Abrams Creek and Upper and Lower Opequon Creek Located in Frederick and Clarke County, Virginia dated October 2003 and Revised January 2004*. Stream segments on Abrams Creek (Segment ID: VAV-B09R_ABR01A00), Upper Opequon Creek (Segment ID VAV-B08R_OPE01A00), and the Lower Opequon Creek (Segment ID: VAV-B09R_OPE01A00) were listed as impaired on Virginia's Section 303(d) Total Maximum Daily Load Priority List and Report due to water quality violations of the general standard for fecal coliform.

3. The WLA(s) assigned to the MS4 as aggregate or individual WLAs;

The City of Winchester (VAR040053) and VDOT (VAR040032) MS4s were assigned aggregated sediment WLAs in the Final TMDL report as follows:

- Abrams Creek TMDL Sediment WLA = 442.7 Metric Tons/Year or 975,985 lbs/year
- Lower Opequon Creek Sediment WLA = 269.2 Metric Tons/Year or 593,484 lbs/year

In order to remedy the water quality impairment pertaining to fecal coliform, TMDLs were developed for the new water quality standards for bacteria, which state that the calendar-month geometric mean concentration of E. coli shall not exceed 126 cfu/100 mL, and that no single sample can exceed a concentration of 235 cfu/100mL. The City of Winchester (VAR040053) and VDOT (VAR040032) MS4s were assigned an aggregated WLA in the Final TMDL report as follows:

Abrams Creek TMDL Bacteria WLA = 19.4x10¹² cfu/year fecal coliform

The remainder of this Action Plan will focus on addressing the City's plan for complying with the WLAs assigned to the City under both of these TMDLs.

SIGNIFICANT SOURCES OF POC(S)

4. Significant sources of POC(s) from facilities of concern owned or operated by the MS4 operator that are not covered under a separate VPDES permit. A significant source of pollutant(s) from a facility of concern means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL.

During the first half of 2013, the City's engineering consultant evaluated City owned/operated properties for potential sources of pollutants for which the City was assigned a waste load allocation (WLA) in a State Water Control Board approved Total Maximum Daily Load (TMDL). The consultant performed an initial potential source evaluation task that utilized the City's Geographic Information System (GIS) to identify and characterize eighty one City owned/operated properties for land use type (the City's zoning layer) and the presence/absence of MS4 outfalls on the property. The outcome of the initial potential source evaluation task identified six City owned/operated properties requiring further site review and runoff characterization.

The City owned/operated properties found to require a site review and runoff characterization triggered an on-site field reconnaissance task to review and assess the on-the-ground conditions for each of the City owned/operated properties. The consultant documented potential pollutant of concern (POC) generating activities (storage, transfer, transport, or disposal) on each site, stormwater pollution potential from the site (exposure to precipitation), and locations of outfalls.

Based on the results of this study, the City incorporated additional pollution prevention activities and training materials into the Pollution Prevention/Good Housekeeping for Municipal Operations (BMPs 6.1 thru 6.7) section of its MS4 Program Plan to further address bacteria and sediment as pollutants of concern. A copy of the full memo report documenting evaluation of the City owned/operated properties for potential WLA pollutant sources is provided in Attachment 1 to this Action Plan.

At the beginning of 2020, the City reviewed the original study results, and practices derived from the 2013 analysis in comparison to current operations at these facilities. Based on this recent review, it is the City's opinion, that the BMPs being implemented are still providing effective pollutant containment and that no new significant sources of POC have emerged in recent years.

EXISTING OR NEW BEST MANAGEMENT PRACTICES

5. Existing or new management practices, control techniques, and system design and engineering methods, that have been or will be implemented as part of the MS4 Program Plan that are applicable to reducing the pollutant for which the WLA was established;

Recognizing that sediment and bacteria pollutant discharges from the City's MS4 need to be controlled to the maximum extent practicable in order to protect the water quality in the streams that flow throughout it, the City's political leadership and staff enacted several changes to the City's Code in order to facilitate a reduction in these pollutant discharges. These Code changes included:

- Reduced the threshold for regulated land disturbing activities from 10,000 ft² to 5,000 ft² under Chapter 9 Article 2 (Sediment)
- Instituted stream buffer protection under Chapter 9 Article 4 (Sediment and Bacteria)
- Prohibited feeding of waterfowl under Chapter 5 Article 3 (Bacteria)

In addition to these strong legal mechanisms for controlling pollutant discharges, the City also incorporated many new Best Management Practices (BMPs) into its MS4 Program Plan that target sediment and bacteria and focus on source control. The following is a list of thirty MS4 Program Plan BMPs that the City is implementing to specifically address the reduction of sediment and bacteria pollutant loads from the City's MS4:

- <u>BMP 1.1. City Stormwater Webpage (Sediment and Bacteria)</u> The City will maintain a web page dedicated to the City's stormwater management program and will distribute stormwater program messages and related information to its citizens via this tool.
- <u>BMP 1.2. Social Media (Sediment and Bacteria)</u> The City will use its Facebook and Twitter accounts to deliver its stomwater program messages and to distribute stormwater related information to its citizens.

- <u>BMP 1.3. Public Events (Sediment and Bacteria)</u> The City will participate in public events such as the Community Wellness Festival to deliver its stomwater program messages and to distribute stormwater related information to its citizens.
- <u>BMP 1.4. Publications Print and Electronic (Sediment and Bacteria)</u> The City will use publications such as its Cit-E newsletter to deliver its stomwater program messages and to distribute stormwater related information to its citizens.
- <u>BMP 1.5. Watershed and Stormwater Educational Opportunities Program (Sediment and Bacteria)</u> The City will continue to implement its Watershed and Stormwater Opportunities Education Program directed at students in Winchester City Public Schools.
- <u>BMP 1.6. Other Message Delivery (Sediment and Bacteria)</u> The City will utilize other types of message delivery such as "Clean Up After Your Dog" signage at the City's Dog Park to reach targeted audiences within the City.
- <u>BMP 1.7. Educational Materials (Sediment and Bacteria)</u> The City will retain copies (electronic or hard copy) of educational materials utilized in delivery of its messages regarding high priority water quality issues to target audiences.
- <u>BMP 2.3. Stormwater Complaint Hotlines (Sediment and Bacteria)</u> The City will
 maintain its current stormwater complaint hotlines to encourage public reporting of
 water quality and stormwater maintenance related issues to include potential illicit
 discharges to the MS4.
- <u>BMP 2.4. Promotion of the Local Environmental Events (Sediment and Bacteria)</u> The
 City will annually promote a total of four events encouraging public participation and
 involvement in Household Hazardous Waste Collection Days and the Adopt-A-Stream
 program.
- <u>BMP 2.6. Sponsorship of Adopt-A-Stream Program (Sediment and Bacteria)</u> The City will continue to promote the Adopt-A-Stream program by sponsoring an annual stream clean-up day.
- <u>BMP 3.3. Legal Authority IDDE (Sediment and Bacteria)</u> The City will maintain legal authority prohibiting illicit discharges into the MS4.
- BMP 3.4. IDDE Investigation and Follow-Up (Sediment and Bacteria) The City will
 investigate and conduct follow-up on potential illicit discharges in accordance with
 procedures included in the City's Illicit Discharge Detection and Elimination (IDDE)
 Standard Operating Procedures Manual.
- <u>BMP 3.5. MS4 Outfall Dry Weather Field Screening (Sediment and Bacteria)</u> The City will conduct dry weather screening on fifty (50) MS4 outfalls annually using procedures included in the City's Illicit Discharge Detection and Elimination (IDDE) Standard Operating Procedures Manual.
- <u>BMP 3.6. Illicit Discharge Tracking and Documentation (Sediment and Bacteria)</u> The
 City will track and document suspected and illicit discharges, as well as, the City's
 investigation, follow-up and enforcement actions in accordance with the procedures
 included in the City's Illicit Discharge Detection and Elimination (IDDE) Standard
 Operating Procedures Manual.
- <u>BMP 3.9. Household Waste Reduction (Sediment and Bacteria)</u> The City will continue to provide weekly waste collection services for City residents to include fall

- leaf collection services, yard waste collection services, and bulky waste collection services.
- <u>BMP 3.10. Elimination of Sanitary Sewage Seepage from Public Sewers (Bacteria)</u> The City will continue, as part of its sanitary sewer utilities program, to implement its inflow and infiltration program to replace or slipline sanitary sewers to prevent illicit discharges.
- <u>BMP 4.1. Legal Authority Erosion and Sediment Control (Sediment)</u> The City will
 maintain legal authority for implementation of a local erosion and sediment control
 program consistent with 9VAC25-840-10 et. seq.
- <u>BMP 4.2. Land Disturbing Activity Plan Review (Sediment)</u> The City will require submission of complete Land Disturbance Permit Application and Virginia Stormwater Management Program Permit Packages for regulated land disturbance activities.
- <u>BMP 4.3. VPDES Construction Activity Permit Coordination (Sediment)</u> The City will
 not authorize initiation of land disturbance activities until it receives evidence that the
 applicant has applied for and obtained coverage under the Virginia General Permit for
 Discharges of Stormwater from Construction Activities, including a completed general
 permit registration statement as required under City Code Section 9-50.
- <u>BMP 4.4. Land Disturbing Activity Inspections (Sediment)</u> The City will maintain a
 land disturbance inspection program consistent with the requirements of Section 9-39
 of the City Code to include inspection for compliance with Section 9-58 of the City
 Code which requires implementation of a pollution prevention plan and Section 9-67 of
 the City Code requiring compliance with the approved stormwater management plan.
- <u>BMP 4.5. Land Disturbing Activity Tracking and Recordkeeping (Sediment)</u> The City
 will maintain its existing program to track land disturbance activities which provides the
 necessary information for routine inspections, as-built inspections, surveys, and
 determining which areas may be most likely to incur heavier than normal sediment
 loading.
- <u>BMP 5.2. Private Stormwater Management Facility Inspections (Sediment and Bacteria)</u> The City will maintain a post development stormwater management facility inspection program in accordance with Section 9-67 of the City Code and will perform inspections on these facilities at least once every five (5) years.
- <u>BMP 5.3. Maintenance Agreements (Sediment and Bacteria)</u> The City will continue to require executed maintenance agreements for stormwater management facilities in accordance with Section 9-63 of the City Code.
- <u>BMP 5.4. City-Owned Stormwater Management Facility Inspections (Sediment and Bacteria)</u> The City Division of Engineering will inspect stormwater management facilities owned/operated by the City annually using procedures identified in the Public Stormwater Management Facility Inspection Standard Operating Procedures Manual.
- BMP 5.5. City-Owned Stormwater Management Facility Maintenance (Sediment and Bacteria) - The City Division of Public Works will conduct maintenance on City-Owned Stormwater Management Facilities, as necessary, and in response to Division of Engineering inspections.

- <u>BMP 6.1. Standard Operating Procedures (Sediment and Bacteria)</u> The City will develop and implement standard operating procedures for pollution prevention to be incorporated into daily operational activities.
- BMP 6.2. Stormwater Pollution Prevention Plans (Sediment and Bacteria) The City will develop a stormwater pollution prevention plan (SWPPP) for the equipment and maintenance facility located at Jim Barnett Park.
- <u>BMP 6.4. Pollution Prevention Inspections (Sediment and Bacteria)</u> The City will conduct an annual pollution prevention inspection at the equipment and maintenance facility located at Jim Barnett Park.
- <u>BMP 6.5. Staff Training (Sediment and Bacteria)</u> The City will conduct staff training
 in accordance with the training schedule and training modules included in the City of
 Winchester Stormwater Training Plan.
- <u>BMP 6.6. Street Sweeping (Sediment and Bacteria)</u> The City will continue its street sweeping program and track the amount of litter, sediment, and debris removed.

More detailed descriptions for each of these BMPs can be found in the City's MS4 Program Plan which is available for download at http://www.winchesterva.gov/engineering/stormwater. The City plans to continue implementation of these BMPs to address the sediment and bacteria WLAs listed in the aforementioned TMDLs. Based on the results of the City's Action Plan assessment methodology (as described in Section 9 of this Action Plan), an adaptive iterative approach will be used to enhance/replace these BMPs to achieve the most effective plan for reducing the discharge of sediment and bacteria from the City's MS4 and to meet the assigned TMDL WLAs.

LEGAL AUTHORITIES

6. Legal authorities such as ordinances, state, federal, and other permits, orders, specific contract language, and inter-jurisdictional agreements applicable to reducing the POCs identified in each respective TMDL.

The City has reviewed its MS4 Program Plan and ordinances to evaluate its ability to comply with the Special Condition for approved (other than the Chesapeake Bay TMDL) TMDLs (Part II.B) in the MS4 Permit. Based on this review, it is the City's opinion that Winchester does not require any new or modified legal authorities or policies to meet the requirements of this special condition. The following is a list of the City's relevant existing legal authorities and policies:

- City of Winchester's Water Protection Ordinance (Chapter 9 of the City Code)
- City of Winchester's MS4 Program Plan
- City of Winchester's Public Services Standards Manual
- City of Winchester's Animals and Fowl Ordinance (Chapter 5 of the City Code)

ENHANCEMENTS TO PUBLIC EDUCATION, OUTREACH, AND EMPLOYEE TRAINING

7. Enhancements to public education, outreach, and employee training programs to also promote methods to eliminate and reduce discharges of the POC(s) for which a WLA has been assigned.

Enhancements to Public Education and Outreach Program

The City continues to implement a very robust public education and outreach program as part of its MS4 Program Plan. The City's webpage is the primary public education and outreach tool utilized for reaching the program's targeted audiences and providing for distribution of educational materials to convey the appropriate messages. Publications currently available for download from the City's Stormwater webpage include the following:

- Stormwater Complaint Hotline Flyer (Sediment and Bacteria)
- EPA's "After the Storm" Video Series (Sediment and Bacteria)
- "Pick it Up, It's Your Doodie" Pet Waste Brochure (Bacteria)
- "Please Do Not Feed the Waterfowl" Wildlife Waste Brochure (Bacteria)
- "How to Make Your Own Rain Barrel" Presentation (Sediment)
- "Adopt-A-Stream" Flyer (Sediment and Bacteria)

As can be seen from this list, the City has utilized several of these publications to directly address the pollutants of concern (sediment and bacteria) for which a WLA has been assigned to the City. The following publications were customized for the City's use and are now available for download on the City's stormwater webpage:

- After the Storm Brochure English English version of this brochure customized with the City's contact information. (Sediment and Bacteria)
- After the Storm Brochure Spanish Spanish version of this brochure customized with the City's contact information. (Sediment and Bacteria)
- SepticSmart Short Rack Brochure in English English version of this brochure customized with the City's contact information. (Bacteria)
- SepticSmart Short Rack Brochure in Spanish English version of this brochure customized with the City's contact information. (Bacteria)
- Make Your Home the Solution to Stormwater Pollution Brochure English version of this brochure customized with the City's contact information. (Sediment and Bacteria)
- *Kids Stormwater Stickers* Print sheets of stormwater stickers that can be printed on sticky back paper. (Sediment and Bacteria)

These publications will also be distributed at future public events. The City is seeking to broaden its reach of the targeted audiences for reduction of sediment and bacteria discharges by offering several of these publications in both English and Spanish.

Another enhancement to the City's program designed specifically to address source control of bacteria is the City's promotion of picking up pet waste through the use of "Clean Up After Your Dog" signs which were placed at the Dog Park located in Jim Barnett Park. These signs along with the dog park rules clearly inform pet owners that they must clean up after their pets with the supplied waste bags and dispose of the bags in the provided sealed container located in the park.

Through these enhancements to the City's Public Education and Outreach Program, the City expects to further reduce the discharge of both sediment and bacteria into local streams.

Enhancements to Employee Training Program

The City's employee training program consists of four different PowerPoint training modules. All four modules have been modified to specifically address the pollutants of concern (sediment and bacteria) for which a WLA has been assigned to the City. These four training modules and their recent enhancements are described below:

Module 1: Recognition and Reporting of Illicit Discharges - Make City staff more aware of the City's focus and procedures to prevent, detect, and eliminate illicit discharges. This module was enhanced to include identification and reporting of illicit discharges associated with both sediment and bacteria sources.

Module 2: Pollution Prevention Practices (PPP) used in Road, Street, and Parking Lot Maintenance - Provide City employees an understanding on how to prevent stormwater pollution during the City's street, parking, and drainage operations by adhering to SOPs and good housekeeping practices. This module was enhanced to include prevention of sediment laden runoff from entering the MS4. Specifically, the training covers control of concrete cutting slurries, erosion & sediment controls, and building material stockpile protection.

Module 3: Pollution Prevention Practices used for Fleet and Facility Operations - Increase employee awareness on how to reduce stormwater pollution from daily fleet and facility operations by adhering to SOPs and good housekeeping practices. This module was enhanced to include proper storage of materials to minimize the release of sediment into the MS4 and implementation of a SWPPP on the City Yards facility.

Module 4: Minimizing Stormwater Pollution from Parks and Grounds Maintenance - Increase awareness on how to minimize stormwater pollution from parks and ground operation/maintenance activities by adhering to good housekeeping practices. This module was enhanced to include training on proper storage of materials to minimize the release of sediment into the MS4 and promotion of the use of the City's Dog Park along with enforcement of the City's requirements for clean-up and proper disposal of pet waste in City parks. Furthermore this module was enhanced to include landscaping techniques for reducing the congregation of waterfowl and enforcement of the City's ordinance against feeding waterfowl.

8. A schedule of interim milestones and implementation of the items in 5, 6, and 7.

As permitted in Section II.B.2 of the MS4 General Permit and referred to in DEQ's Local TMDL Action Plan Guidance Document, the City is proposing to implement this Action Plan in multiple stages over multiple permit cycles using an adaptive iterative approach. This approach will allow the City to gather the necessary data and information to determine the most effective BMPs/management strategies for controlling POC loads along with identifying targeted areas for their implementation to meet the TMDL WLAs for bacteria and sediment. The following schedule is proposed for implementation of the BMPs and milestone activities included in this Action Plan for the current permit cycle ending on October 31, 2023:

current permit cycle chaing on October 31, 2023.	
BMP/Milestone Activity	<u>Schedule</u>
Submission of Local TMDL Action Plan to DEQ	May 1, 2020
BMP 1.1. City Stormwater Webpage	Annually
BMP 1.2. Social Media	Annually
BMP 1.3. Public Events	Annually
BMP 1.4. Publications - Print and Electronic	Annually
BMP 1.5. Watershed and Stormwater Educational Opportunities Program	Annually
BMP 1.6. Other Message Delivery	Annually
BMP 1.7. Educational Materials	Annually
BMP 2.3. Stormwater Complaint Hotlines	Annually
BMP 2.4. Promotion of the Local Environmental Events	Annually
BMP 2.6. Sponsorship of Adopt-A-Stream Program	Annually
BMP 3.3. Legal Authority – IDDE	Annually
BMP 3.4. IDDE Investigation and Follow-Up	Annually
BMP 3.5. MS4 Outfall Dry Weather Field Screening	Annually
BMP 3.6. Illicit Discharge Tracking and Documentation	Annually
BMP 3.9. Household Waste Reduction	Annually
BMP 3.10. Elimination of Sanitary Sewage Seepage from Public Sewers	Annually
BMP 4.1. Legal Authority – E and SC	Annually
BMP 4.2. Land Disturbing Activity Plan Review	Annually
BMP 4.3. VPDES Construction Activity Permit Coordination	Annually
BMP 4.4. Land Disturbing Activity Inspections	Annually
BMP 4.5. Land Disturbing Activity Tracking and Recordkeeping	Annually
BMP 5.2. Private Stormwater Management Facility Inspections	Every 5 Years
BMP 5.3. Maintenance Agreements	Annually
BMP 5.4. City-Owned Stormwater Management Facility Inspections	Annually
BMP 5.5. City-Owned Stormwater Management Facility Maintenance	As-Needed
BMP 6.1. Standard Operating Procedures	Annually
BMP 6.2. Stormwater Pollution Prevention Plans	Annually
BMP 6.4. Pollution Prevention Inspections	Annually
BMP 6.5. Staff Training	Annually
BMP 6.6. Street Sweeping	Annually
Prepare WQ Monitoring Reports	Annually

Methods to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs.

In order to assess the effectiveness of the City's Abrams Creek and Lower Opequon Creek Combined Sediment and Bacteria TMDL Action Plan, the City prepared a Water Quality (WQ) Monitoring Program. The City is actively collecting water quality samples (TSS and fecal coliform) from representative MS4 outfalls that discharge into the impaired reaches of Abrams Creek and Lower Opequon Creek. The City will utilize the water quality data collected under the monitoring program to: Identify potential sources of discharge of the POCs; target locations within the MS4 permit area for implementation of BMPs; and ultimately to assess the overall effectiveness of the Action Plan in reducing the discharge of the POCs from the City's MS4.

During the current permit cycle, the City is looking to establish baseline levels that can be used as comparisons for future data analyzes. Four (4) stormwater locations were sampled and analyzed for total suspended solids (TSS) and Escherichia Coli. The results have been summarized in the tables below:

Total Suspended Solids (TSS) Sample Data					
	(mg/	'L)			
Outfall Point	12/6/2016	6/19/2017	7/30/2018		
OT-11	3.00	<1.0*	123.00		
OT-34	98.70	584.00	212.00		
OT-42	31.00	53.60	25.20		
OT-54	35.20	5.80	2.80		
*Note: Sample was	obtained on 06/	05/2017.			

Table 1: Total Suspended Solids (TSS) Sample Data

Escherichia Coli Sample Data (CFU/100 ml)				
Outfall Point	12/6/2016	6/19/2017	7/30/2018	1/24/2019
OT-11	0.00	0.00	450.00	233.00
OT-34	680.00	-	-	0
OT-42	160.00	380.00	-	467.00
OT-54	0.00	240.00	550.00	633.00

Table 2: Escherichia Coli Sample Data

Samples were taken during varying rainfall events to ensure a comprehensive data pool for future analysis. The City will continue it's WQ Monitoring Program going forward. This data will be used to determine if any adjustments are necessary to the Action Plan with regards to the BMPs/management strategies for controlling POC loads. At the end of each MS4 permit reporting

period, the City will also prepare annual WQ monitoring reports to be included with City's MS4 Annual Report.

MEASURABLE GOALS AND METRICS TO TRACK COMPLIANCE

10. Measurable goals and the metrics that the permittee and DEQ will use to track those goals (and the milestones required by the permit). Evaluation metrics other than monitoring may be used to determine compliance with the TMDL(s).

The City intends to demonstrate its progress on implementation of this Action Plan by tracking, monitoring, and reporting on BMP/milestone activity progress in its MS4 Program Annual Report that is submitted to DEQ on October 1st of each permit year. In the Annual Report, the City will provide updates on the status of each of the BMP/milestone activities listed under Section 8 of this Action Plan to include compliance with the proposed schedule. The City will also continue its Water Quality Monitoring Program to further track potential increase in POC loads and better adjust its stormwater strategy. In accordance with the adaptive iterative approach adopted by the City, referenced in this Action Plan, the City may modify/replace BMPs, as necessary, to achieve the most effective plan for reducing the discharge of sediment and bacteria from the City's MS4 and meeting the assigned TMDL WLAs.

ATTACHMENT 1 – EVALUATION OF THE CITY OWNED/OPERATED PROPERTIES FOR POTENTIAL WLA POLLUTANT SOURCES REPORT



To: Ms. Kelly Henshaw

From: GKY & Associates, Inc.

Date: May 30, 2013

Re: Report of Evaluation of City Owned Properties for WLA Pollutant Sources

Introduction

In accordance with the City of Winchester's MS4 Program plan, GKY & Associates, Inc. (GKY) evaluated City owned/operated properties for potential sources of pollutants for which the City was assigned a waste load allocation (WLA) in a State Water Control Board approved Total Maximum Daily Load (TMDL). GKY performed an initial potential source evaluation task that utilized the City's Geographic Information Systems (GIS) to identify and characterize City owned/operated properties, land use type (the City's zoning layer) for each property and regulated outfall location/presence on each property. The outcome of the initial potential source evaluation task identified City owned/operated properties requiring further site review and runoff characterization. For the City owned/operated properties found to require a site review and runoff characterization, GKY performed field reconnaissance on site to review and assess the on-the-ground conditions for each of the City owned/operated properties and document potential pollution generating activities (storage, transfer, transport, or disposal) on each site, stormwater pollution potential from the site (exposure to precipitation), and locations of outfalls. Detailed summaries for the initial potential source evaluation task and site review task are provided below.

Task 1. Perform Initial Potential Source Evaluation.

GKY utilized the City's GIS to perform a potential source evaluation by combining two data layers provided by the City of Winchester (Winchester_City_Parcels and Corporate_Limits). These two layers were merged with a regulated outfalls layer and overlaid on aerial imagery. Eighty one (81) City owned/operated properties were analyzed based on two criteria that would trigger the need for a field visit to the site. The criteria evaluated were as follows: (1) The presence of regulated outfalls on-site that would allow for an adequate water sampling location, and (2) The presence of potential sources of E.Coli (Animal/Waterfowl activity) or TSS (Denuded Areas or stockpiling)

Based on the GIS analysis, it was determined that six (6) City owned/operated properties met both criteria laid forth to warrant a site review. The sites are listed in Table 1.

Table 1. GIS determination of City owned or operated sites requiring a site field visit.

Site	Site Name	Site Address
1	Hollingsworth House	E S 1360 South Pleasant Valley Road
2	Moose Lodge	S S 215 East Cork Street
3	Court Square Auto park	E S 4-10 South Cameron Street
4	Jim Barnett Park	S S 1001 East Cork Street
5	Shawnee Springs Reserve	S S 301 East Pall Mall Street
6*	Frederick Douglas Elementary	S S 100 West Cedarmeade Avenue
*	Note: Site 6 Was not evaluated pe	r City of Winchester instructions

Task 2. Perform Site Reviews.

GKY performed field reconnaissance for each of the sites listed in Table 1 to evaluate and assess potential pollution generating activities on the City owned properties. Furthermore, the field visits allowed the team to analyze the drainage aspects, land cover, and infrastructure (piping, culverts, channels) that would result in determining representative sampling locations. GKY took several photos per site, as well as any important notes. A brief summary of each site, representative photo(s), and an explanation as to whether the site qualifies for sampling is provided below.

Site 1 – Hollingsworth House (Representative sampling locations not present).

The Hollingsworth House sits nested in the lower western corner of Jim Barnett Park. The land cover consists primarily of a grassed property, with a riparian buffer along the banks of the stream that divides the site. Due to the presence of the stream, waterfowl and other animal indicators raise the probability of an *E.Coli* presence. On site there are 3 regulated outfalls, but sampling at these locations would not be representative of the site itself. Two outfalls located closest to the road, drain only the road and none of the site, whereas the third outfall drains the

access road within the site, but doesn't have the sampling indicators needed to justify the presence of E.Coli or TSS. Figure 1 illustrates the land cover characteristics and outfall locations (red asterisks') for the Hollingsworth House.



Figure 1. Hollingsworth House Land Cover and Outfall Locations.

Site 2 – Moose Lodge (Representative sampling locations not present).

The Moose Lodge parcel runs parallel to a concrete channel, which conveys one of the City's urban streams. The property consists primarily of the lodge and its associated parking lot, as well as a grassed area towards the southern part of the site. Four outfalls drain this parcel and the significant presence of leaf detritus, sediment, and plant debris throughout the parking lot provide quality TSS indicators. Originally, this site met all of the criteria set forth to qualify as representative sampling location, but after correspondence with the City it was determined that the City property encompasses only the concrete channel area which includes the outfalls, and not the Moose Lodge property. Site photos are shown in Figures 2 and 3.



Figure 2. Moose Lodge Site Overall



Figure 3. Concrete Channel (Actual City Owned Property)

Site 3 – Court Square Auto Park (Representative sampling locations not present).

Court Square Auto Park is located in Downtown/Old Town Winchester. The property has a large, multi-deck parking garage on it and is almost 100% impervious. An urban stream runs under the parking garage which raises the probability of the presence of E.Coli essentially "onsite", but the representative outfalls derive from the roof drains of the parking garage, which are not likely to be sources of E.Coli or TSS. Due to the lack of optimal sampling locations on site these outfalls would not be classified as a representative outfall sampling locations. Site characteristics and outfalls are shown in Figures 4 and 5.



Figure 4. Court Square outfall locations (Roof Drains)



Figure 5. Stream running parallel and under Court Square Auto Park. Note: The outfalls discharge to the stream, but only drain the parking garage.

Site 4 – Jim Barnett Park (Representative sampling locations not present).

Jim Barnett Park is a large park comprised of several different land covers. The park has recreational fields, drainage ponds, maintenance locations with large stockpiles, and a dog park all having indicators of TSS, E.Coli, or both. The site also has 3 regulated outfalls within the parcel limits. The park is an ideal location for representative sampling, but as seen with the previous sites, the regulated outfalls on site drain adjacent properties and thus cannot adequately represent the City parcel through sampling. Site characteristics are shown in Figures 6 and 7.



Figure 6. Duck Pond with waterfowl present. Note: There is no regulated outfall at the downstream portion of this pond, so sampling cannot be performed.



Figure 7. Regulated outfall within Jim Barnett Park limits. Outfall drains a Shenandoah University owned parking lot.

Site 5 – Shawnee Springs Reserve (Representative sampling location present).

Shawnee Springs Reserve is a wildlife and park area, having open grassed space, wooded riparian areas, a stream that runs the extent of the entire property, and a walking trail for pedestrian use. The site is bordered to the north by the City Yards Facility, and has five regulated outfalls. As seen in the previous sites, the majority of the outfalls drained adjacent properties, and thus cannot be used as representative outfalls for that specific site. Of the five

outfalls onsite, only one drained the site, showed the presence of TSS, and could easily be accessed to gather a representative sample, and thus was chosen as a quality sampling location. Figure 8 below shows the entire parcel and identifies the location of the representative outfall. Figures 9 and 10 show the representative outfall and upland drainage contributing to the outfall respectively.



Figure 8. Shawnee Springs Reserve site overall. Representative Outfall 1 is shown in white text.



Figure 9. Front of Representative Outfall 1.



Figure 10. Upland drainage to Representative Outfall 1.

Task 3. Perform Representative Sampling

As part of the site review for Shawnee Springs Reserve, two samples (1) TSS, and (2) E.coli, were required during two sampling periods (October through March and April through September) in order to comply with the sampling procedures set forth in Section I.B.6.a and I.B.6.b of the current Virginia Small MS4 General Permit.

The first sampling took place on February 19, 2013. The field conditions were cold with a temperature right above freezing, and the total precipitation for that day was approximately 0.15 inches. The samples were collected approximately at 8:25 a.m. and received by Environmental Systems Service (ESS) by 10:30 a.m. The lab results are shown in Figure 11. The second of the two samplings took place on May 7, 2013. The field conditions were windy with a mean temperature of 56°C, and a total daily precipitation of 1.35 inches. The sample was taken approximately at 10:15 a.m. and received by ESS by 12:30 pm. Figure 12 illustrates the sample results. The full laboratory analysis can be seen in Attachment 2.

Sample ID#: Sample Date/Time:	0013520 02/19/2013 / 0	8:25	Sample Source: Date Received:	Winchester VA 02/19/2013			
Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml) Total Suspended Solids	<1 10.8	MPN mg/l	1 1.00	COLILERT SM 19 2540D	02/19/2013 02/19/2013	11:25 16:07	JI JI

Figure 11. February 19, 2013 Sample Results

Sample ID#: Sample Date/Time:	0016669 05/07/2013 / 1	0:15	Sample Source: Date Received:	Shawnee Park, V 05/07/2013	Vinchester VA		
Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml) Total Suspended Solids	161.6 19.6	MPN mg/l	1 1.00	COLILERT SM 19 2540D	05/07/2013 05/08/2013	12:28 10:42	JI EP

Figure 12. May 7, 2013 Sample Results

Task 4. Estimate Runoff Volume & Pollutant Loads

Per Section I.B.7 of the current Virginia Small MS4 General Permit, the City of Winchester is required to estimate the runoff volume and pollutant loads (for pollutants identified in the WLAs) discharged by the MS4. GKY utilized Purdue University's Long Term Hydrologic Impact Analysis (L-THIA) model to determine the City of Winchester's MS4 hydrologic and non-point source pollutant discharge characteristics.

Model Background and Winchester L-THIA Development

L-THIA is based on more than 30 years of daily precipitation data for the United States. The model is primarily used to estimate changes in recharge, runoff volumes, and non-point source pollutant loads from MS4s for which the City was assigned a waste load allocation (WLA) in a State Water Control Board approved Total Maximum Daily Load (TMDL). The pollutant loading evaluated utilizing L-THIA was TSS and Fecal Coliform, the latter of the two converted to E.*Coli* concentrations using Equation's 1 and 2.

Equation 1. Fecal Coliform (FC) to E. Coli Translator Equation for L-THIA Pollutant Loads¹.

 $E.Coli = 0.988 \times FC^{0.919}$

Where, the bacteria concentrations (FC and E.Coli) are millions of coliform.

¹ HSPF Model Calibration and Verification for Bacteria TMDLs, "Guidance Memo No. 03-2012 Commonwealth of Virginia, Department of Environmental Quality, Water Division, September 3, 2003, p.4.

Equation 2. Fecal Coliform (FC) to E. Coli Translator Equation for samples².

E. Coli Concentration = $2^{-0.0172}$ x (FC Concentration $^{0.91905}$)

Where, the bacteria concentrations (FC and E.Coli) are in cfu/100mL.

² Bacteria TMDLs for Abrams Creek and Upper and Lower Opequon Creek Located in Frederick and Clarke County, Virginia, Virginia Tech Department of Biological Systems Engineering, October 2003, Revised January 2004, p.135.

Model Inputs

L-THIA uses the following model inputs to generate pollutant loading results: (1) State and County, (2) Hydrologic Soil Group (HSG), and (3) Land use. Per Winchester's guidance, we utilized the City's zoning layer in GIS and converted their zoning land classifications to match the L-THIA land use classes. The conversions can be seen in Table 2.

After the land use was reclassified, soils data was needed to further develop the model. To date, the City of Winchester hasn't had a detailed soil study performed, and thus state soil survey data was used. The vast majority of the City had HSG B as the underlying soil media, with a small portion of HSG C in the lower south eastern corner.

The land use reclassification and soil group layers were evaluated in GIS to determine the area breakouts for each soil group and corresponding land use. These parameters became the final inputs to the L-THIA model and are summarized in Table 3.

Table 2. Land Use conversion from Winchester Zoning Layer to L-THIA Land use classification.

L-THIA LAND USES	WINCHESTER ZONING CLASSIFICATION	WINCHESTER TO L-THIA
Commercial	Central Business District	Commercial
Industrial	Commercial Industrial District	Commercial
Low Density Residential	Health Services District	Commercial
Agricultural	Highway Commercial District	Commercial
Water/Wetlands	Medical Center District	Commercial
Grass/Pasture	Planned Commercial	Commercial
Forest	High Density Residential District	High Density Residential
High Density Residential	Higher Education District	High Density Residential
	Limited High Density Residential	High Density Residential

Medium Density Residential District	High Density Residential
Residential Business District	High Density Residential
Residential Office District	High Density Residential
Intensive Industrial District	Industrial
Limited Industrial District	Industrial
Education, Institution, and Public Use District	Low Density Residential
Low Density Residential District	Low Density Residential

Table 3. L-THIA Model Inputs

L_THIA Land Use	Soil Group	Area Total (ac)
Commercial	В	1207.38
High Density Residential	В	1465.51
Industrial	В	336.03
Low Density Residential	В	1772.39
Commercial	С	37.84
High Density Residential	С	74.77
Industrial	С	180.22

Model Results

Once the model inputs were generated, they were run in L-THIA to determine the pollutant loadings for both TSS and Fecal Coliform (Converted to E.Coli using Eq.1). The annual TSS and E.Coli results can be seen in Tables 4 and 5 respectively, and the L-THIA results are provided in Attachment 1.

Table 4. Annual Total Suspended Solids (TSS) in lbs. Pollutant Loading

Land Use	Soil	TSS (lbs.)
Commercial	В	202608
High Density Residential	В	94030
Industrial	В	42113
Low Density Residential	В	34674
Commercial	С	7822
High Density Residential	С	7632
Industrial	С	29343
Total		418222

Table 5. Annual E.Coli (millions) Pollutant Loading

Land Use	Soil	E.Coli (millions)
Commercial	В	44034
High Density Residential	В	76384
Industrial	В	13132
Low Density Residential	В	30538
Commercial	С	2213
High Density Residential	С	7599
Industrial	С	9421
Total		183321

Task 5. Document Results in a Brief Memorandum Report

This memo report serves as GKY's deliverable under Task 5 of the scope of work.

Attachments

Attachment 1: L-THIA Model Results



SUMMARY OF SCENARIOS

State: Virginia County: Winchester

Industrial

Commercial

Low Density Residential

High Density Residential

Average Annual Rainfall Depth (in)

Land Use	Hydrologic Soil Group	Current	Scenario 1	Scenario 2
Commercial	В	1207.38	0	0
High Density Residential	В	1465.514	0	0
Industrial	В	336.0322	0	0
Low Density Residential	В	1772.39	0	0
Commercial	C	37.84	0	0
High Density Residential	C	7477	0	0
Industrial	C	180.224	0	0

Land Use	Current	Scenario 1	Scenario 2	
Commercial	1339.84	0	0	
High Density Residential	841,73	0	0	
Industrial	255.47	0	0	
Low Density Residential	310.39	0	0	
Commercial	51.72	0	0	
High Density Residential	68.32	0	0	
Industrial	178.00	0	0	
Total Annual Volume (acre-ft)	3045.51	0	0	
Avg, Annual Runoff Depth (in)				
Current S		2	Scenario 3	
7.20	0		0	
Avg, Runoff Depth by Landuse				
Land Use	Hydrologic Soil group	Curve Number	Runoff Depth (in)	
Commercial	В	92	13.37	
High Density Residential	В	85	6.92	

88

70

94

90

91

9.16

2.11

16.47

11.01

11.9

39.71

В

В

С

C

C

All				
Land Use	Nitrogen (lbs)			
All		Current	Scenario 1	Scenario 2
High Density Residential				0
Industrial 877				_
Low Density Residential				0
Commercial 188	Paragraph and the second secon	7.1		1
High Density Residential 338	the set of			1 0
Industrial	5 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			0
Phosphorous (lbs)		7777		0
Phosphorous (Ibs) Current Scenario 1 Scenario 2 Commercial 1168 0 0 High Density Residential 1307 0 0 Industrial 194 0 0 Low Density Residential 482 0 0 Commercial 45 0 0 High Density Residential 106 0 0 Industrial 135 0 0 Total 3437 0 0 Suspended Solids (Ibs) Current Scenario 1 Scenario 2 Commercial 202608 0 0 High Density Residential 42113 0 0 Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7632 0 0 High Density Residential 7632 0 0	1000		-	
Commercial 1168	1044		1 3	
Commercial		Current	Sonnario 1	Scenario 2
High Density Residential 1307 0 0 0 0 0 0 0 0 0	The state of the s		- 1500	
Industrial				1
Low Density Residential	to a construction of the same and the same a			0
Commercial 45 0 0 High Density Residential 106 0 0 Industrial 135 0 0 Total 3437 0 0 Suspended Solids (Ibs) Current Scenario 1 Scena Commercial 202608 0 0 High Density Residential 94030 0 0 Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0	71.71.5.100			
High Density Residential 106 0 0 0 0 0 0 0 0 0				
Industrial	22711711202120			-
Suspended Solids (lbs) Suspended Solids (lbs)		45.		
Suspended Solids (lbs) Land Use Current Scenario 1 Scena Commercial 202608 0 0 High Density Residential 94030 0 0 Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0		170	-	1
Land Use Current Scenario 1 Scena Commercial 202608 0 0 High Density Residential 94030 0 0 Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0	Iotai	3437		0
Commercial 202608 0 0 High Density Residential 94030 0 0 Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0		Current	Scenario 1	Scenario 2
High Density Residential 94030 0 0 Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0	Citing Sec			1
Industrial 42113 0 0 Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0	Commercial			1 0
Low Density Residential 34674 0 0 Commercial 7822 0 0 High Density Residential 7632 0 0	A Property of the Control of the Con			
Commercial 7822 0 0 High Density Residential 7632 0 0	High Density Residential	42113	0	0
High Density Residential 7632 0 0	High Density Residential			0
	High Density Residential Industrial Low Density Residential	34674	0	
119USU (81 U U	High Density Residential Industrial Low Density Residential Commercial	34674 7822	0	0
Total 418222 0 0	High Density Residential Industrial Low Density Residential Commercial	34674 7822	0	0
TIMES V	High Density Residential Industrial Low Density Residential Commercial High Density Residential	34674 7822 7632	0	0 0
	High Density Residential Industrial Low Density Residential	34674	0	
1000	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial	34674 7822 7632 29343	0 0 0	0 0 0
TOSES V	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial	34674 7822 7632 29343	0 0 0	0 0
	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial	34674 7822 7632 29343	0 0 0	0 0 0
	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total	34674 7822 7632 29343	0 0 0	0 0 0
Lead (lbs)	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Lead (Ibs)	34674 7822 7632 29343 418222	0 0 0 0 0 0	0 0 0
Lead (lbs) Land Use Current Scenario 1 Scena	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Lead (Ibs) Lead Use	34674 7822 7632 29343 418222	0 0 0 0 0	0 0 0 0 0
Lead (lbs) Land Use Current Scenario 1 Scena Commercial 47 0 0	High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Lead (Ibs) Land Use Commercial	34674 7822 7632 29343 418222	0 0 0 0 0	0 0 0

Industrial	10	0	0
Low Density Residential	7	0	0.
Commercial	1	0	0
High Density Residential	1	0	0
Industrial	7	0	0
Total	93	0	0
Copper (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	52	0	0
High Density Residential	20	0	0
Industrial	10	0	0
Low Density Residential	7	0	0
Commercial High Density Residential	2	0	0
Industrial	7	0	0
Total	99	0	0
Land Use Commercial	Current 657	Scenario 1	Scenario 2
Commercial	657	0	0
High Density Residential	183	0	0
Industrial	170	0	0
Low Density Residential	67	0	0
Commercial	25	0	0
High Density Residential	14	0	0
Industrial	118	0	0
Total	1234	0	0
Cadmium (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	3	0	0
High Density Residential	4	0	-0-
Industrial	1	0	0
Low Density Residential	0.634	0	0
Commercial	0.135	0	0
High Density Residential	0.139	0	0
Industrial			
iiidusu (a)	0.970	0	0
Total	0.970 6.878	0	0

Current 36 4 4 1 1 0.390	Scenario 1 0 0 0 0	Scenario 2
4	0 0	
1	0	
1	0	0
1		0
		0
0.390	0	0
	0	0
3	0	0
49.39	0	0
Current	Scenario 1	Scenario 2
43	0	0
22	0	0
5	0	0
8	0	0
	0	0
1		0
1	0	0
		0
-1	0.	-
4	0	0
4	0	0
4 84	0 0	0
1 4 84 Current	0 0 0 Sœnario 1	0 0 Scenario 2
1 4 84 84 Current 83963	0 0 0 Sœnario 1	Scenario 2
Current 83963 58482 9745 21566	0 0 0 0 Seenario 1 0 0	Scenario 2 0 0 0 0 0 0 0 0 0
Current 83963 58482 9745	0 0 0 0 Seenario 1 0 0 0	Scenario 2 0 0 0 0 0 0 0 0 0
Current 83963 58482 9745 21566 3241 4747	0 0 0 0 0 Scenario 1 0 0 0	Scenario 2 0 0 0 0 0 0 0 0 0 0
Current 83963 58482 9745 21566 3241	0 0 0 0 Seenario 1 0 0 0	Scenario 2 0 0 0 0 0 0 0 0 0
	Current 43 22 5	Current Scenario 1 43 0 22 0 5 0

Low Density Residential	41863	0	0
Commercial	16349	0	0
High Density Residential	9215	0	0
Industrial	22067	0	. 0
Total	658160	0	0
Oil & Grease (lbs)			
Land Use	Current	Scenario 1	Scenario 2
Commercial	32855	0	0
High Density Residential	3898	0	0
Industrial	2088	0	0
Low Density Residential	1437	0	0
Commercial	1268	0	0
High Density Residential	316	- 0	0
Industrial	1455	0	0
Total	43317	0	0
Fecal Coliform (millions of coliforn		Separatio 1	Scanario 2
Land Use	Current	Sœnario 1	Scenario 2
Land Use Commercial	Current 114496	0	0
Land Use Commercial High Density Residential	Current 114496 208493	0	0
Land Use Commercial High Density Residential	Current 114496 208493 30691	0 0	0 0
Land Use Commercial High Density Residential	Current 114496 208493	0	0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial	Current 114496 208493 30691 76884	0 0 0	0 0
Land Use Commercial High Density Residential Industrial Low Density Residential	Current 114496 208493 30691 76884 4420	0 0 0 0	0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential	Current 114496 208493 30691 76884 4420 16924	0 0 0 0	0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial	Current 114496 208493 30691 76884 4420 16924 21384	0 0 0 0 0	0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform)	Current 114496 208493 30691 76884 4420 16924 21384	0 0 0 0 0	0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use	Current 114496 208493 30691 76884 4420 16924 21384 473292	0 0 0 0 0 0	0 0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use Commercial	Current 114496 208493 30691 76884 4420 16924 21384 473292	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use	Current 114496 208493 30691 76884 4420 16924 21384 473292 Current 298685	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use Commercial High Density Residential Industrial	Current 114496 208493 30691 76884 4420 16924 21384 473292 Current 298685 583782	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use Commercial High Density Residential Industrial Low Density Residential Industrial Commercial Low Density Residential Commercial	Current 114496 208493 30691 76884 4420 16924 21384 473292 Current 298685 583782 19300	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use Commercial High Density Residential Industrial Low Density Residential Industrial Low Density Residential Commercial	Current 114496 208493 30691 76884 4420 16924 21384 473292 Current 298685 583782 19300 215276 11531 47388	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0
Land Use Commercial High Density Residential Industrial Low Density Residential Commercial High Density Residential Industrial Total Fecal Strep (millions of coliform) Land Use Commercial High Density Residential Industrial Low Density Residential Industrial Low Density Residential	Current 114496 208493 30691 76884 4420 16924 21384 473292 Current 298685 583782 19300 215276 11531	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0

Attachment 2: ESS Lab Results



Analytical Report

GKY & Associates ATTN: Casey Kight 4229 Lafayette Ctr Dr, St 1041 Chantilly, VA 20151 Report Date:

02/25/2013

Job#:

Customer#:

0001470

Customer PO #:

Collected By:

Customer

Sample Location:

Sample ID#: Sample Date/Time:

0013520

02/19/2013 / 08:25

Sample Source: Date Received:

Winchester VA

02/19/2013

Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml)	<1	MPN	1	COLILERT	02/19/2013	11:25	Jl
Total Suspended Solids	10.8	mg/l	1.00	SM 19 2540D	02/19/2013	16:07	Jl



Analytical Report

GKY & Associates ATTN: David Breindel 4229 Lafayette Ctr Dr, St 1850 Chantilly, VA 20151 Report Date:

05/14/2013

Job#:

Customer #:

0001470

Customer PO #:

Collected By: Customer Sample Location: City of Winchester

Sample ID#: Sample Date/Time: 0016669

05/07/2013 / 10:15

Sample Source: Date Received:

Shawnee Park, Winchester VA

05/07/2013

Parameter	Results	Unit	Report Limit	Method	Analysis Date	Time	INIT
Escherichia coli (100 ml)	161.6	MPN	1	COLILERT	05/07/2013	12:28	JI
Total Suspended Solids	19.6	mg/l	1.00	SM 19 2540D	05/08/2013	10:42	EP

ATTACHMENT 2 - WATER QUALITY MONITORING PROGRAM SAMPLING DATA



SAMPLE SUMMARY

Client Project ID: Stormwater Outfall 001

Report To:

Client Name: City of Winchester Engineering Department

Attn: Robert Brown

Client Address: 301 Cork Street

City, State, Zip: Winchester, VA, 22601

P.O.#.:

The laboratory has analyzed the following samples:

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
OT-11 Grab 120616	Storm Water	16120606.01	12/06/2016 11:15	12/6/2016 13:44	Russel I B. Loy
OT-34 Grab 120616	Storm Water	16120606.02	12/06/2016 11:15	12/6/2016 13:44	Robert A. Brown
OT-42 Grab 120616	Storm Water	16120606.03	12/06/2016 11:15	12/6/2016 13:44	Emest Rose Jr.
OT-54 Grab 120616	Storm Water	16120606.04	12/06/2016 11:35	12/6/2016 13:44	D.E. Makely



This Laboratory is NELAP accredited.

This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

Date: 12/14/2016 12:13

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TERM AND QUALIFIER DEFINITION

General Term I	Definition
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
J	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
pg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery



This Laboratory is NELAP accredited.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowledgy withheld that would affect the quality of the data.

VELAP ID# 460028

Page 3 of 13



CERTIFICATE OF ANALYSIS

	City of Winchester Engineering De Stormwater Outfall 001	epartment						tn: Robert ste: 12/14/2	Brown 2016 12:13 PM	
Job ID : Client Sample ID Job Sample ID: Other Informatio Conclusion:	16120606,01					Date (le Matrix: Collected: Collected: ddress:			
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS) TSS	3.0	mg/L	1.0	1		-1	2/08/2016 18:29	12/09/2016 10:35	C30

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This Laboratory is NELAP accredited.

Inits Laboratory is NELEA* accredited,
I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.



CERTIFICATE OF ANALYSIS

	City of Winchester Engineering De Stormwater Outfall 001	epartment					74.5	tn: Robert ite: 12/14/	Brown 2016 12:13 PM	
Job ID : Client Sample ID Job Sample ID: Other Informatio Conclusion:	16120606.02					Date (e Matrix: Collected: Collected: ddress:			
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		Date/Time Prepared	Date/Time Analyzed	Analys
SM 2540D-2011	Total Suspended Solids (TSS) TSS	98.7	mg/L	7,0	7		- 1	2/08/2016 18:29	12/09/2016 10:49	CJO

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I III LOUVEUTY IS INCLAY OCCIDITED.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.



CERTIFICATE OF ANALYSIS

A THE STATE OF THE	City of Winchester Engineering D Stormwater Outfall 001	epartment	Mark Car Tool Source				Attr Dat		Brown 2016 12:13 PM	
Job ID : Client Sample ID Job Sample ID: Other Informatio Conclusion:	16120606.03					Date 0	e Matrix: Collected: Collected: ddress:	7.7.7.7.7		
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		te/Time repared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS) TSS	31.0	mg/L	5.0	5		12	08/2016 18:29	12/09/2016 10:46	C)0

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CERTIFICATE OF ANALYSIS

	ity of Winchester Engineering Di tormwater Outfall 001	epartment					1000	tn: Robert te: 12/14/2	Brown 2016 12:13 PM	
Job ID : Client Sample ID: Job Sample ID: Other Information Conclusion:	16120606.04					Date C	e Matrix: Collected: Collected: ddress:			
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS) TSS	35.2	mg/L	4.0	4		i	2/08/2016 18:29	12/09/2016 10:47	CJO

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QUALITY CONTROL DATA

Analysis : Total S	uspended Solids (TSS)	Method: SM 2540D-2011	Matrix: Storm Water
QC Batch ID : Qb16 Samples in This QC I		Created Date : 12/12/2016 3,04	Created By : CObert
Sample Preparation	PB16120805	SM 2540D-2011	CObert

QC Type: Method Blank										
	Parameter	CAS	Result	Units	DF	RL	SDL	Qual		
Method Blank	TSS		<1.0	mg/L	1	1.0				
Method Blank 2	TSS		<1.0	mg/Ł	1	1.0				

QC Typ	e: Duplicate							
	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup4	16120709.01	TSS	24.5	23.5	mg/L	2.1	20	
Dup2	16120504.01	TSS	3.0	3.0	mg/L	0.0	20	
Dup3	16120605.01	TSS	9,2	8.6	mg/L	3,4	20	
Dup	16120704.01	TSS	9.8	9.7	mg/L	1.0	20	

QC Typ	e: LCS/LCSD										
	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qual
LCS	TSS	100	96.0	96	100	100	100	4.1	20	80-120	
LCS2	TSS	100	102	102						80-120	
LCS2D	TSS	100	104	104						80-120	

Refer to the Definition page for terms.



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SAMPLE CONDITION CHECKLIST

Client Name: City of Winches	ster Engineering Department	Contact : Robert Brown
Client Address: 301 Cork Stree	t	Contact Phone: 540-667-2376
Job1D: 16120606	Date Received: 12/06/2016	Time Received: 01:44 PM
Temperature :	Sample pH :	
ThermometerID : IR CC 1	pHPaperID :	

Washington Co. A.	A ST. CO. Branches Co.	Contraction areas	With a Property State Account to Property	
Comments	: Include actions	taken to resolve	discrepancies/problem:	

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with Ice.	~	1	1
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).		V	
3	Cooling began immediately (within 15 minutes) after collection.	~	1	
4	Samples received on the same day as sample collection.	V		
5	Ice surrounding all samples in cooler,	V	11 1	
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s),	V		
7	COC form contains date and time of sample collection.	V		
8	Sample containers arrived intact.	V	1	
9	Samples were received in Greenway-provided containers,	V		
10	Sample(s) were received in appropriate containers.	V		
11	Sample(s) were properly preserved (includes thermal preservation).	~		
12	All samples were properly labeled on receipt (distinguishable).	V		
13	Sampling dates and times on bottles match COC.	V		
14	Bottle count on COC matches number of bottles received.	V		
15	Sample amount is sufficient for analyses requested	V		
16	Samples received within the hold time.	V		

CheckIn Date: 12/06/2016



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VELAP ID# 460028

Page 9 of 13

GREENWAY ENVIRONMENTAL AGORATORY 51 Windy Hill Lane. Winc Owner Name and Address of City of Winchester Engineeri 301 Cork Street Winchester, VA 22601 Billing/Mailing Address (if of 15 N. Cameron St. Winchester, VA 22601 Contact Phone: Reports: Robert Brown 540-6 Invoices: Kelly Henshaw: 540 Identifying No.(a) VPDES: VAN/VAG: Other (list): Field Data (temp, pl I, dissolve Relinquished by Sample? Relinquished by (signature) Relinquished by (signature)	(Sampling Site ing Department different) (67-2376 0-667-1815	Sample D. C. Sample Optional Received	er (print) . Ma er (signatur for client by (signatur d by (signatur y B	KCLY kelly convenience onl ure)	Sample Outh Type (STW Regul Do	e Source ((stroot) / Commerce (Commerce (Comme	Outfall 00 Outfall 00 T - 57 GW, PW, water addition	# 35 01, Final Eff., etc.)
ENVIRONMENTAL LABORATORY 51 Windy Hill Lane. Winc Owner Name and Address of City of Winchester Engineer 301 Cork Street Winchester, VA 22601 Billing/Mailing Address (if c IS N. Cameron St. Winchester, VA 22601 Contact Phone: Reports: Robert Brown 540-6 Invoices: Kelly Henshaw: 540 Identifying No.(s) VPDES: VAN/VAG: Other (list): Field Data (temp, pl I, dissolve Relinquished by Sample? Relinquished by (signature)	Sampling Site ing Department lifferent) 667-2376 0-667-1815 ed oxygen, TRC, etc.) Date/Time 12-67-00 12-67-1815	Sample D. C. Sample Optional Received	er (print) . Ma er (signatur for client by (signatur d by (signatur y B	KCLY kelly convenience onl ure)	Sample Outh Type (STW Regul Do	e Source ((att 001 / (ww. sw., o = Storm attory Agen cince Con	Outfall 00 Outfall 00 T - 57 GW, PW, water addition	DI, Final Eff., etc.) STW, S) IPDES DEQ
Owner Name and Address of City of Winchester Engineers (Minchester Engineers Winchester, VA 22601 Billing/Mailing Address (if of 5 N. Cameron St. Winchester, VA 22601 Contact Phone: Reports: Robert Brown 540-6 Invoices: Kelly Henshaw: 540 (dentifying No.(s) VPDES: VAN/VAG: Other (list): Field Data (temp, pl. I, dissolve Relinquished by Sampler Relinquished by (signature)	Sampling Site ing Department lifferent) 667-2376 0-667-1815 ed oxygen, TRC, etc.) Date/Time 12-67-00 12-67-1815	Sample D. C. Sample Optional Received	er (print) . Ma er (signatur for client by (signatur d by (signatur y B	KCLY kelly convenience onl ure)	Sample Outh Type (STW Regul Do	e Source ((att 001 Z (WW, SW, e Storm atory Agen CLS/ODW	Outfall 00 Outfall 00 T - 57 GW, PW, water Nor	D1, Final Eff., etc.) 4 STW, S) IPDES DEQ
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Contact Phone: Reports: Robert Brown 540-6 nvoices: Kelly Henshaw: 540 dentifying No.(s) PPDES: VAN/VAG: Dither (list): Field Data (temp, pl I, dissolve Relinquished by Sampler Relinquished by (signature)	Date/Time Date/Time Date/Time 12-6-15 1-44-pm	Sample (optional Received Received	er (signature // /// // // // // // // // // // // /	kelly convenience onl	Type (STW Regul Do	atory Agen CLS/ODW	GW, PW, water acy N N Nor	, STW, S) IPDES DEQ
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	v measurements are						ort.	
Greenway Sample ID Sampl		COMP	GRAB	Preservation	pH SU	Temp.	TRC mg/L	Analysis Requested (circle)
1612060604 1135	2L plastic		x	<6C	x	63	x	TSS
	500 mL plastic (a/w)		x	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as I
	2x 250 mL amber glass		x	<6C	x		x	TPH-DRO
1 1	3x 40 mL amber glass vial		x	HCl to pH<2, <6C	x		x	TPH-GRO
Observations and Comment	8:			all and the	-			
Samples Received in cooler of the samples are not <6C, were were samples collected in constitution that the samples collected in constitution analysis? (Sufficient volume & intact)	samples delivered i	immediat	iner Y N	Ver Blue None ollection and ha Were the co PYN Proper match COC tin	d the co	oling proce Greenway erved? N Final re	ess begar	ile N here: N in/labels Y N

Page 10 of 13

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LABORATORY CHAIN-OF-CUSTODY RECORD RP16121421 1





Divided Hill Lane. Winchester, VA 22602 Divided Name and Address of Sampling Site City of Winchester Engineering Department 301 Cork Street Winchester, VA 22601 Billing/Mailing Address (if different) 15 N. Cameron St. Winchester, VA 22601 Contact Phone: Reports: Robert Brown 540-667-2376 Invoices: Relly Henshaw: 540-667-1815 Identifying No.(s) VPDES: VAN/VAG: Other (list): Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional – for client convenience only) Relinquished by Sampler Date/Time Received by (signature) Date/Time Condition 12 - 6 - 16	GREENWAY ENVIRONMENTAL LABORATORY						f Winch			
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Email Invoice? Y Email Results? Y Email: robert.brown@winchesterva.gov Email: robert.brown@winchesterva.gov CREENWAY ENGINEERING USE ONLY indicated by GRAY AREAS. Below measurements are QC measurements out-of-hold in the lab, do not report. Greenway Sample ID Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.) Label Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circ.)	linguished by (signature) Date/Time		1 44 0	-	1	-	fs : //r			
Email Invoice? Y Email: Kelly.henshaw@winchesterva.gov Email: robert.brown@winchesterva.gov Email: robert.brown@winchesterva.gov GREENWAY ENGINEBRING USE ONLY indicated by GRAY AREAS. Below measurements are QC measurements out-of-hold in the lab, do not report. Greenway Sample ID Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circle) Label Composition of the lab, do not report. Greenway Sample ID Sample Container Type COMP GRAB Preservation pH Temp. TRC mg/L Requested (circle) Label Composition of the lab, do not report. Substitute of the lab, do not report. Substitute of the lab, do not report. TRC mg/L TSS H2SO4 to pH<2, <6C x 50 x TKN, Nitrate+Nitri	Relinquished by (signs	nure)	Date/Time	Received	hy (signati	we)	Date/ 1	ime Co	ndition a	t Lab Receipt
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glass vial X pH<2, <6C X X TPH-GRC	Email Invoice? Y Email: Kelly,henshaw	GR Below	EENWAY ENGIN measurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass	nail Resultinail: robert	BY Y Brown@ C USE ON UNEMENTS GRAB X	Turns winchesterva.ge JLY indicated b out-of-hold in t Preservation <6C H2SO4 to pH<2, <6C	around I	Requesti Due AREAS. do not rep	Standard Date: Date: TRC mg/L X	Analysis Requested (circle) TKN, Nitrate+Nitrite,
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Disposition Site: Disposition No.: Method of Disposition/Date: Performed by: Date:	Email Invoice? Y Email: Kelly,henshaw Greenway Sample ID Observations and Con Samples Received in c If samples are not <60 Were samples collecte Short hold-time analys Sufficient volume & in	GR Below Sample Time	Enway Englishmeasurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial aice? Y N Tramples delivered in cert type of samplishour) Y N Sin COC complete?	when the second	SP Y brown GUSE ON urements GRAB X X X X X M A Ccircle): W by after content of the times Method	Turns winchesterva.ge JLY indicated b out-of-hold in t Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C Were the con Y N Proper match COC time The property of the control of th	y GRAY, he lab, coph such that the such that the containers or by presents of the containers or by presents or	Request; Due (AREAS, do not rep Temp. C S Oling proc Greenwa Erred P N Final	Standare: Date: Ort. TRC mg/L X X X X X X X X X X X X X	Analysis Requested (circle TSS) TKN, Nitrate+Nitrite Total N, Total Phosphorus as TPH-DRO TPH-GRO (If no, see below). n? Y N n/s did Y N ice N here: Y in/labelss N

Page 11 of 13

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51 Windy Hill Lane.			Phone: (540) 662-418	5				
Owner Name and Add City of Winchester En 301 Cork Street Winchester, VA 22601 Billing/Mailing Addre	gineering	g Department	Sampling Grab:	g Date:	12/6/16	Sampli Grab:	ng Time(s) [1-	15 am
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Winchester, VA 22601 Contact Phone: Reports: Robert Brow	n 540-667		Robe	rt Bro	own	Type (ww, sw,	GW, PW	and the second s
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Email: Kelly.henshaw Greenway Sample ID 16120606-02A	GRI Below i Sample Time	EBNWAY ENGII BENWAY ENGII measurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber	NEERING QC measu COMP	Y Y Drown & V USE ON rements of GRAB	LY indicated bout-of-hold in t Preservation <6C H2SO4 to pH<2, <6C	by GRAY he lab, d	AREAS. o not repo	Standard Date: ort. TRC mg/L X	Analysis Requested (circle TSN TKN, Nitrate+Nitrite Total N, Tota Phosphorus as
Email: Kelly.henshaw Greenway Sample ID 16120606.02A	GRI Below I Sample Time	EBNWAY ENGII BENWAY ENGII Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	nail: robert. NEERING QC measu COMP	VSE ON PREMERS AND A STATE OF THE STATE OF T	ILY indicated bout-of-hold in t Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C	by GRAY he lab, d pH SU X	AREAS. o not report Temp.	Standare Date: Ort. TRC mg/L X	Analysis Requested (circle TSS) TKN, Nitrate+Nitrit Total N, Tota Phosphorus as TPH-DRO TPH-GRO
Email: Kelly.henshaw Greenway Sample ID 16120606-02A	Below i Sample Time IIIS	EBNWAY ENGINE MEASUREMENTS ARE COntainer Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	nail: robert. NEERING QC measu COMP	USE ON REMERTS OF THE PROPERTY	LY indicated bout-of-hold in t Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C	by GRAY he lab, d pH SU X	AREAS. o not report Temp. 'C' 7.2	Standard Date: Ort. TRC mg/L X	Analysis Requested (circle TSS) TKN, Nitrate + Nitrite Total N, Total Phosphorus as TPH-DRO TPH-GRO (If so, see below). n? N n/a cle N here; cin/labelse N

Page 12 of 13

GREENWAY ENVIRONMENTAL LABORATORY 51 Windy Hill Lane.	Winch	octor VA 22602	Phone: /54	m 662 419	5		Studior Bostlei	12/00/2016 1	ator Engineering
Owner Name and Ade				g Date: /			=		
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Billing/Mailing Addr 15 N. Cameron St.	ess (if dif	ferent)	Sampler	(print)		Sampl	e Source	(Outfall 0	1, Final Eff., etc.
Winchester, VA 22601			ren	1 Rose	. T-			OT- 42	
Contact Phone: Reports: Robert Brow Invoices: Kelly Hensh								, GW, PW, mwater	STW, S)
dentifying No.(s) /PDES: /AN/VAG:		Sampler (signature)			Regulatory Agency NPDES DEC DCLS/ODW None Other (list				
Field Data (temp, pH,	dissolved	oxygen, Tro, etc.	(opuonai –	TOT CHEIN	convenience on	4)			
Relinquished by Sam	pler	Date/Time	Received 1	y (signatu	ire)	Date/T	ime C	ondition	
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Relinquished by (signature)		Date/Time	Received I	y (signatu	re)	Date/Time Con		ondition	
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Greenway Sample ID 6130604034 Observations and Cor Samples Received in If samples are not <6 Were samples collects Short hold-time analyses	GR Below Sample Time	EENWAY ENGI EENWAY ENGI EENWAY ENGI Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial aice N amples delivered creet type of sample hour) Y (N)	rype of Ice immediateling contain Samples rec	USE ON rements of GRAB X X X X X X A Coircle): W y after cook Y N d in hold the times of the cook Y N	LY indicated bout-of-hold in to Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C Cet Blue None llection and has were the con Y N Prope	y GRAY he lab, d pH SU X X X All to d the coordinates trly presentes?	AREAS o not re Temp. *C 5. 4 Sing pro Greenwein Final	Date: Date: TRC mg/L X X X X X X X X X X X X X	Analysis Requested (circle TSS) TKN, Nitrate + Nitrate Total N, Tota Phosphorus as TPH-DRO TPH-GRO (If no, see betree) If N n/a

Page 13 of 13



SAMPLE SUMMARY

Client Project ID: Stormwater Outfall 001

Report To:

Client Name: City of Winchester Engineering Department

Attn: Robert Brown

Client Address: 301 Cork Street City, State, Zip: Winchester, VA, 22601 P.O.#.:

The laboratory has analyzed the following samples:

Client Sample ID Outfall 001 Grab 060517 OT-11 Grab 060517

Matrix Storm Water

Storm Water

Sample ID 17060505.01 17060505.02 Collection D/T 06/05/2017 13:15 06/05/2017 14:00

Received D/T 6/5/2017 15:45 6/5/2017 15:45 Collected by Robert A. Brown Russel B Layman JR



This Laboratory is NELAP accredited.

I must laboratory is interver accounted.

I am the laboratory manager, or his/her designee, and I am responsible for the release of this data package. This laboratory data package has been reviewed and is complete and technically compliant with the requirements of the methods used, except where noted. I affirm, to the best of my knowledge that all problems/anomalies observed by this laboratory (and if applicable, any and all laboratories subcontracted through this laboratory) that might affect the quality of the data, have been disclosed in this report, and that no information or data has been knowingly withheld that would affect the quality of the data.

VELAP ID# 460028

Date: 06/28/2017 15:26

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TERM AND QUALIFIER DEFINITION

eneral Term (Definition
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit.
1	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
pg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microslemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery



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CERTIFICATE OF ANALYSIS

	y of Winchester Engineering Department ormwater Outfall 001	Attn: Date:	Robert Brown 06/28/2017 03:26 PM
Job ID :	17060505	Sample Matrix:	Storm Water
Client Sample ID:	Outfall 001 Grab 060517	Date Collected:	06/05/2017
Job Sample 1D:	17060505.01	Time Collected:	13:15
Other Information: Conclusion:	Outfall 001	Site Address:	301 Cork Street Winchester, VA 22601

Parameter/Test Description Date/Time Prepared Test Method Result Units RL DF MDL Q Analyst Analyzed SM 2540D-2011 Total Suspended Solids (TSS) 06/08/2017 17:31 06/09/2017 64.3 mg/L 3.0 3 TDH

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SM 2540D-2011 Total Suspended Solids (TSS)

151 Windy Hill Lane, Winchester, Virginia 22602 | (540) 662-4185 | www.greenwayeng.com | akaval@greenwayeng.com

06/09/2017

16:42

TDH

06/08/2017 17:31

CERTIFICATE OF ANALYSIS

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QUALITY CONTROL DATA

Analysis : Total Suspended Solids (TSS)		Method: SM 2540D-2011	Matrix: Storm Water
QC Batch ID : Qb170 Samples in This QC I		Created Date : 06/08/2017	Created By : thammack
Sample Preparation	PB17060802	SM 2540D-2011	thammack

QC Type: Method	Blank							-
	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		111
Method Blank 2	TSS		<1.0	mg/L	1	1.0		

QC Typ	e: Duplicate					-		
	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup	17060602.01	TSS	18.8	17,6	mg/L	6.6	20	
Dup2	17060504.01	TSS	55.0	61.0	mg/L	-10.3	20	
Dup3	17060505.01	TSS	64.3	68,3	mg/L	-6.0	20	

QC Ty	e: LCS/LCSD										
	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qua
LCS	TSS	100	106	106	100	98.0	98	-7.8	20	80-120	
LCS2	TSS	100	98.0	98	100	98.0	98	0.0		80-120	

Refer to the Definition page for terms.



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VELAP ID# 460028

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SAMPLE CONDITION CHECKLIST

Client Name : City of Winche	Contact :	Robert Brown		
Client Address: 301 Cork Street	/inchester Engineering Department k Street Date Received: 06/05/2017 Sample pH:	Contact Phon	e: 540-667-2376	
JobID: 17060505	Date Received: 06/05/2017	Time Received: 03:45 PM		
Temperature :	Sample pH :	*		
ThermometerID : IR CC1	pHPaperID:			

Comments: Include actions taken to resolve discrepancies/problem:

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	V		
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).	~		
3	Cooling began immediately (within 15 minutes) after collection.	V		
4	Samples received on the same day as sample collection.	~		200
5	Ice surrounding all samples in cooler.	V		-
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s),	V		
7	COC form contains date and time of sample collection.	V		
8	Sample containers arrived intact.	V		
9	Samples were received in Greenway-provided containers.	V		-
10	Sample(s) were received in appropriate containers.	V		
11	Sample(s) were properly preserved (includes thermal preservation).	V		
12	All samples were properly labeled on receipt (distinguishable).	V		_
13	Sampling dates and times on bottles match COC.	V		1
14	Bottle count on COC matches number of bottles received.	V		
15	Sample amount is sufficient for analyses requested	V		
16	Samples received within the hold time.	V		

Checkin By : Taylor Hammack

CheckIn Date : 06/05/2017



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VELAP ID# 460028

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GREENWAY						City of	Winches	ster Engine	eering Departm
51 Windy Hill Lane.	Winch	ester, VA 22602	Phone: (54	0) 662-41	85				
Owner Name and Add	iress of S	Sampling Site			15/17	Sampl	ing Tim	e(s)	
City of Winchester En	gineerin	g Department	Grab:		/	Grab:	1-1	5pm	
Winchester, VA 22601 Billing/Mailing Addre	ess (if dif	Terent)						34.5	
15 N. Cameron St. Winchester, VA 22601			Sampler	(print)			le Source	(Outfall 0	01, Final Eff., etc
Contact Phone: Reports: Robert Brown	n 540-663	7-2376	Rober	rt Br	0001	Туре	(WW, SV	V, GW, PW	, STW, S)
Invoices: Kelly Hensh						STW	= Stor	mwater	
Identifying No.(8) VPDES:			Sampler	(signature	=)	Regul	atory Ag	ency 🛛 N	PDES DE
VAN/VAG:			15/1	I s	June .	D	CLS/OI	W No	NPDES DE
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	GRI	EENWAY ENGIN	nail; robert.	USE ON	LY indicated b	around F	Request: Dr	Standan ie Datei	
Email: Kelly.henshaw	GRI	esterva.gov Em	nail; robert.	USE ON	LY indicated b	around F by oy GRAY he lab, d	Request: Dr	Standan ie Datei	d x Priority □
Email: Kelly.henshaw	GRI Below r	EENWAY ENGIN neasurements are Container Type	nail; <u>robert.</u> NEERING QC measu	USE ON	LY indicated bout-of-hold in t	around F	Request: Di AREAS	Standan ie Datei S. port.	d x Priority Analysis Requested (circ
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Smail: Kelly.henshaw	GRI Below r	EBNWAY ENGIN BERNWAY ENGIN DESCRIPTION OF THE PROPERTY OF T	nail; <u>robert.</u> NEERING QC measu	USE ON rements GRAB	ILY indicated bout-of-hold in t Preservation <6C	around For Survey GRAY	AREAS lo not re Temp.	Standan ne Date: S. port. TRC mg/L	Analysis Requestas (circ TSS) TKN, Nitrate+Nitri
Email: Kelly.henshaw	GRI Below r	EBNWAY ENGIN neasurements are Container Type 2L plastic 500 mL plastic (a/w)	NEERING QC measu COMP	USE ON rements GRAB	Preservation 46C H2SO4 to pH<2, <6C	around For Survey GRAY	AREAS lo not re Temp.	Standan ne Date: S. port. TRC mg/L	Analysis Requested (circle TSS) TKN, Nitrate+Nitrit Total N, Total
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Greenway Sample ID OII OIL	GRI Below I Sample Time	EENWAY ENGIN measurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass	NEERING QC measu COMP	USE ON rements GRAB	Preservation 46C H2SO4 to pH<2, <6C	by GRAY he lab, d	AREAS lo not re Temp. °C	Standaruse Date: S. port. TRC mg/L X	Analysis Requessad (circl TSS) TKN, Nitrate+Nitrit Total N, Tota Phosphorus as
OIL	GRI Below I Sample Time	EENWAY ENGIN measurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber	NEERING QC measu COMP	USE ON CEMENTS GRAB X X	Preservation HLSO4 to pH<2, <6C HCl to	around F	AREAS lo not re Temp. °C	Standard Date: S. port. TRC mg/L X	Analysis Requested (circle TSS) TKN, Nitrate+Nitrit Total N, Tota Phosphorus as
Greenway Sample ID OID OIC Observations and Con Samples Received in c If samples rot <60	GRI Below r Sample Time	EENWAY ENGIN measurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	NEERING QC measu COMP ype of Ice (mmediate)	USE ON REMEMBER STATE OF THE ST	Preservation 46C H2SO4 to pH<2, <6C HCI to pH<2, <6C Colored Blue None Rection and has ween the colored and has a second colored by the colored	around For Sy GRAY the lab, the substitution of the substitution o	AREAS O DO TEMPO	Standavie Date: 3. port. TRC mg/L X X C?: Y N Cess beigd	Analysis Requested (circl TSS) TKN, Nitrate+Nitrii Total N, Tota Phosphorus as TPH-DRO TPH-GRO (If no, see below). n? N n/a d? N n/a die N here: Y 4 in/labels? N
Greenway Sample ID OID OID Observations and Con Samples Received in c If samples are not <60	GRI Below r Sample Time	EENWAY ENGIN measurements are Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	ype of Ice (mmediatelyng contains amples rec'	USE ON REMEMBER STATES OF THE	Preservation 46C H2SO4 to pH<2, <6C HCI to pH<2, <6C Colored Blue None Rection and has ween the colored and has a second colored by the colored	All te d the containers rity presenes?	AREAS to not re Temp. The series of the seri	Standavie Date: 3. port. TRC mg/L X X C?: Y N Cess beigd	Analysic Requested (circle TSS) TKN, Nitrate+Nitrit Total N, Tota Phosphorus as TPH-DRO TPH-GRO (If no, see below) n? N n/a die N here: Y din/labels? N

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6			CHAI		-01		Station	V OT-11	Grab 06
GREENWAY ENVIRONMENTAL LABORATORY							Clinat is Collecte Rand	th City of Winches of: 86/85/2817 1 86/85/2817 1	4:00
151 Windy Hill Lan	e. Winch	ester, VA 22602	Phone: (54	0) 662-41	85		Test:	Total Suspende	of Speledy (TSS)
Owner Name and A	ddress of	Sampling Site		g Date:		Samp	ling Tim	e(s)	
City of Winchester I 301 Cork Street Winchester, VA 2266 Billing/Mailing Add	01		Grab:	6/5/1	7	Grab:	2:0	opm	
15 N. Cameron St.	ness (n di	nerent	Sample	(print)		Samp	le Source	(Outfall 0	01, Final Eff., etc
Winchester, VA 2266 Contact Phone;	01		Russ	ell B	Layman Jr.			OT-1	
Reports: Robert Bro Invoices: Kelly Hen-								v, GW, PW mwater	, STW, S)
Identifying No.(s) VPDES: VAN/VAG: Other (list):			Sampler	(signatur	e)	Regul	atory Ag	ency No	NPDES DEC
Field Data (temp, pl-	I, dissolved	oxygen, TRC, etc.)	(optional -	for client	convenience on	ly)			
Relinquished by San	nplet	Date/Time	Received I	y (signan	are)	Date/T	ime C	ondition	
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Relinquished by (sig	nature)	Date/Time	Received I	y (signan	are)	Date/T	-	ondition	
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			-			733	1 1 6	100	le-/rey/in/
Email Invoice? Y Email: Kelly,hensha			ail Results		Turn winchesterva.g	around R		Standard	x Priority 🗅
STATE OF THE PARTY				-		1000		e Date:	
		EENWAY ENGIN	VEERING	USE ON	LY indicated b	y GRAY	AREAS		
	GR.			rements (pH	Temp.	TRC	Analysis
Greenway Sample ID	Below: Sample Time	Container Type	COMP	GRAB	Preservation	SU	°C	mg/L	
Greenway Sample ID 17868585	Sample	measurements are	COMP	GRAB	<6C	SU X	3.9.		TSS TSS
	Sample	Container Type 2L plastic 500 mL plastic (a/w)	COMP	GRAB	<6C H2SO4 to pH<2, <6C	SU	3.9.	mg/L	TKN, Nitrate+Nitrate Total N, Total
	Sample	Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass	COMP	GRAB X	<6C H2SO4 to pH<2, <6C	SU	3.92	mg/L	TKN, Nitrate+Nitrate Total N, Total
org	Below: Sample Time	Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber	COMP	X X	<6C H2SO4 to pH<2, <6C	X	3.93	Mg/L	TKN, Nitrate+Nitrit Total N, Tota Phosphorus as
org	Below: Sample Time	Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber	COMP	X X X	<6C H2SO4 to pH<2, <6C <6C HCl to	x	3.93	x X	TKN, Nitrate+Nitrite Total N, Tota Phosphorus as
Observations and Co	Below: Sample Time Dimments: cooler on 6C, were s	Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial cicer Y N Type amples delivered in the contract type of samples	ype of Ice (mmediately accontaints)	X X X X X X X	<6C H2SO4 to pH<2, <6C <6C HCl to pH<2, <6C Car Blue None Lection and ha Were the core	X X All te	mps <6	x x x x x	TKN, Nitrate+Nitrit Total N, Tota Phosphorus as TPH-DRO TPH-GRO (If no, see below). aP Y N (A) dP Y N dP Y N dP Y N dP Y N in/labels? N
Observations and Co Samples Received in If samples are not < Were samples collection to hold-time and Sufficient volume & Disposition Site:	Below: Sample Time Dimments: cooler on 6C, were s	Container Type 2L plastic 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial cicer Y N Type amples delivered in the contract type of samples	ype of Ice (mmediatel ag contain amples rec'y) N Bott	X X X X X X din hold le times	<6C H2SO4 to pH<2, <6C <6C HCl to pH<2, <6C Car Blue None Lection and ha Were the core	X X All te d the coordinaters only presented? The presented of the coordinaters of the presented of the coordinaters of the presented of the coordinaters of the coo	emps <6	x x x x x	TKN, Nitrate+Nitrit Total N, Tota Phosphorus as TPH-DRO TPH-GRO (If no, see below). (If N A T

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Pace A RP17062822 C 980 RP17062822 Ob Huntersville, NC 28078 (704)875-9092

June 12, 2017

Andrea R. Kaval Greenway Engineering 151 Windy Hill Lane Winchester, VA 22602

RE: Project: City of Winc Eng 060517 Pace Project No.: 92343464

Dear Andrea Kaval:

Enclosed are the analytical results for sample(s) received by the laboratory on June 08, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Whather Brand

Matthew Brainard matthew.brainard@pacelabs.com (704)875-9092 Project Manager

Enclosures



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CERTIFICATIONS

Project:

City of Winc Eng 060517

Pace Project No.: 92343464

Charlotte Certification IDs 9800 Kincey Ave. Ste 100, Huntersville, NC 28078 North Carolina Drinking Water Certification #: 37706 North Carolina Field Services Certification #: 5342 North Carolina Wastewater Certification #: 12

South Carolina Certification #. 99006001 Florida/NELAP Certification #: E87627 Kentucky UST Certification #: 84 Virginia/VELAP Certification #: 460221

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SAMPLE SUMMARY

Project:

City of Winc Eng 060517

Pace Project No.: 92343464

Lab ID	Sample ID	Matrix	Date Collected	Date Received
92343464001	17060505.01B (Outfall 001)	Water	06/05/17 13:15	06/08/17 09:27
92343464002	17060505.01C (Outfall 001)	Water	06/05/17 13:15	06/08/17 09:27

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SAMPLE ANALYTE COUNT

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory	
92343464001	17060505.01B (Outfall 001)	EPA 8015 Modified	PKS	2	PASI-C	
92343464002	17060505.01C (Outfall 001)	EPA 5030/8015 Mod.	TSM	2	PASI-C	

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ANALYTICAL RESULTS

Project:

City of Winc Eng 060517

Pace Project No.: 92343464									
Sample: 17060505.01B (Outfall (001) Lab ID:	92343464001	Collected	: 06/05/17	13:15	Received: 06/	/08/17 09:27 M	atrix: Water	
			Report						
Parameters	Results	Units	Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS THC-Diesel	Analytical	Method: EPA 8	3015 Modified	d Preparati	on Met	thod: EPA 3510	-		
Diesel Range Organics(C10- C28)	ND	mg/L	0.50	0.10	1	06/09/17 08:11	06/09/17 19:03		
Surrogates n-Pentacosane (S)	53	%	48-110		1	06/09/17 08:11	06/09/17 19:03	629-99-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: City of Wind Eng 060517

Pace Project No.: 92343464

1 400 1 10,000 110.									
Sample: 17060505.01C (Outfall 00	1) Lab ID:	92343464002	Collecte	d: 06/05/17	13:15	Received: 06/	/08/17 09:27 N	latrix: Water	
			Report						
Parameters	Results	Units	Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Gasoline Range Organics	Analytical	Method: EPA 5	030/8015	Mod.					
Gas Range Organics (C6-C10) Surrogates	0.027J	mg/L	0.080	0.016	1		06/10/17 04:20)	В
4-Bromofluorobenzene (S)	100	%	70-145		1		06/10/17 04:20	460-00-4	

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Pace A DOLTOGOGO BE RP17062822 00 Huntersville, NC 28078 (704)875-9692

QUALITY CONTROL DATA

Project:

City of Winc Eng 060517

Pace Project No.: 92343464

QC Batch:

364205 QC Batch Method: EPA 5030/8015 Mod

Associated Lab Samples: 92343464002

Parameter

Analysis Method.

EPA 5030/8015 Mod.

Analysis Description:

Gasoline Range Organics

METHOD BLANK: 2019361

Gas Range Organics (C6-C10)

4-Bromofluorobenzene (S)

Associated Lab Samples 92343464002

Matrix: Water

Limit

0.79

70-145

Blank Result 0.028J 100 Reporting MOI Analyzed 0.080

Qualifiers

0.016 06/10/17 01:57 06/10/17 01 57

LABORATORY CONTROL SAMPLE: 2019362

Parameter Gas Range Organics (C6-C10) 4-Bromofluorobenzene (S)

Spike Units Conc mg/L

Units

mg/L %

LCS Result

LCS % Rec 79 98

% Rec Limits 70-150 70-145

Qualifiers

MATRIX SPIKE SAMPLE 2019363 Units Parameter Gas Range Organics (C6-C10) mg/L

92343402001 Result ND Spike MS Result Conc. 0.82

MS % Rec 107

% Rec Limits 70-150

Qualifiers 70-145

SAMPLE DUPLICATE: 2020431

4-Bromofluorobenzene (S)

Parameter Gas Range Organics (C6-C10) 4-Bromofluorobenzene (S)

92343430003 Units Result mg/L 0.024J 98

Dup Result

Max RPD RPD

2

Qualifiers

ned 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.

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QUALITY CONTROL DATA

Project:

City of Winc Eng 060517

Pace Project No.: 92343464

QC Batch:

364118

Analysis Method:

EPA 8015 Modified

QC Batch Method: EPA 3510

Analysis Description:

8015 GCS

Associated Lab Samples: 92343464001

Parameter

METHOD BLANK: 2018935 Associated Lab Samples: 92343464001 Matrix: Water

68

LCS

Result

Blank ND

Result

Reporting

Analyzed

Qualifiers

Diesel Range Organics(C10-C28) n-Pentacosane (S)

n-Pentacosane (S)

n-Pentacosane (S)

mg/L

%

0.50 48-110 0.10 06/09/17 15:30 06/09/17 15:30

LABORATORY CONTROL SAMPLE: 2018936

Parameter Diesel Range Organics(C10-C28)

Spike Units mg/L 10

LCS % Rec 51 77 5.1

MS

Result

% Rec Limits Qualifiers 41-114 48-110

MATRIX SPIKE SAMPLE: 2018937

Parameter Units Diesel Range Organics(C10-C28) mg/L n-Pentacosane (S)

35316189001 Spike 0.10U 10

MS % Rec 4.7 46

Limits 41-114

48-110

Qualifiers

SAMPLE DUPLICATE: 2019682

Parameter Diesel Range Organics(C10-C28)

35316189002 Units Result mg/L 2.6 74

RPD Result 1.9 30 61 18 RPD Qualifiers 30

73

uits 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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Pace A 980 RP17062822 00 Huntersville, NC 28078 (704)875-9092

QUALIFIERS

Project:

City of Winc Eng 060517

Pace Project No.: 92343464

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.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

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.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

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

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

TNI - The NELAC Institute.

LABORATORIES

PASI-C Pace Analytical Services - Charlotte

ANALYTE QUALIFIERS

Date: 06/12/2017 04:01 PM

Analyte was detected in the associated method blank. В

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: City of Winc Eng 060517
Pace Project No.: 92343464

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92343464001	17060505.01B (Outfall 001)	EPA 3510	364118	EPA 8015 Modified	364232
92343464002	17060505.01C (Outfall 001)	EPA 5030/8015 Mod.	364205		

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Laboratory receiving samples: Asheville Eden Greenwood Huntersville Raleigh Mechanicsville Samples conduces Upso Client Name: Courier: Fed Ex UPS USPS Client Grownercial Custody Seal Present? Ves Mo Seals Indicat? Ves Mo Date/Initials Person Examining Contents Packing Material Gubble Wrap Subble Bags None Other: Samples on ice, cooling process has be received in Gun to: USD A Regulated Supfer Supfer Subble States: CA, NY, or SC (check maps)? Did samples originate in a quarantine sone within the United States: CA, NY, or SC (check maps)? Did samples originate in a quarantine sone within the United States: CA, NY, or SC (check maps)? Comments/Discrepancy: Comments/Discrepancy: Comments/Discrepancy: Chain of Custody Present? Ves Mo M/A 2. Short Hold Time Analysis (C22 Nr.)? Ves Mo M/A 3. Rush Turn Around Time Requested? Mrs Client Mrs Comments/Discrepancy: Surples Field Filter ed? Mrs Mrs	17060505 "ice Analytical"	Document Na Sample Condition Upon Document N F-CAR-CS-033-R	Receipt(SCUR) Page 1 of 2 RP17062822
Courier: Fed Ex		Greenwood [Huntersville
Custody Seal Present? Yes No Seals Intact? Yes No Date/Initials Person Examining Contents Packing Material: Gubble Wrap Subble Bags None Other: Thermometer: Coler Temp Corrected (*C): Support kee: Wet Sive None Samples on kee, cooling process has be corrected above (peeting to 6*C USDA Regulated Soil,F. NA, water sample) Usda samples originate from a foreign source (joesnationally, including Navall and Puerto Rico)? Indicator NA NA NA NA NA NA NA N		e: Nounimina	Project #
Packing Material: Bubble Wrap Bubble Bags None Other: Thermometer: Bubble Bags None Other: Samples on Ice, cooling process has be corrected factor: Cooler Temp Corrected (*C): Superifice: Wet Blue None Samples on Ice, cooling process has be corrected factor: Cooler Temp Corrected (*C): Superifice: Wet Blue None Samples on Ice, cooling process has be corrected factor: Cooler Temp Corrected (*C): Superifice: Wet Blue None Samples on Ice, cooling process has be corrected factor: Superifice: Sup			☐Client 92343464
Packing Material:	Custody Seal Present? Yes	No Seals Intact? Yes	
Correction Factor: Cooler Temp Corrected (*C): Specifies: Biological Tissue Frozen? Yes No N/A Temp should be above figering to 6*C USDA Regulated Soli/ 1/4, water sample) Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)? Yes No N/A Yes No N/A	Thermometer:	1	Other:
Comments/Discrepancy: Chain of Custody Present? Camples Arrived within Hold Time? Samples Arrived within Hold Time? Sufficient Volume? Correct Containers Used? Pace Containers Used? Containers Intact? Containers Intact? Containers Match COC? If yes No N/A Samples Field Filtered? Sample Labels Match COC? If yes No N/A Sample Labels Match COC? If yes No N/A Containers Intact? Containers Used? Containers Intact? Containers I	Temp should be above freezing to 6°C USDA Regulated Soil NA, water sample Did samples originate in a quarantine zone wil	Corrected (°C): 3()	heck maps}? Did samples originate from a foreign source (lpternationally,
Short Hold Time Analysis (<72 hr.)? Short Hold Time Analysis (<72 hr.)? Short Hold Time Requested? Sufficient Volume? Sufficient Volume? Surficient Volume? Surf			Comments/Discrepancy:
hort Hold Time Analysis (<72 hr.)? Sush Turn Around Time Requested? Sufficient Volume? Sure Two No N/A 4. Surficient Volume? Sure No N/A 5. Surrect Containers Used? Sure N/A 5. Surrect Containers Used? Surr			
Jufficient Volume? Vest No			N/A 2.
Surficient Volume? Dives		□Yes ☑No □	N/A 3.
Correct Containers Used? Pace Containers Used? Pace Containers Intact? Project Manager SCIIFE Review: Project Manager SCII		Dyg ONO D	N/A 4.
Pace Containers Used? Yes	ufficient Volume?	ØYes □No □	N/A 5.
ontainers Intact? Yes	orrect Containers Used?	Dres ONO O	N/A 6.
amples field Filtered? Tyes	-Pace Containers Used?	Zyes ONO O	N/A
ample Labels Match COC? Includes Date/Time/ID/Analysis Matrix: leadspace in VOA Vials (>S-6mm)? Ives No No No Sold 11. Ives No No No No Sold 11. Ives No	ontainers Intact?	□Yes □No □	N/A 7.
-Includes Date/Time/ID/Analysis Matrix: eadspace in VOA Vials (>S-6mm)?	amples Field Filtered?	□Yes □No □	N/A 8. Note if sediment is visible in the dissolved container
rip Blank Present? Yes No N/A 16. rip Blank Custody Seals Present? Yes No N/A 11. rip Blank Custody Seals Present? Yes No N/A 11. CUENT NOTIFICATION/RESOLUTION Fletd Data Required? Yes No Person Contacted: Date/Time: Comment: Sample Discrepancy: Project Manager SCURE Review: Project Manager SCURE Revi	ample Labels Match COC?	Yes ONO D	N/A 9.
rip Blank Present? Yes	-Includes Date/Time/ID/Analysis Matrix:	W	ii' ii
rip Blank Custody Seals Present? CUENT NOTIFICATION/RESOLUTION Person Contacted: Comment:s/Sample Discrepancy: Project Manager SCUBE Beginger.	eadspace In VOA Vials (>5-6mm)?	□Yes ☑No □	N/5-18.
CUENT NOTIFICATION/RESOLUTION Person Contacted: Comment: Sample Discrepancy: Project Manager SCURE Review:		, □Yes □No □	N/A 11.
Person Contacted: Comment.s/Sample Discrepancy: Project Manager SCIBE Review:			N/A
Project Manager SCIBE Review:	Person Contacted:	DLUTION	and the second s
Project Manager SCURF Review: Date:			
1112		141	
Project Manager SRF Review: Date:	Project Manager SCURF Review:	185	Date:

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, Incorrect preservative, out of temp, incorrect containers)

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17060505) #ace Analytical*							-	Document Name: Sample Condition Upon Receipt(SCUR) Document No.: F-CAR-CS-033-Rev.01									Document Revised: Sept. 21, 2 RP1 Page 2 of 2 RP1 Issuing Authority: Pace Quality Office						P17	17062822				
*Check mark top half of box if pH and/o is verified and within the acceptance rai												_	-	033-1	Rev.O		ject	#	WC	# MNB	: 9		34	34	16	4		
			n sar alf o			o lis	t nu	mbe	rof	bott	les										92-	Grne	y E	ng	Le:	06/	22/1	7
tem#	8P4U-125 mL Plastic Unpreserved (N/A) (CI-)	8P3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP3S-250 mL Plastic H25O4 (pH < 2) (CI-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP3Z-250 mL Plastic ZN Acetate & NaCH (>9)	BP3C-250 mL Plastic NaOH (pH > 12) (CI-)	WGFL-Wide-mouthed Glass Jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (CF)	AG15-1 liter Amber H2504 (pH < 2)	AG35-250 mL Amber H2504 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4CI (N/A)(CI-)	DG9H-40 mL VOA HCI (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mt VOA Unp (N/A)	DG99-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SPZT-250 mt Sterile Plastic (N/A - lab)		BP3A-250 mL Plastic (NH2)2504 (9.3-9.7)	Cubitainer	VSGU-20 mL Scintillation vials (N/Å)	NS
7	1				1	1	1	-			1	2	1	1	/									1	1			
1	1				/	/	/	1			/	0,	/	/	1	3	11							1	1			
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_		_	_) are	pl	H Ac	just	mei	nt Lo	og fo	r Pr						-							
Sa	mple	ID	Type of Preservative pH upon re						n rec	elpt	Dat	te pre	servat	ion ad	ļusted		Time preservation adjusted			on Amount of Preservative added						Lot#		
_		-	-	-			+-	-	-			-	-			1	_		_							+		_

Page 12 of 13

Page 21 of 22

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Section B Repartice Andreas Re	
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Monday, June 5, 2017

Daily	Weekly	Monthly	Custom							
			Actual	Average	Record					
Temperatu	re									
Mean Tem	perature		64 °F	2						
Max Temp	erature		69 *F	76 *F	91 °F (2002)					
Min Tempe	erature		59 °F	56 *F	44 °F (1990)					
Degree Da	ys									
Heating De	gree Days		1							
Growing D	egree Days		14 (Base 50)							
Moisture										
Dew Point			61 *F							
Average H	umidity		82							
Maximum I	Humidity		94							
Minimum H	lumidity		68							
Precipitation	n									
Precipitation	n		0.07 in	•	-0					
Sea Level	Pressure									
Sea Level	Pressure		29.75 in							
Wind										
Wind Spee	d		2 mph (SW)							
Max Wind	Speed		9 mph							
Max Gust S	Speed		16 mph							
Visibility			10 miles							
Events			Rain							

https://www.wunderground.com/history/airport/KOKV/2017/6/5/DailyHistory.html?req_cit... 7/7/2017

Averages and records for this station are not official NWS values.

10:15 AM	69.8 °F	62.6 °F	78%	29.78 in	10.0 mi	wsw	6.9 mph	2.4	N/A		Mostly Cloudy
10:35 AM	69.8 °F	62.6 °F	78%	29.77 in	10.0 mi	wsw	5.8 mph		N/A		Mostly Cloudy
10:55 AM	69.8 °F	62.6 °F	78%	29.77 in	10.0 mi	sw	5.8 mph		N/A		Overcast
11:15 AM	69.8 °F	62.6 °F	78%	29.79 in	10.0 mi	sw	8.1 mph		N/A		Mostly Cloudy
11:35 AM	69,8 °F	64.4 °F	83%	29.79 in	10.0 mi	West	4.6 mph		N/A		Drizzle
11:55 AM	69.8 °F	64.4 °F	83%	29.80 in	7.0 mi	West	5.8 mph		N/A	Rain	Rain
12:15 PM	68.0 °F	64.4 °F	88%	29.80 in	5.0 mi	West	4.6 mph	-	0.02 in	Rain	Rain
12:35 PM	68.0 °F	64.4 °F	88%	29,80 in	7.0 mi	wsw	3.5 mph	÷	0.04 in	Rain	Rain
12:55 PM	68.0 °F	64.4 °F	88%	29.60 in	7.0 mi	West	4.6 mph	-	0.06 in	Rain	Light Rain
1:15 PM	68.0 °F	62.6 °F	83%	29.80 in	7.0 mi	NNW	3.5 mph		0.01 in	Rain	Light Rain
1:35 PM	68.0 °F	62.6 °F	83%	29.79 in	10.0 mi	NW	3.5 mph		0.01 in	Rain	Light Rain
1:55 PM	68.0 °F	62.6 °F	83%	29.78 in	10.0 mi	Calm	Calm	-	0.01 in		Mostly Cloudy
2:15 PM	68.0 °F	60.8 °F	78%	29.77 in	10.0 mi	Calm	Calm	-	N/A		Overcast
2:35 PM	68.0 °F	60.8 °F	78%	29.77 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds
2:55 PM	69.8 °F	59.0 °F	68%	29.75 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds
3:15 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	South	4.6 mph	-	N/A		Clear
3:35 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	Calm	Calm		N/A		Scattered Clouds
3:55 PM	69.8 F	60.8 °F	73%	29.73 in	10.0 mi	sw	4.6 mph	-	N/A		Scattered Clouds
4:15 PM	69.8 °F	60.8 °F	73%	29.73 in	10.0 mi	Calm	Calm	-	N/A		Scattered Clouds

https://www.wunderground.com/history/airport/KOKV/2017/6/5/DailyHistory.html?req_cit... 7/7/2017

Daily Weather History & Observations

2017	Temp.	(°F)		Dew P	oint (°F)	Humid	lity (%)		Sea Lov	el Press.	(in)	Visibili	ity (mi)		Wind (mph)		Precip. (in)	Events
Jun	high	avg	low	high	avg	low	high	avg	low	high	avg	NOW.	high	avg	low	high	avg	high	ร นก	
4	66	70	53	63	53	46	82	88	33	30.05	29.94	28.82	10	10	10	12	4	16	0.00	
5	89	64	59	64	61	55	94	82	68	29.83	29.75	29.68	10	10	5	9	2	16	0.07	Rain
6	71	61	51	63	51	46	100	84	41	29.88	29.79	29.71	10	10	5	20	7	25	0.00	
7	66	56	46	55	52	46	100	83	60	30.06	29.97	29.67	10	10	5	7	2		00.0	Rein
8	69	58	46	52	48	45	100	71	40	30.06	29.98	29.85	10	8	0	6	1		0.00	Fog
7	78	66	53	52	60	46	88	58	34	29.98	29.88	29.82	10	10	10	16	5	22	0.00	
10	84	70	57	61	55	50	82	57	37	30.08	30.03	29.98	10	10	10		4		0.00	

https://www.wunderground.com/history/airport/KOKV/2017/6/5/WeeklyHistory.html?req_... 7/7/2017

Daily Weather History & Observations

2017	Temp.	(°F)		Daw F	oint (*	F)	Humk	My (%)		Sea Le	val Press	· (In)	Visibil	ilty (mi)	ı	Wind	(mph)		Precip. (in)	Events
May	high	avg	low	high	avg	low	h.gh	evg	low	high	avg	low	high	avg	low	high	avg	high	sum	
28	69	63	67	63	60	57	100	91	68	29,92	29.86	29.82	10	6	0	13	2	15	0.06	Fog , Rain
29	77	68	60	84	69	54	106	78	44	30.02	29.90	29.60	10	7	0	14	3	20	0.02	Fog , Rain
30	77	66	55	84	60	55	100	86	61	30.07	30.02	29.94	10	10	6	16	4	21	0.00	Thunderstorm
31	78	68	69	61	55	48	94	68	32	30.05	30.01	29.95	10	10	7	13	3	17	0.00	
2017	Temp.	(°F)		Dew F	oint (*	F)	Humk	ility (%)		Sea Le	vel Press	. (in)	Visibil	lty (mlj		Wind	(mph)		Precip. (in)	Events
Jun	hìgh	avg	low	hìgh	avg	low	hìgh	avg	low	high	avg	low	high	avg	low	high	842	high	sum	
1	78	68	53	54	49	43	88	55	32	30.08	30.02	29.98	10	10	10	17	6	25	0.00	Thunderstorm
2	77	64	51	52	45	39	82	53	26	30.07	30.04	30.02	10	10	7	16	6	37	0.00	
3	80	68	67	84	46	43	72	48	28	30.06	30.02	29.99	10	10	10	21		28	8.00	

https://www.wunderground.com/history/airport/KOKV/2017/5/29/WeeklyHistory.html?req... 7/7/2017



SAMPLE SUMMARY

Client Project ID: Stormwater Outfall 001

Report To:

Client Name: City of Winchester Engineering Department

Attn: Robert Brown

Client Address: 301 Cork Street

P.O.#.:

City, State, Zip: Winchester, VA, 22601

The laboratory	has anal	vzed the	following	samples:

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
OT-54 Grab 061917	Storm Water	17061908.01	06/19/2017 13:20	6/19/2017 14:55	Russel B Layman JR
OT-34 Grab 061917	Storm Water	17061908.02	06/19/2017 13:20	6/19/2017 14:55	Robert A, Brown
OT- 42 Grab 061917	Storm Water	17061908.03	06/19/2017 13:40	6/19/2017 14:55	Robert A. Brown



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Date: 07/04/2017 15:32

Page 2 of 11



TERM AND QUALIFIER DEFINITION

eneral Term [Definition
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
3	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit
RL	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
µg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
CCU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD – Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery



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CERTIFICATE OF ANALYSIS

	Dity of Winchester Engineering De Stormwater Outfall 001	epartment							Brown 2017 03:32 PM	
Job ID : Client Sample ID Job Sample ID: Other Information	17061908.01					Date (le Matrix Collected Collected ddress:	1: 06/19/ 1: 13:20 301 Cd	0.000	
Conclusion: Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/Time Prepared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS) TSS	5,8	mg/L	2.0	2			06/21/2017 14:30	06/22/2017 10:48	SDP

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VELAP 1D# 460028



CERTIFICATE OF ANALYSIS

	City of Winchester Engineering De Stormwater Outfall 001	epartment						HILL .	Robert 07/04/2	Brown 2017 03:32 PM	
Job ID :	17061908					Sample	e Matrix	e e	Storm V	Vater	
Client Sample ID	OT-34 Grab 061917					Date C	Collected	i:	06/19/2	017	
Job Sample ID:	17061908.02					Time (Collected	d:	13:20		
Other Informatio	n: OT-34					Site Ad	ddress:			k Street ster, VA 22601	
Condusion:											
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	Q	Date/ Prepa	2.75	Date/Time Analyzed	Analys
SM 2540D-2011	Total Suspended Solids (TSS)										
	TSS	584	mg/L	20.0	20			06/21/		06/22/2017 10:52	SDP

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VELAP ID# 460028

Page 5 of 11



CERTIFICATE OF ANALYSIS

	City of Winchester Engineering De Stormwater Outfall 001	epartment					Attr Dat	A 4000 TO C	Brown 2017 03:32 PM	
Job ID : Client Sample ID Job Sample ID: Other Informatio Conclusion:	17061908.03					Date C	e Matrix: Collected: Collected: ddress:		34,737	
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL	()	te/Time repared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS) TSS	53.6	mg/L	4.0	4		06	/21/2017 14:30	06/22/2017 10:50	SDP

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QUALITY CONTROL DATA

Analysis : Total S	uspended Solids (TSS)	Method: SM 2540D-2011	Matrix: Storm Water
QC Batch ID : Qb170 Samples in This QC i		Created Date : 06/21/2017	Created By : SDavis
Sample Preparation	PB17062104	SM 2540D-2011	SDavis

QC Type: Method	Blank							
	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		

QC Ty	pe: Duplicate							
	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup	17061908.03	TSS	53.6	54.8	mg/L	-2.2	20	

QC Ty	pe: LCS/LCSD										
	And the same	LCS Spk		LCS %		LCSD	research and	200	RPD	% Rec	
	Parameter	Amt	LCS Result	Rec	Amt	Result	LCS % Rec	RPD	CtrlLimit	CtrlLimit	Qual
LCS	TSS	100	100	100	100	98.0	98	-2.0	20	80-120	

Refer to the Definition page for terms.



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SAMPLE CONDITION CHECKLIST

Client Name: City of Winches	Contact : Robert Brown				
Client Address: 301 Cork Stree		Contact Phone: 540-667-237			
JobID: 17061908	Date Received: 06/19/2017	Time Received: 02:55 PM			
Temperature :					
ThermometerID : IR-CC-1	pHPaperID:				

Comments : Include actions taken to resolve discrepancies/problem:

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	V		
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).	~		
3	Cooling began immediately (within 15 minutes) after collection.	V		
4	Samples received on the same day as sample collection.	V		
5	Ice surrounding all samples in cooler.	V		
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s).	V		
7	COC form contains date and time of sample collection.	V		
8	Sample containers arrived intact.	~	_	
9	Samples were received in Greenway-provided containers.	V		
10	Sample(s) were received in appropriate containers.	V	4	
11	Sample(s) were properly preserved (includes thermal preservation).	V		
12	All samples were properly labeled on receipt (distinguishable).	V		
13	Sampling dates and times on bottles match COC.	V		1
14	Bottle count on COC matches number of bottles received.	V		1
15	Sample amount is sufficient for analyses requested	V		127
16	Samples received within the hold time.	V		

CheckIn By :

Kristen Muller

CheckIn Date: 06/19/2017



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VELAP ID# 460028

Page 8 of 11

HOLLOW HOLD BY

17061908





LABORATORY CHAIN-OF-CUSTODY PECOPE REPUMPED (3

Job ID:17061908

51 Windy Hill Lane	. WILICI	TOUTEN, TILLEGUE		40) 662-411	33						
Owner Name and Ad			Samplin	ng Date: (119/17	Sampling Time(s)					
City of Winchester Er 301 Cork Street	ngmeern	ng Department	Grab:			Sample Source (Outfall 001, Final Eff., etc.) Outfall 001 OT 42 OT-54 Type (WW, SW, GW, PW, STW, S)					
Winchester, VA 22601			Giab.								
Billing/Mailing Addr		ifferent)									
15 N. Cameron St.			Sample	r (print)							
Winchester, VA 22601			RUSS	sell lay	man						
Reports: Robert Brow	m 540-66	7-2376	70								
Invoices: Kelly Hensh						STW	= Storm	water			
Identifying No.(8) VPDES:			Sample	(signature	:)	-		F 57 33			
			31			Regula	TS/ODW	C XIN	PDES DEQ		
VAN/VAG: Other (list):			m	7		Пъс	LO, OD W		le 🔲 Other (nst)		
Field Data (temp, pH,	dissolve	Osween TRC etc.)	(entional	for cheat	convenience only	-1	_		_		
		/6/	(opaona	101 04011	convenience on	,			- 1		
Relinquished by Sam	414	Data /PP	D	- (all and		Desc PT					
Pussell Carman	pier	Date/Time	Received	L	ize)	Date/Ti		ndition			
Relinquished by (signature)		Date/Time	Meli	ALS.	was	Date/Tis		ndition			
O Sign	ature)		Received	by (signati	ire)	Louie/ II	Te Coi	aution	-		
8 alust Bear	-	6/19/2:55									
Relinquished by (sign:	ature)	Date/Time	Received	by (signatu	ire)	Date/Ti	me Cor	dition a	Lab Receipt		
			421	ne		unin	145 971	d. cost	u-livelistact		
Email Invoiced Y			YA-	Selection .	Tuena	round R	equest	Standard			
Kmail Invoice? Y Email: Kelly henshaw	GR	EENWAY ENGI	naili robert NEERING	brown@	Tuma vinchesterva.go	round R	equest Due AREAS.	Standard Dates			
	GR	EENWAY ENGI measurements are	naili robert NEERING	brown@	Tuma vinchesterva.go	round R	equest Due AREAS.	Standard Date:	X Priority		
Email: Kelly.henshaw	GR Below Sample	EENWAY ENGI measurements are	naili robert NEERING : QC meass	USE ON	Tuma winchesterva.go /LY indicated b out-of-hold in the	y GRAY ne lab, do pH SU	AREAS. o not report	Standard Dates ort. TRC mg/L	x Priority 🗆		
Email: Kelly.henshaw	GR Below Sample	EENWAY ENGI measurements are Container Type	NEERING QC measu COMP	USE ON	Turna winchesterva.go ILY indicated b out-of-hold in the Preservation	y GRAY ne lab, de	AREAS.	Standard Date:	Analysis Requested (circle)		
Email: Kelly.henshaw	GR Below Sample	EENWAY ENGI measurements are Container Type 21 plastic 11 Our 66/a	NEERING QC measu COMP	USE ON Irements GRAB	Tuma winchesterva.go ILY indicated by out-of-hold in the Preservation <6C H2SO4 to	y GRAY ne lab, do pH SU	AREAS. o not report	Standard Dates ort. TRC mg/L	Analysis Requested (circle) TKN,		
Email: Kelly.henshaw	GR Below Sample	EEENWAY ENGI measurements are Container Type 21 plastic 11 Au 66/2 500 mL plastic	NEERING QC measu COMP	USE ON irements GRAB	Turna winchesterva.go ILY indicated b out-of-hold in the Preservation	y GRAY ne lab, do pH SU	AREAS. o not report	Standard Dates ort. TRC mg/L	Analysis Requested (circle TSS) TKN, Nitrate+Nimite		
Email: Kelly.henshaw	GR Below Sample	EENWAY ENGI measurements are Container Type 21 plastic 11 Our 66/a	NEERING QC measu COMP	USE ON Irements GRAB	Tuma winchesterva.go ILY indicated by out-of-hold in the Preservation <6C H2SO4 to	y GRAY ne lab, do pH SU	AREAS. o not report	Standard Dates ort. TRC mg/L	Analysis Requested (circle) TKN, Nitrate+Nitrate Total N, Total		
Email: Kelly.henshaw	GR Below Sample	EEENWAY ENGI measurements are Container Type 21 plastic 11 Au 66/2 500 mL plastic	NEERING QC measu COMP	G USE ON GRAB X X	Tuma winchesterva.go ILY indicated by out-of-hold in the Preservation <6C H2SO4 to	y GRAY ne lab, de pH SU	AREAS. o not report	Standard Date: Ort. TRC mg/L X	Analysis Requested (circle) TKN, Nitrate+Nitrite Total N, Total Phosphorus as I		
Email: Kelly.henshaw	GR Below Sample	EENWAY ENGI measurements are Container Type 21 plastic 11 014 66/a 500 mL plastic (a/w)	NEERING QC measu COMP	USE ON irements GRAB	Tuma winchesterva.go ILY indicated b out-of-hold in tl Preservation <6C H2SO4 to pH<2, <6C <6C	y GRAY ne lab, do pH SU	AREAS. o not report	Standard Dates ort. TRC mg/L	Analysis Requested (circle TS) TKN, Nitrate+Nitrate Total N, Total		
Email: Kelly.henshaw	GR Below Sample	EEENWAY ENGI measurements are Container Type 21 plastic 11 Cun 66/a 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber	NEERING QC measu COMP	GUSE ON LIFE O	Turns winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C <6C HCl to	y GRAY y GRAY be lab, de pH SU X	AREAS. o not report	Standard Datg: Ort. TRC mg/L X	Analysis Requested (circle) TKN, Nitrate+Nitrate Total N, Total Phosphorus as I TPH-DRO		
Greenway Sample ID	GR Below Sample Time	EEENWAY ENGI measurements are Container Type 21 plastic 11 Cua. 66/a 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	NEERING QC measu COMP	G USE ON GRAB X X	Tuma winchesterva.go ILY indicated b out-of-hold in tl Preservation <6C H2SO4 to pH<2, <6C <6C	y GRAY ne lab, de pH SU	AREAS. o not report	Standard Date: Ort. TRC mg/L X	Analysis Requested (circle) TKN, Nitrate+Nitrite Total N, Total Phosphorus as I		
Greenway Sample ID	GR Below Sample Time	EEENWAY ENGI measurements are Container Type 21 plastic 11 Cua. 66/a 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	NEERING QC measu COMP	GUSE ON LIFE O	Turns winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C <6C HCl to	y GRAY y GRAY be lab, de pH SU X	AREAS. o not report	Standard Datg: Ort. TRC mg/L X	Analysis Requested (circle TSS) TKN, Nitrate+Nitrite Total N, Total Phosphorus as TPH-DRO		
Greenway Sample ID 7061968. () A	GR Below Sample Time	EBNWAY ENGI measurements are Container Type 21 plastic 11 Otto 66/2 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	nail robert NBERING QC measu COMP	S USE ON USE OF OR OTHER OF OWNER OWNER OF OWNER OWN	Tuma winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C	y GRAY y GRAY ne lab, de pH SU X	AREAS. o not repp. Temp. 'C i.l	Standard Date: ort. TRC mg/L X	Analysis Requested (circle TSS) TKN, Nitrate+Nitrite Total N, Total Phosphorus as TPH-DRO TPH-GRO		
Greenway Sample ID 70101908. (A) A	Below Sample Time	EEENWAY ENGI measurements are Container Type 21 plastic 11 OLM 66/2 500 mL plastic (a/w) 2x 250 mL amber glass 3x 40 mL amber glass vial	NEERING QC meass COMP	USE ON REMEMBERS OF THE STATE O	Turns winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C We Blue None Discription and ha	y GRAY ye lab, de pH SU X X All to	AREAS. o not reprint the control of	Standard Date: Ort. TRC mg/L X X X	Analysis Requested (circle TSS) TKN, Nitrate+Nitrate Total N, Total Phosphorus as TPH-DRO TPH-GRO		
Greenway Sample ID Observations and Co Samples Received in If samples are not Co Were samples collect	Below Sample Time Time cooler of GC, were ted in co	EENWAY ENGI measurements are Container Type 21 plastic 11	NEERING QC measu COMP Oli	USE ON PROPERTY OF THE PROPERT	Turns winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C Well Blue None of the Phenomena of the Phenom	y GRAY ye lab, de pH SU X All te d the containers	AREAS. o not represent the contract of the con	Standard Date: TRC mg/L X X X X N Cess begz y-provide N Circl N Circ	Analysis Requested (circle) TKN, Nitrate+Nitrate Total N, Total Phosphorus as I TPH-DRO TPH-GRO (If no, see below)- Lin? Y N (5/2) Lin? Y N (5/2) Lin N, here; S (6/2)		
Greenway Sample ID 7061968. (A) A Observations and Co Samples Received in If samples are not Co	Below Sample Time Time cooler of GC, were ted in co	EENWAY ENGI measurements are Container Type 21 plastic 11	NEERING QC measu COMP Oli	USE ON PROPERTY OF THE PROPERT	Turns winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C Well Blue None of the Phenomena of the Phenom	y GRAY ye lab, de pH SU X All te d the containers	AREAS. o not reperied to the control of the control	Standard Date: TRC mg/L X X X X X N Cess begs provide N Circ eview lop	Analysis Requested (circle) TKN, Nitrate+Nitrate Total N, Total Phosphorus as I TPH-DRO TPH-GRO (If no, see below). Le? YN (A) Le? YN (A) Le N here; X (Sin/labels) YN		
Greenway Sample ID 7061968. (A) A Observations and Co Samples Received in If samples are not <6	Below Sample Time Time cooler of GC, were ted in co	EENWAY ENGI measurements are Container Type 21 plastic 11	Eype of Ice immediate ling contain Samples re	GRAB X X X X (circle): (vircle): (vircle)	Turns winchesterva.go ILY indicated bout-of-hold in the Preservation <6C H2SO4 to pH<2, <6C HCl to pH<2, <6C Well Blue None of the Phenomena of the Phenom	y GRAY ye lab, de pH SU X All te d the containers extly pessents;	AREAS. o not reperied to the control of the control	Standard Date: TRC mg/L X X X X N Cess begz y-provide N Circl N Circ	Analysis Requested (circle) TKN, Nitrate+Nitrate Total N, Total Phosphorus as I TPH-DRO TPH-GRO (If no, see below). Le? YN (A) Le? YN (A) Le N here; X (Sin/labels) YN		

Sampler Robe Sampler	g Date: (6/19/1 (print) (signature A B for client by (signature	7 ouv convenience onl	Sample Ourfa	### Object Comme C	Outfall 00 OT - 3 GW, PW, nwater	
Sampler Solutional - Received I	(signature A B for client by (signature)	convenience onl	Type ('STW' Reguls DC	### Object Comme C	GW, PW, nwater ncy ⊠ N V □ Nor	FDES □ DEC
Sampler (optional - Received I	A B for client by (signature)	convenience onl	Regular DO	= Storm	ney N N	PDES 🗆 DEG
Received I	by (signatu	ure)	Date/Ti			
Received I	by (signatu					
Received I	by (signatu		Date/Ti	me Co	ndition	
		ire)	Date/Ti	me Co	ndition	2
Received I	by (signatu					
Marin	Date/Time Condition at Lab Receipt					
	200		around R	equest	Standard	
COMP	GRAB	Preservation	he lab, d pH SU	Temp.	TRC mg/L	Analysis Requested (circ
/13	x		x	2.1	x	TSS
	x	pH<2, <6C				TKN, Nitrate+Nim Total N, Tot Phosphorus a
E .	x	<6C	x		x	TPH-DRO
	x	HCl to pH<2, <6C	x		x	TPH-GRO
I C III	NEERING QC measu COMP	NEERING USE ON QC measurements COMP GRAB X X X Yepe of Ice (circle): W immediately after co	NEBERING USE ONLY indicated by QC measurements out-of-hold in the COMP GRAB Preservation X H2SO4 to pH<2, <6C X HCI to pH<2, <6C Yet of Ice (circle) When Blue None immediately after collection and ba	NEERING USE ONLY indicated by GRAY OC measurements out-of-hold in the lab, d COMP GRAB Preservation pH SU A	NEERING USE ONLY indicated by GRAY AREAS. QC measurements out-of-hold in the lab, do not rep COMP GRAB Preservation pH Temp. X < 6C	NEBRING USE ONLY indicated by GRAY AREAS. OC measurements out-of-hold in the lab, do not report. COMP GRAB Preservation PH Temp. TRC mg/L X < 6C

Disposition Site:
Disposition No.:
Method of Disposition/Date:
Performed by:
Date:

**** Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well.

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17061908

VAN/VAG: Other (list):

LABORATORY CHAIN-OF-CI

	ELI MANDE ELI MILLO DE LA CORRE
200.00	OT- 42 Grat RIRIPIDADABI31
	Smillion: SottleTD: 17/61/90813 A
	Climit No. 25y of Whichester Engineering (a)Naction: 96/19/2017 13:40 Nami : 86/19/2017 14:55
	Test: Total Suspended Solds (TSS)

Sampling Time(s)

Grab: 1:40 P

G	
GREENWAY ENVIRONMENTAL LABORATORY	
51 Windy Hill Lane. Winchester, VA 22602	Phone: (540) 662-4185
Owner Name and Address of Sampling Site	Sampling Date;
City of Winchester Engineering Department 301 Cork Street	Grab: 6/19/17

301 Cork Street Winchester, VA 22601 Billing/Mailing Address (if different) 15 N. Cameron St. Winchester, VA 22601 Contact Phone: Reports: Robert Brown 540-667-2376 Invoices: Kelly Henshaw: 540-667-1815 Identifying No.(s) VPDES:

Robert Brown Sampler (signature)

Type (WW, SW, GW, PW, STW, S) STW = Stormwater Regulatory Agency NPDES DEQ
DCLS/ODW None Other (list):

Sample Source (Outfall 001, Final Eff., etc.)

Outfall 001 O7-42

Field Data (temp, pH, dissolved oxygen, TRC, etc.) (optional - for client convenience only)

Sampler (print)

Relinquished by Sampler	Date/Time	Received by (signature)	Date/Time	Condition
Palet Bean	6-19/2:50			
Relinquished by (signature)	Date/Time	Received by (signature)	Date/Time	Condition
Relinquished by (signature)	Date/Time	Received by (signature)	Date/Time	Condition at Lab Receipt
		451 MX	unnlus	5 carpa conterticulos

Email Invoice? Y Email: Kelly.henshaw@winchesterva.gov			il Result	26	Turna winchesterya.go		Requesti Dug	Standard Date:	x Priority D
		EENWAY ENGIN						et.	
Greenway Sample 1D	Sample Time	Container Type	COMP	GRAB	Preservation	pH SU	Temp.	TRC mg/L	Analysis Requested (circle)
1704,408 BA		12 plastic		x	<6C	x	0.6	x	(TSS)
		500 mL plastic (a/w)		x	H2SO4 to pH<2, <6C				TKN, Nitrate+Nitrite, Total N, Total Phosphorus as P
		2x 250 mL amber glass		x	<6C	x		x	TPH-DRO
		3x 40 mL amber			HCl to	1100			

Observations and Comments:

glass vial

Disposition Site: Performed by: Disposition No.: Method of Disposition/Date:

pH<2, <6C

Date: * Condition: please note conditions of sample when received (i.e. on ice, from fridge). Other applicable conditions may be noted as well *

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TPH-GRO

Winchester, VA n

9 2:51 PM EDT on July 07, 2017 (GMT -0400)

Weather History for KOKV - June, 2017

June

19

2017

View Monday, June 19, 2017

Daily	Weekly	Monthly	Custom		
		A	ctual	Average	Record
Temperatu	ire				
Mean Tem	perature	70	I*F	la.	
Max Temp	erature	8-	I.F	81 *F	94 °F (1984)
Min Tempe	erature	61	9*F	61 °F	48 °F (1999)
Cooling De	egree Days	1:	2		
Growing D	egree Days	20	6 (Base 50)		
Moisture					
Dew Point		6	r+F		
Average H	umidity	7:	7		
Maximum !	Humidity	9	i)		
Minimum I	Humidity	51	3		
Precipitation	on				
Precipitation	on	0.	74 in		-0
Sea Level	Pressure				

https://www.wunderground.com/history/airport/KOKV/2017/6/19/DailyHistory.html?req_ci... 7/7/2017

	Actual	Average	Record	
Sea Level Pressure	29.85 in			
Wind				
Wind Speed	6 mph (SW)			
Max Wind Speed	14 mph			
Max Gust Speed	26 mph			
Visibility	10 miles			
Events	Rain , Thunderstorm			
verages and records f	or this station are not off	icial NWS values.		
T = Trace of Precinitation, MN	A = Missing Value	Source: MIAIS Dail	Cummani	

https://www.wunderground.com/history/airport/KOKV/2017/6/19/DailyHistory.html?req_ci... 7/7/2017

10	Weath	ner Hist	ory for	Winche	ester,	VAIW	eather l	Jnderg	ground				Page 1 of 1	
	10 15 AM	80.6 °F	83.2 °F	68.0 °F	65%	29.86 in	10.0 mi	ssw	13.8 mph	20.7 mph	N/A		Mostly Cloudy	
	10.35 AM	82.4 °F	85.4 °F	68.0 °F	62%	29.54 in	10.0 mi	ssw	8.1 mph	16,1 mph	N/A		Overcast	
	10.55 AM	84.2 °F	87 3 °F	68.0 °F	58%	29.84 in	10.0 m	ssw	9.2 mph		N/A		Scattered Clouds	
	11 15 AM	82.4 °F	85.4 °F	68.0 °F	62%	29.84 n	10.0 mi	ssw	5.8 mpn		N/A		Mostly Cloudy	
	11:35 AM	84.2 °F	87.3 °F	68.0 °F	58%	29.83 :n	10.0 mr	ssw	10.4 mph	*	N/A		Mostly Cloudy	
	11 55 AM	84.2 °F	87.3 °F	68.0 °F	58%	29.83 in	10.0 mi	ssw	10.4 mph	16.1 mph	N/A		Overcast	
	12 15 PM	82.4 °F	85.4 °F	68.0 °F	62%	29.83 in	10.0 mi	SSW	11.5 mph	17.3 mph	N/A		Overçasi	
	12 35 PM	80.6 °F	83.2 F	68.0 'F	65%	29.82 in	10.0 mi	www	12,7 mph	17.3 mph	N/A		Overcast	
	12:55 PM	84.2 'F	87.3 °F	68,0 °F	58%	29.80 in	10.0 mi	South	11.5 mph	18.4 mph	N/A		Mostly Cloudy	
	1 15 PM	69.8 'F		68.0 °F	94%	29.83 in	1,5 mi	West	12.7 mph	26.5 mph	0.30 in	Rem , Thunderstorm	Heavy Thunderstorms and Rain	
	1 35 PM	89.8 °F	(2)	68.0 °F	94%	29.80 in	2.5 mi	West	8.1 mph		0.57 in	Rein . Thunderstorm	Heavy Thunderstorms and Rain	
	1 55 PM	69.8 °F	e'i	66.0 °F	94%	29.83 in	4.0 mi	ssw	6.9 mph		0.70 in	Rain Thunderstorm	Ran	
	2 15 PM	71.6 °F		4° 0.88	88%	29.82 n	10.0 mi	wsw	6.9 mph	(+)	0.03 in	Rain . Thunderstorm	Thunderstorms and Rain	
	2 35 PM	73.4 °F	ir (69.8 °F	88%	29,81 in	10.0 mi	sw	4.6 mph	- Ē	0.04 m	Thunderstorm	Overcast	
	2.55 PM	73.4 °F		69.8 °F	88%	29.82 in	10.0 mi	South	4.6 mph		0.04 in		Overcast	
	3·15 PM	73.4 °F	•	69.8 °F	88%	29.83 m	10.0 m	Calm	Calm	÷	N/A	Thunderstorm	Overcast	
	3·35 PM	73,4 °F		89.8 °F	88%	29.83 in	10.0 ms	SSW	3.5 mph	4	N/A		Overcast	
	3:55 PM	73.4 °F	÷	69.8 °F	88%	29.83 in	10.0 mi	ssw	3.5 mph		N/A		Overcast	
	4 15 PM	75.2 °F		69.8 °F	83%	29.84 in	19,0 mi	SSW	3.5 mph	9	NA		Overcasi	

https://www.wunderground.com/history/airport/KOKV/2017/6/19/DailyHistory.html?req_ci... 7/7/2017

Daly W	feather	Histor	y & O	bserva	tions															
2017	Temp	(*F)		Dow	Point (F)	Humi	dity (%	1	Sea Le	vel Pres	s. (in)	Visite	illy (m	0	Wind	(mph)		Precip. (in)	Events
Jun	high	avg	low	high	avg	low	righ	avo	low	Nigh	evg	low	Ngh	avg	low	high	avg	high	sum	
1	78	66	53	84	49	43	88	55	32	30.06	30.02	29.98	10	10	10	17	6	25	0.00	Thunderstorm
Z	77	64	51	82	48	34	82	63	28	30.07	30.04	30,02	10	10	7	18	5	37	0.00	
3	80	68	67	64	46	43	72	40	28	30.06	30.02	29.99	10	10	10	21		28	0.00	
4	86	70	63	83	63	46	82	68	33	30.08	29.94	29.62	10	10	10	12	4	18	0.00	
5	89	54	59	64	81	55	94	82	68	29.53	29.75	29,68	10	10	6	9	2	16	0.07	Rain
6	71	81	51	63	61	46	100	64	41	29.88	29.79	29.71	10	10		20	7	26	0.00	
7	66	58	45	68	52	46	100	83	60	30.05	29.97	29.67	10	10		7	2		0,00	Rein
8	69	56	46	82	48	45	100	71	40	30.00	29.96	29,85	10	8		6	1	¥,	0.00	Fog
9	78	66	63	52	50	46	88	58	34	29.98	29.68	29.62	10	10	10	16	6	22	0.00	
10	84	70	67	61	55	50	82	57	37	30.08	30.03	29.98	10	10	10	9		¥)	0.00	
11	87	76	84	63	50	57	78	57	38	30.18	30.11	30.08	10	10	10	12	6	18	0.00	
12	87	74	62	64	81	69	94	62	38	30.16	30.09	30.02	10	10	10	9	3	17	0.00	
13	91	80	69	68	64	61	78	61	38	30.05	30.00	29.92	10	10	10	9	4		0.00	Thunderstorm
14	46	75	84	68	85	62	34	72	51	30.03	29.98	29.93	10	10	7	10	3	*	0.00	Thunderstorm
15	82	73	84	68	65	61	100	77	61	30.00	29,98	29.89	10	•	1	14	4	20	0.00	Rein
16	80	74	68	70	67	63	100	85	65	29.02	29.91	29,88	10	9	•	12	5	•	0.05	Rein Thunderslorm
17	86	75	84	70	67	84	100	82	65	29.93	29.40	29.84	10	1	0	16	3	20	0.00	Fog
18	80	78	88	70	68	64	100	72	49	29.85	20.83	29.77	10	10	10	17	6	24	0.00	
19	84	78	69	70	67	61	94	77	58	29,94	29.65	29 80	10	10	2	14	6	26	0.74	Rain . Thunderstorm
20	82	72	60	64	55	48	94	57	30	30.02	29.99	20 94	10	10	10	18		26	0.00	Rein
El	86	72	69	63	58	54	88	61	37	30.01	29,99	29.95	10	10	10	16	5	23	0.00	
22	82	72	82	72	66	61	94	72	57	30.64	30 00	29.95	10	10	10	10	3	6	0.00	
23	46	77	68	72	68	64	100	75	68	29,96	29.80	29.69	10	10	7	17	7	28	0.07	Ram
24	80	74	6.0	70	60	54	190	62	79	30,01	29.85	29.82	10	10	3	21		28	0,25	Rain
25	80	70	63	50	81	43	94	63	29	30.08	30.04	30.00	10	10	10	17	8	22	0,00	
26	78	66	53	52	47	43	82	51	32	30.11	30.06	30,00	10	10	10	13	5	17	0.00	
27	77	66	53	52	47	41	77	52	29	30.12	30.04	30.01	10	10	10	17	5	25	0.00	
28	77	62	46	54	48	43	100	60	32	30 22	50.16	30.12	10	10	10	9.	2		0.00	
29	86	72	59	63	57	52	77	59	40	30:15	30.10	30,03	10	10	7	15	5	18	0.00	
30	69	79	69	68	84	81	83	61	40	30.06	38.00	29.93	10	10	10	10	7	24	0.00	

https://www.wunderground.com/history/airport/KOKV/2017/6/12/MonthlyHistory.html?req... 7/7/2017

Coliscan Easygel Data Form

Sample Site #:	Sample Date:	Sample Time:	Rain Past 48 Hours (Inches) ¹	Incubator Time In:	incubator Temp in: ²	Incubator	Incubator Temp Out:	Sample Volume (ml) ³	# E. coli Colonies (dark Total blue to royal E. co purple) 4 (CFU	li Count 1100 ml) ⁵	Comments:
OT-42	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5		160	
OT-34	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	34	680	
OT-54	12/6/2016	11:35 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	0	0	
OT-11	12/6/2016	11:15 AM	0	12:30 PM	95 F	1:30 PM	95 F	5	0	0	
OT-42	6/19/2017	1:40 PM	0	2:30 PM	95 F	2:30 PM	95 F	5	19	380	
OT-34	6/19/2017	1:20 PM	0	2:30 PM	95 F	2:30 PM	95 F	.5	TNTC		
OT-54	6/19/2017	1:20 PM	0	2:30 PM	95 F	2:30 PM	95 F	5	12	240	
OT-11	6/5/2017	2:00 PM	0	3:30 PM	95 F	3:30 PM	95 F	3	0	0	

² Ideal incubation temperature is 37.5 C.

³ Between 1.0 - 5.0 ml

 5 To calculate the number of E, coli colonies: (# E, coli colonies/ml sample size) x 100 ⁴ Colonies to be counted per Coliscan Easygel instructions provided in Attachment 1 to the WQMP ¹ See http://w1.weather.gov/data/obhistory/KOKV.html.



SAMPLE SUMMARY

Client Project ID : Stormwater Outfall 001

Report To:

Client Name: City of Winchester Engineering Department

Attn: Kelly Henshaw

Client Address: 301 Cork Street

The laboratory has analyzed the following samples:

P.O.#.:

City, State, Zip: Winchester, VA, 22601

Client Sample ID	Matrix	Sample ID	Collection D/T	Received D/T	Collected by
OT-34 GRAB 073018	Storm Water	18073009.01	07/30/2018 13:43	7/30/2018 14:48	Hong Lim
OT-42 GRAB 073018	Storm Water	18073009.02	D7/30/2018 13:52	7/30/2018 14:48	Hong Lim
OT-54 GRAB 073018	Storm Water	18073009.03	07/30/2018 13:58	7/30/2018 14:48	Hong Lim
OT-11 GRAB 073018	Storm Water	18073009.04	07/30/2018 14:09	7/30/2018 14:48	Hong Lim



This Laboratory is NELAP accredited.

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VELAP ID# 460028

Date: 08/07/2018 17:41

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TERM AND QUALIFIER DEFINITION

ieneral Term I	Definition
Conc.	Concentration
DF	Dilution Factor - the factor applied to the reported data due to sample preparation, dilution, or moisture content
ND	Non Detect - Not Detected at or above adjusted reporting limit
1	Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
RL.	adjusted Reporting Limit (QL – Quantification Limit)
MDL	adjusted Method Detection Limit (LOD – Limit of Detection)
RegLimit	Regulatory Limit
mg/l	Milligrams per Liter/ppm
mg/kg	Milligrams per Kilogram
ppm	Parts per Million
µg/L	Micrograms per Liter/ppb
µg/g	Micrograms per Gram
ppb	Parts per Billion
gr/gal	Grains per Gallon
SU	Standard Units
COU	Cobalt Color Units
NTU	Nephelometric Turbidity Units
µS/cm	Microsiemens per cm at 25C
P/A	Presence/Absence
MPN	Most Probable Number
RB	Reagent Blank
MB	Method Blank
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LFM	Laboratory Fortified Matrix (MS – Matrix Spike)
LFMD	Laboratory Fortified Matrix Duplicate (MSD - Matrix Spike Duplicate)
DUP	Sample Duplicate
RPD	Relative Percent Difference
%Rec	Percent Recovery



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VELAP 1D# 460028



CERTIFICATE OF ANALYSIS

	ity of Winchester Engineering De tormwater Outfall 001	epartment					Attn Date	Park Salahan	enshaw 2018 05:41 PM	
Job ID ; Client Sample ID: Job Sample ID: Other Information Conclusion:	18073009.01					Date (e Matrix: Collected: Collected: ddress:			
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		te/Time epared	Date/Time Analyzed	Analys
SM 2540D-2011	Total Suspended Solids (TSS) TSS	212	mg/L	5,0	5			01/2018 16:24	08/02/2018 11:54	knc

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CERTIFICATE OF ANALYSIS

	900	of Winchester Engineering De mwater Outfall 001	epartment						Attn: Date:	A STATE OF THE PARTY OF THE PAR	enshaw 2018 05:41 PM	me Projetom u
Job ID :		18073009					Sampl	e Matrix	c	Storm V	Vater	
Client Sample ID	:	OT-42 GRAB 073018					Date 0	Collected	d:	07/30/2	018	
Job Sample ID:		18073009.02					Time (Collecte	d:	13:52		
Other Informatio	n:	OT-42					Site A	ddress:			k Street ster, VA 22601	
Conclusion:											2000	
Test Method	Pa	arameter/Test Description	Result	Units	RL	DF	MDL	Q		/Time pared	Date/Time Analyzed	Analys
SM 2540D-2011	T	otal Suspended Solids (TSS)										w e car
	T	SS	25.2	mg/L	2.0	2				1/2018 5:24	08/02/2018 11:56	knc

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CERTIFICATE OF ANALYSIS

	Olty of Winchester Engineering De Stormwater Outfall 001	epartment					Attr Dat	ME - 12 N. 1915	enshaw 2018 05:41 PM	
Job ID : Client Sample ID Job Sample ID; Other Informatio Conclusion;	18073009.03					Date C	e Matrix; Collected; Collected; ddress;		7 7 7.	
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		ite/Time repared	Date/Time Analyzed	Analyst
SM 2540D-2011	Total Suspended Solids (TSS) TSS	2.8	mg/L	1.0	i.		08	/01/2018 16:24	08/02/2018 11:57	knc

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CERTIFICATE OF ANALYSIS

	ity of Winchester Engineering De tormwater Outfall 001	epartment					-		enshaw 2018 05:41 PM	- unaudi
Job ID : Client Sample ID: Job Sample ID: Other Information Conclusion:	18073009.04					Date C	e Matrix: Collected: Collected; ddress;			
Test Method	Parameter/Test Description	Result	Units	RL	DF	MDL		Date/Time Prepared	Date/Time Analyzed	Analys
SM 2540D-2011	Total Suspended Solids (TSS) TSS	123	mg/L	4.0	4		0	8/01/2018 16:24	08/02/2018 11:57	knc

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VELAP 1D# 460028



QUALITY CONTROL DATA

Analysis : Total S	Suspended Solids (TSS)	Method: SM 2540D-2011	Matrix: Storm Water
QC Batch ID : Qb180 Samples in This QC I		Created Date : 08/01/2018 03,04	Created By : kcoffey
Sample Preparation	PB18080103	SM 2540D-2011	kcoffev

QC Type: Method	Blank			_				
	Parameter	CAS	Result	Units	DF	RL	SDL	Qual
Method Blank	TSS		<1.0	mg/L	1	1.0		

QC TYP	e: Duplicate							
	QC Sample ID	Parameter	Result	QC Sample Result	Units	RPD	RPD CtrlLimit	Qual
Dup2	18073009.04	TSS	123	122	mg/L	1	20	
Dup	18073009.01	TSS	212	224	mg/L	-6	20	

QC Ty	pe: LCS/LCSD									557	
	Parameter	LCS Spk Amt	LCS Result	LCS % Rec	LCSD Spk Amt	LCSD Result	LCS % Rec	RPD	RPD CtrlLimit	% Rec CtrlLimit	Qual
LCS	TSS	100	102	102	100	100	100	-2	20	80-120	7.11

Refer to the Definition page for terms.



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SAMPLE CONDITION CHECKLIST

Client Name: City of Winchest	er Engineering Department	Contact : Kelly Hensha
Client Address: 301 Cork Street		Contact Phone: 540-667-181
JobID: 18073009	Date Received: 07/30/2018	Time Received: 02:48 PM
Temperature :	Sample pH :	
ThermometerID : FLUKE 561	pHPaperID: A-STAR	

Comments: Include actions taken to resolve discrepancies/problem:

Only one ice pack between 2 samples, not completely surrounded by ice. tdh 7/30/18

	Check Points	Yes	No	N/A
1	Sample(s) received in laboratory in a cooler with ice.	V	-	
2	All temperatures <6C on receipt (<10C for bacteriological) if no, the answer to Questions #3 and #4 must be "YES" in order for the sample to be considered properly preserved).		~	
3	Cooling began immediately (within 15 minutes) after collection.	~		
4	Samples received on the same day as sample collection.	V		
5	Ice surrounding all samples in cooler.		~	-
6	COC form contains sampler(s) signature(s) and is properly relinquished by sampler(s) and courier(s).	~	-	HT
7	COC form contains date and time of sample collection.	~		11.
8	Sample containers arrived intact.	V		
9	Samples were received in Greenway-provided containers.	V		
10	Sample(s) were received in appropriate containers.	~	-	-
11	Sample(s) were properly preserved (includes thermal preservation).	~		
12	All samples were properly labeled on receipt (distinguishable).	V	- 11	
13	Sampling dates and times on bottles match COC.	~	-	
14	Bottle count on COC matches number of bottles received.	~		
15	Sample amount is sufficient for analyses requested	~		
16	Samples received within the hold time.	V		

CheckIn By:

Taylor Hammack

CheckIn Date: 07/30/2018



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VELAP ID# 460028

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18073009

LABORATORY CHAIN-OF-CUCTO

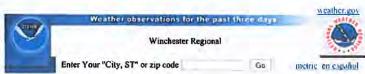
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Job ID:18073009

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D	Time	Wind	Vie		Sky	T	emper	ature (°F)	Relative	Wind	Heat	Pressu	ire	Preci	pita in.)	tion
t		(mph)		Weather	Cond.			6 hour	Humidity		Index		sea		1	
e	(,	(()		Contro	Air	Dwpt	Max. Min.	Atamany	(°F)	(°F)	altimeter (in)	level (mb)	1 hr	3 hr	hr
30	16:15	Calm	10.00	Light Rain	BKN026 BKN070 OVC080	64	63		94%	NA	NA	30.14	NA	0.01		
30	15:55	Calm	5.00	Rain	SCT050 BKN070 OVC080	64	63		94%	NA	NA	30.13	NA	0.43		
30	15:35	SE 8	1.50	Heavy Rain	SCT017 BKN041 OVC055	64	63		94%	NA	NA	30.13	NA	0.33		
30	15:15	NW 3 G 20	4.00	Heavy Rain	SCT017 BKN029 OVC047	66	63		88%	NA	NA	30,14	NA	0.08		
30	14:55	S 3	10.00	Overcast	SCT015 BKN048 OVC070	68	64		88%	NA	NA	30.12	NA			
30	14:35	SE 9	10.00	Overcast	BKN013 BKN020 OVC070	68	66		94%	NA	NA	30.11	NÀ			
30	14:15	SE 13	7.00	Drizzle	SCT011 BKN017 OVC044	70	66		88%	NA	NA	30.10	NA			
30	13:55	SE 7	4.00	Rain	SCT017 BKN043 OVC075	70	68		94%	NA	NA	30.10	NA	0.21		
30	13:35	S 5	5.00	Light Rain	SCT015 BKN030 OVC075	70	68		94%	NA	NA	30.10	NA	0.21		
30	13:15	S 15 G 18	5.00	Heavy Rain	SCT014 BKN024 OVC036		68		83%	NA	NA	30.11	NA	0.06		
30	12:55	SE 7	10.00	Overcast	BKN025 BKN033 OVC044	75	68		78%	NA	NA	30.10	NA			
30	12:35	SE 9	10.00	Overcast	SCT027 BKN033 OVC044	77	68		74%	NA	79	30.11	NA.			
30	12:15	SE 12 G 18	10.00	Mostly Cloudy	SCT024 SCT030 BKN035	77	64		65%	NA	79	30.11	NA			
30	11:55	SE 10	10.00	Partly Cloudy	SCT021 SCT027 SCT070	77	66		69%	NA	79	30.11	NA			
30	11:35	E 7	10.00	Mostly Cloudy		75	68		78%	NA	NA	30.12	NA			

http://w1.weather.gov/data/obhistory/KOKV.html

					observe.								
					SCT017 SCT022 BKN070								
30	11:15	E 6	10.00	Mostly Cloudy	SCT015 SCT020 BKN070	73	68	83%	NA	NA	30.12	NA	
30	10:55	E 3	10.00	Partly Cloudy	SCT015 SCT070	73	68	83%	NA	NA	30.13	NA	
30	10:35	E 6	10.00	Fair	CLR	72	66	83%	NA	NA	30.13	NA	
30	10:15	NE 3	10.00	Partly Cloudy	SCT110	70	66	88%	NA	NA	30.13	NA	
30	09:55	E 3	10.00	Mostly Cloudy	SCT060 BKN110	70	64	83%	NA.	NA	30.13	NA	
30	09:35	NE 3	10.00	Overcast	SCT060 OVC110	70	64	83%	NA	NA	30.14	NA	
30	09:15	Calm	10.00	Mostly Cloudy	SCT060 BKN110	68	64	88%	NA	NA	30.13	NA	
30	08:55	Calm	10.00	Partly Cloudy	SCT060 SCT090 SCT110	68	64	88%	NA	NA	30.13	NA	
30	08:35	Calm	10.00	Partly Cloudy	SCT090	68	64	88%	NA	NA	30.13	NA	
30	08:15	NE 3	10.00	Mostly Cloudy	BKN090	68	64	88%	NA	NA	30.13	NA	
30	07:55	Calm	10.00	Mostly Cloudy	BKN090	66	64	94%	NA	NA	30.13	NA	
30	07:35	Calm	10.00	Mostly Cloudy	BKN090 BKN120	66	63	88%	NA	NA	30.13	NA	
30	07:15	Calm	10.00	Mostly Cloudy	SCT090 BKN120	64	63	94%	NA	NA	30.13	NA	
30	06:55	Calm	10.00	Mostly Cloudy	SCT100 BKN120	64	63	94%	NA.	NA	30.13	NA	
30	06:35	Calm	10.00	Overcast	OVC090	64	63	94%	NA.	NA	30.13	NA	
30	06:15	Calm	10.00	Overcast	OVC090	64	63	94%	NA	NA	30.13	NA	
30	05:55	Calm	10.00	Overcast	SCT028 SCT075 OVC100	64	63	94%	NA	NA	30.13	NA	
30	05:35	Calm	10.00	Overcast	OVC100	64	63	94%	NA	NA	30.13	NÁ	
30	05:15	Calm	10.00	Mostly Cloudy	BKN100 BKN120	64	63	94%	NA	NA	30.13	NA	
30	04:55	Calm	10.00	Mostly Cloudy	SCT030 SCT050 BKN100	64	63	94%	NA	NA	30.13	NA	
30	04:35	Calm	10.00	Mostly Cloudy	SCT028 SCT034 BKN050	64	63	94%	NA	NA	30.14	NA	
30	04:15	Calm	10.00	Fair	CLR	64	63	94%	NA	NA	30.15	NA	
30	03:55	Calm	10.00	Partly Cloudy	SCT110	64	63	94%	NA	NA	30.13	NA	
30	03:35	Calm	10.00	Partly Cloudy	SCT110	63	63	100%	NA	NA	30.14	NA	
30	03:15	Calm	10.00	Partly Cloudy	SCT100	63	63	100%	NA	NA	30.15	NA	
30	02:55	Calm	10.00	Partly Cloudy	SCT100	64	63	94%	NA	NA	30.15	NA	
30	02:35	Calm	10.00	Fair	CLR	64	63	94%	NA	NA	30.14	NA	
30	02:15	Calm	10.00	Fair	CLR	64	63	94%	NA	NA	30.14	NA	

http://wl.weather.gov/data/obhistory/KOKV.html

30	01:55	Calm	10.00	Fair	CLR	63	63	100%	NA	NA	30.13	NA
30	01:35	Calm	10.00	Partly Cloudy	SCT095	64	63	94%	NA	NA	30.14	NA
30	01:15	SE 3	10.00	Mostly Cloudy	BKN095	68	64	88%	NA	NA	30.14	NA
30	00:55	Calm	10.00	Mostly Cloudy	BKN095	66	63	88%	NA	NA	30.15	NA
30	00:35	Calm	10.00	Partly Cloudy	SCT095	64	63	94%	NA	NA	30.15	NA
30	00:15	Calm	10.00	Partly Cloudy	SCT095	70	63	78%	NA	NA	30.15	NA
29	23:55	Calm	10.00	Partly Cloudy	SCT085	66	64	94%	NA	NA	30.16	NA
29	23:35	Calm	10.00	Mostly Cloudy	SCT075 BKN085	68	64	88%	NA	NA	30 16	NA
29	23:15	Calm	10.00	Overcast	OVC075	68	64	88%	NA	NA	30.16	NA
29	22:55	Calm	10.00	Mostly Cloudy	BKN090	68	64	88%	NA	NA	30.16	NA
29	22:35	Calm	10.00	Partly Cloudy	SCT090	68	64	88%	NA	NA	30.16	NA
29	22:15	SE 3	10.00	Partly Cloudy	SCT085	70	64	83%	NA	NA	30.15	NA
29	21:55	SE 3	10.00	Mostly Cloudy	BKN085	70	64	83%	NA	NA	30.15	NA
29	21:35	Calm	10.00	Overcast	OVC085	70	66	88%	NA.	NA	30.13	NA
29	21:15	Calm	10.00	Mostly Cloudy	BKN085	70	66	88%	NA	NA	30.13	NA
29	20:55	Calm	10.00	Mostly Cloudy	BKN085	70	64	83%	NA	NA	30.13	NA
29	20:35	Calm	10.00	Mostly Cloudy	BKN085	73	64	74%	NA	NA	30.13	NA
29	20:15	E3	10.00	Overcast	OVC085	73	64	74%	NA	NA	30.13	NA
29	19:55	E3	10.00	Overcast	OVC075	75	64	69%	NA	NA.	30.13	NA
29	19:35	E5	10.00	Mostly Cloudy	BKN075 BKN090	75	64	69%	NA	NA	30.13	NA
29	19:15	E 5	10.00	Partly Cloudy	SCT075 SCT100	77	63	61%	NA	79	30.12	NA
29	18:55	E 5	10.00	Mostly Cloudy	SCT075 BKN100	77	63	61%	NA	79	30.12	NA
29	18:35	E 3	10.00	Overcast	BKN080 OVC110	77	63	61%	NA	79	30.12	NA
29	18:15	E6	10.00	Overcast	OYC080	77	63	61%	NA	79	30.12	NA
29	17:55	SE 6	10.00	Overcast	OVC090	77	63	61%	NA	79	30.12	NA
29	17:35	SE 3	10.00	Mostly Cloudy	BKN090	79	63	58%	NA	81	30.13	NA
29	17:15	SE 5	10.00	Partly Cloudy	SCT050 SCT055	79	61	54%	NA	80	30.13	NA
29	16:55	SE 6	10.00	Partly Cloudy	SCT048	79	63	58%	NA	81	30.13	NA
29	16:35	E6	10.00	Partly Cloudy	SCT046	81	61	51%	NA	82	30.12	NA
29	16:15	E 6	10.00	Mostly Cloudy	BKN046 BKN090	81	63	54%	NA	82	30.12	NA
29	15:55	Calm	10.00	Mostly Cloudy	SCT048 SCT070 BKN090	79	61	54%	NA	80	30,13	NA
29	15:35	Calm	10.00	Mostly Cloudy		79	61	54%	NA	80	30.14	NA

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					SCT060 BKN070 BKN080								
29	15:15	SE 3	10.00	Mostly Cloudy	SCT048 BKN060 BKN070	79	61	34%	NA	80	30.14	NA	
29	14:55	S 6	10.00	Partly Cloudy	SCT050	81	61	51%	NA	82	30.14	NA	
29	14:35	E 3	10.00	Partly Cloudy	SCT060 SCT065	79	59	51%	NA	80	30 14	NA	
29	14:15	E 5	10.00	Partly Cloudy	SCT050 SCT060	79	61	54%	NA	80	30.15	NA	
29	13:55	Calm	10.00	Partly Cloudy	SCT046 SCT080	77	61	57%	NA	79	30.15	NA	
29	13:35	Calm	10.00	Partly Cloudy	SCT046 SCT075	77	59	54%	NA	79	30.15	NA	
29	13:15	W 3	10.00	Overcast	SCT042 BKN050 OVC075	77	61	57%	NA	79	30.16	NA	
29	12:55	Calm	10.00	Overcast	OVC038	77	61	57%	NA	79	30.16	NA.	
29	12:35	53	10.00	Overcast	BKN038 BKN045 OVC070	77	61	57%	NA	79	30.16	NA	
29	12:15	N 3	10.00	Overcast	SCT036 BKN045 OVC070	75	61	61%	NA	NA	30.16	NA	
29	11:55	NE 3	10.00	Partly Cloudy	SCT034	75	61	61%	NA	NA	30.16	NA	
29	11:35	E 3	10.00	Partly Cloudy	SCT034	73	61	65%	NA	NA	30.17	NA	
29	11:15	Calm	10.00	Fair	CLR	73	61	65%	NA	NA	30.17	NA	
29	10:55	SE 3	10.00	Fair	CLR	73	61	65%	NA	NA	30.17	NA	
29	10:35	Calm	10.00	Fair	CLR	73	61	65%	NA	NA	30.17	NA	
29	10:15	Calm	10.00	Partly Cloudy	SCT075	72	61	69%	NA	NA	30.18	NA	
29	09:55	Calm	10.00	Partly Cloudy	SCT075	70	61	73%	NA	NA	30.18	NA	
29	09:35	Calm	10.00	Mostly Cloudy	BKN075	70	61	73%	NA	NA	30.18	NA	
	09:15	S 3		Mostly Cloudy	BKN075	68	61	78%	NA	NA	30.18	NA	
				Partly Cloudy	SCT075	68	61	78%	NA	NA	30.17	NA	
	08:35		10.00		CLR	66	61	83%	NA	NA	30.17	NA	
- 7.3	08:15	T 42	10.00		CLR	64	61	88%	NA	NA	30.17	NA	
100	55.33	Calm	200		CLR	64	61	88%	NA	NA	30.17	NA	
		Calm			CLR	63	61	94%	NA	NA	30.17	NA	
		Calm	12775	A 100 PM	CLR	61	59	94%	NA	NA	30.17	NA	
				Partly Cloudy		59	59	100%	NA	NA	30.17	NA	
				Partly Cloudy	SCT080	59	59	100%	NA	NA	30.17	NA	
		Calm			CLR	59	59	100%	NA	NA	30.17	NA	
29	05:55	Calm	10.00	Fair	CLR	59	59	100%	NA	NA	30.16	NA	
		Calm	0.00	97.0	CLR	59	59	100%	NA	NA	30.15	NA	
	22.20	Calm	1000	2777	CLR	59	59	100%	NA	NA	30.15	NA	
29	04:55	Calm	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA	
29	04:35	NW 3	10.00	Fair	CLR	61	59	94%	NA.	NA	30.15	NA	

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29	04:15	Calm	10.00	Fair	CLR	59	59	100%	NA	NA	30.15	NA	
29	03:55	Calm	10.00	Fair	CLR	59	59	100%	NA	NA	30.15	NA	
29	03:35	Calm	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA	
29	03:15	Calm	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA	
29	02:55	SE 3	10.00	Fair	CLR	61	59	94%	NA	NA	30.15	NA	
29	02:35	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.14	NA.	
29	02:15	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.14	NA	
29	01:55	Calm	10.00	Partly Cloudy	SCT085	63	59	88%	NA	NA	30.13	NA	
29	01:35	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.13	NA	
29	01:15	Calm	10.00	Fair	CLR	64	59	83%	NA	NA	30.13	NA	
29	00:55	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.13	NA	
29	00:35	Calm	10.00	Fair	CLR	63	59	88%	NA	NA	30.12	NA	
29	00:15	Calm	10.00	Fair	CLR	68	59	73%	NA	NA	30.12	NA	
28	23:55	NW 5	10.00	Fair	CLR	66	59	78%	NA	NA	30.12	NA	
28	23:35	NW 3	10.00	Fair	CLR	68	59	73%	NA	NA	30.12	NA	
28	23:15	NW 3	10.00	Fair	CLR	68	61	78%	NA	NA	30.11	NA	
28	22:55	NW 5	10.00	Fair	CLR	66	61	83%	NA	NA	30.12	NA	
28	22:35	NW 6	10.00	Fair	CLR	66	61	83%	NA	NA	30.11	NA	
28	22:15	NW 5	10.00	Fair	CLR	68	61	78%	NA	NA	30.11	NA	
28	21:55	NW 3	10.00	Fair	CLR	68	61	78%	NA	NA	30.10	NA	
28	21:35	Calm	10.00	Fair	CLR	68	61	78%	NA	NA	30.09	NA	
28	21:15	Calm	10.00	Partly Cloudy	SCT065	68	61	78%	NA	NA	30.09	NA	
28	20:55	NW 5	10.00	Fair	CLR	70	59	69%	NA	NA	30 08	NA	
28	20:35	NW 5	10.00	Fair	CLR	72	59	65%	NA	NA	30.08	NA	
28	20:15	NW 5	10.00	Fair	CLR	72	61	69%	NA	NA	30.07	NA	
28	19:55	Calm	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA	
28	19:35	Calm	10.00	Fair	CLR	73	59	61%	NA	NA	30.07	NA	
28	19:15	NW 3	10.00	Fair	CLR	73	59	61%	NA	NA	30.07	NA	
28	18:55	N 3	10.00	Partly Cloudy	SCT060	77	59	54%	NA	79	30.06	NA	
28	18:35	NW 7	10.00	Fair	CLR	79	57	48%	NA	80	30.06	NA	
28	18:15	N 6	10.00	Partly Cloudy	SCT060 SCT085	79	59	51%	NA	80	30.05	NA	
28	17:55	N 3	10.00	Partly Cloudy	SCT060	81	59	48%	NA	81	30.05	NA	
28	17:35	NW 8	10.00	Partly Cloudy	SCT060	79	59	51%	NA	80	30.06	NA.	
28	17:15	W 10	10.00	Fair	CLR	81	57	45%	NA	81	30.05	NA	
28	16:55	NW 10	10.00	Partly Cloudy	SCT070	81	59	48%	NA	81	30.05	NA	
28	16:35	N 6	10.00	Fair	CLR	81	57	45%	NA	81	30.05	NA	
28	16:15	NW 8	10.00	Fair	CLR	81	57	45%	NA	81	30.05	NA	
28	15:55	N7	10.00	Partly Cloudy	SCT075	81	57	45%	NA	81	30.05	NA	
28	15:35	NW 7	10.00	Partly Cloudy	SCT075	81	55	42%	NA	81	30.06	NA	
28	15:15	W 10	10.00	Partly Cloudy	SCT075	79	59	51%	NA	80	30.06	NA	
28	14:55	NW 12	10.00	Mostly Cloudy	SCT060 BKN075	79	59	51%	NA	80	30.07	NA	
28	14:35	NW 12 G 17	10.00	Mostly Cloudy	BKN060	79	59	51%	NA	80	30.07	NA	

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28	14:15	NW 13 G 17	10.00	Partly Cloudy	SCT050	79	59	51%	NA	80	30.07	NA
28	13:55		10.00	Partly Cloudy	SCT050 SCT065	79	59	51%	NA	80	30.07	NA
28	13:35	NW 9	10.00	Partly Cloudy	SCT049 SCT065	79	59	51%	NA	80	30.07	NA
28	13:15	W 14	10.00	Partly Cloudy	SCT049	79	59	51%	NA	80	30.07	NA
28	12:55	NW 12	10.00	Partly Cloudy	SCT050	79	59	51%	NA	80	30.08	NA
28	12:35	NW 8	10.00	Partly Cloudy	SCT050	77	59	54%	NA	79	30.08	NA
28	12:15	W 14 G 20	10.00	Partly Cloudy	SCT045	79	59	51%	NA	80	30.10	NA
28	11:55	W 14	10.00	Partly Cloudy	SCT047	77	59	54%	NA	79	30.09	NA
28	11:35	NW 10	10.00	Partly Cloudy	SCT045	77	61	57%	NA	79	30.10	NA
28	11:15	NW 8	10.00	Fair	CLR	77	61	57%	NA	79	30.09	NA
28	10:55	W 10	10.00	Fair	CLR	75	61	61%	NA	NA	30.09	NA
28	10:35	NW 6	10.00	Fair	CLR	75	61	61%	NA	NA	30.09	NA
28	10:15	NW 9	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	09:55	NW 7	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	09:35	NW 8	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	09:15	NW 8	10.00	Fair	CLR	73	61	65%	NA	NA	30.08	NA
28	08:55	NW 6	10.00	Fair	CLR	72	61	69%	NA	NA	30.08	NA
28	08:35	NW 9	10.00	Fair	CLR	72	61	69%	NA	NA	30.08	NA
28	08:15	NW 6	10.00	Fair	CLR	72	63	73%	NA	NA	30.08	NA.
28	07:55	Calm	10.00	Fair	CLR	68	66	94%	NA	NA	30.07	NA
28	07:35	Calm	10.00	Fair	CLR	68	64	88%	NA	NA	30.06	NA
28	07:15	Calm	10.00	Partly Cloudy	SCT050	66	64	94%	NA	NA	30.05	NA
28	06:55	Calm	10.00	Overcast	OVC050		64	94%	NA	NA	30.05	NA
28	06:35	Calm		Overcast	OVC050	64	64	100%	NA	NA	30.05	NA
	TANE	Calm		Overcast	OVC055	64	64	100%	NA	NA	30.05	NA
28	05:55	Calm	10.00	Overcast	OVCI10	64	64	100%	NA	NA	30.04	NA
-				Overcast	OVCITO	555.	64	100%	NA	NA	30.03	NA
17.3			3277	Overcast	OVC120	955	64	94%	NA	NA	30.03	NA
28	04:55	Calm	10.00	Overcast	OVC120	66	64	94%	NA	NA	30.03	NA
28	04:35	SE 3	7,00	Overcast	OVC110	66	64	94%	NA	NA	30.03	NA
28	04:15	W 3	10.00	Mostly Cloudy	SCT060 BKN120	68	64	88%	NA	NA	30.03	NA
28	03:55	Calm	10.00	Overcast	OVC060	68	66	94%	NA	NA	30.03	NA
28	03:35	SW 5	10.00	Overcast	BKN060 OVC120	68	66	94%	NA	NA	30.04	NA
28	03:15	Calm	10.00	Overcast	OVC110	68	66	94%	NA	NA	30.04	NA
28	02:55	Calm	10.00	Overcast	OVC120	68	66	94%	NA	NA	30.03	NA
28	02:35	Calm	10.00	Overcast	OVCIIO	68	66	94%	NA	NA	30.04	NA
28	02:15	Calm	10.00	Overcasi		68	66	94%	NA	NA	30.04	NA

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•	0					T	empera	ture (°F)		(°F)	(°F)	Pressu	re	Preci	pita in.)	(1013
8	Time	Wind (mph)		Weather	Sky Cond.	Air	Dwpt	6 hour	Relative Humidity	Chill	Heat Index	altimeter (in.)	level (mb)		3 hr	
		G 16	10.00	Light Rain in Vicinity		00		Max. Min.	21.0	na	III		sea	0.02		Q.
				Thunderstorm in Vicinity Thunderstorm	SCT065 BKN120	70	68		94%	NA NA	NA NA	30.00		0.02		
	7 17:15			Partly Cloudy	SCT120	72	68		88%	NA	NA	30.02	NA			
2	7 17 35	E 6		Partly Cloudy		72	68		88%	NA	NA	30.01	NA			
2	7 17:55	E 3	10.00	Partly Cloudy	SCT110	73	64		74%	NA	NA	30.00	NA			
2	7 18:15	E 5	10.00	Partly Cloudy	SCT070 SCT085	73	66		78%	NA	NA	30.01	NA			
2	7 18:35	Calm	10.00	Overcast	BKN070 OVC080	73	66		78%	NA	NA	30.02	NA			
2	7 18:55	Calm	10.00	Mostly Cloudy	BKN060	73	64		74%	NA	NA	30.01	NA			
2	7 19 15	NW 3	10.00	Mostly Cloudy	BKN060 BKN070 BKN120	73	64		74%	NA	NA	30.01	NA			
2	7 19:35	Calm	10.00	Partly Cloudy	SCT060 SCT120	72	66		83%	NA	NA	30.02	NA			
2	7 19.55	Calm	10.00	Fair	CLR	70	66		88%	NA	NA	30.02	NA			
	7 20 15		1000	4.5%	CLR	70	66		88%	NA	NA	30.02	NA			
	7 20 35		.0000		CLR	68	64		88%	NA	NA	30.02	NA			
	7 20 55				CLR	68	64		88%	NA	NA	30.02	NA			
	7 21:15				CLR	66	64		94%	NA NA	NA NA	30.03	NA NA			
	7 21:35		145,55	0.00	CLR	66	64		94%	NA NA	NA	30.04	NA			
	7 22 15 7 21 55				CLR	66	64		94%	NA	NA	30.04	NA			
				Partly Cloudy		64	64		100%	NA	NA	30.04	NA			
				Partly Cloudy		64	64		100%	NA	NA	30.05	NA			
				Partly Cloudy		64	64		100%	NA	NA	30.05	NA			
				Overcast	OVC065	66	64		94%	NA	NA	30.05	NA			
2	8 00:00	Calm	10.00	Mostly Cloudy	BKN065 BKN085	68	64		88%	NA	NA	30.05	NA			
				Partly Cloudy	SCT065	66	64		94%	NA	NA	30.05	NA			
2	8 00 35	Calm	10.00	Mostly Cloudy	BKN080	66	64		94%	NA	NA	30.05	NA			
2	8 00:55	Calm	7.00	Overcast	SCT075 OVC090	66	64		94%	NA	NA	30.05	NA			
2	8 01:15	W 3	10.00	Overcast	OVC090	68	66		94%	NA	NA	30.05	NA			
2	8 01:35	Calm	10.00	Overcast	OVC090	68	66		94%	NA	NA	30.05	NA			
2	8 01:55	Calm	10.00	Overcast	OVC110	68	66		94%	NA	NA	30.05	NA			
					SCT080 SCT100											

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Coliscan Easygel Data Form

OT-11	OT-54	OT-34	07-42	01-11	OT-54	OT-34	OT-42	Sar
								Sample Site #:
1/24/2019	1/24/2019	1/24/2019	1/24/2019	7/30/2018	7/30/2018	7/30/2018	7/30/2018	Sample Date:
				2:10 PM	1:58 PM	1:43 PM	1:52 PM	Sample Time:
0	0	0	0	0	0	0	0	Rain Past 48 Hours (Inches) ¹
3:30 PM	2:30 PM	2:30 PM	2:30 PM	3:30 PM	2:30 PM	2:30 PM	2:30 PM	incubator Time in:
95 F	95 F	Incubator Temp In: ²						
12:10PM	12:10PM	12:10PM	12:10PM	3:30 PM	2:30 PM	2:30 PM	2:30 PM	Incubator Time Out:
95 F	95 F	Incubator Temp Out:						
u	3	3	3	4	4	4	4	Sample Volume (ml) ³
7		0	14	81	22	TNTC	TNTC	# E. coli Colonies (dark blue to royal purple) 4
233	633	0	467	450	550			Total E. coli Count (CFU/100 ml) ⁵
						55 55 55 55 55 55 55		Comments:

Notes:

¹See http://w1.weather.gov/data/obhistory/KOKV.html.

² Ideal incubation temperature is 37.5 C.

³ Between 1.0 - 5.0 ml

⁴ Colonies to be counted per Coliscan Easygel instructions provided in Attachment 1 to the WQMP

⁵ To calculate the number of E. coli colonies: (# E. coli colonies/ml sample size) x 100