



Final

STORMWATER OUTFALL MONITORING PLAN



**Marine Corps Installations East –
Marine Corps Base Camp Lejeune &
Marine Corps Air Station New River**



Naval Facilities Engineering Systems Command Mid-Atlantic

Contract: N62470-19-D-4001 | Task Order: N4008520F6173

August 2021

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STORMWATER OUTFALL MONITORING PLAN

MARINE CORPS INSTALLATIONS EAST – MARINE CORPS BASE CAMP LEJEUNE & MARINE CORPS AIR STATION NEW RIVER, NORTH CAROLINA

Prepared For:

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ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
AB	Amphibious Base
AH	AH Environmental Consultants, Inc.
AS	Air Station
BMP	best management practice
CB	Courthouse Bay
CFR	Code of Federal Regulations
CJ	Camp Johnson
COC	chain-of-custody
CWA	Clean Water Act of 1972
DEMLR	Department of Energy, Mineral, and Land Resources
DMR	data monitoring report
DEQ	Division of Environmental Quality
EMD	Environmental Management Division
EPA	Environmental Protection Agency
FC	Frenchs Creek
FedEx	Federal Express
gpm	gallons per minute
HDPE	high density polyethylene
HP	Hadnot Point
HQW	high quality waters
ID	identifier
LF	Landfill
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCIEAST	Marine Corps Installations East
MG	million gallons
mg/L	milligrams per liter



mL	milliliter
MS4	municipal separate storm sewer system
N/A	not applicable
NAD	North American Datum
NAVFAC MIDLANT	Naval Facilities Engineering Systems Command Mid-Atlantic Division
NC	North Carolina
NELAC	National Environmental Laboratory Accreditation Conference
NH	Naval Hospital
NPDES	National Pollutant Discharge Elimination System
NSW	nutrient sensitive waters
OH	Old Hospital
PCA	tetrachloroethane
PCE	tetrachloroethene
POL	petroleum, oil, lubricant
PWD	Public Works Department
RR	Rifle Range
SDO	stormwater discharge outfall
SWOMP	Stormwater Outfall Monitoring Plan
SWPPP	Stormwater Pollution Prevention Plan
TC	Camp Geiger
TMDL	Total Maximum Daily Load
TSS	total suspended solids
UPS	United Parcel Service
US	United States
UTM	Universal Transverse Mercator
VOP	visual observation point
WC	Wallace Creek



CERTIFICATION OF STORMWATER OUTFALL MONITORING PLAN

I certify under penalty of law that this Stormwater Outfall Monitoring Plan and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Director, Environmental Management Division
Marine Corps Installations East – Marine Corps Base
MCIEAST-MCB CAMLEJ, North Carolina

Date



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RECORD OF REVISIONS AND AMENDMENTS

All revisions and amendments to the Stormwater Outfall Monitoring Plan are, and will continue to be, summarized in the following table. The Environmental Management Division is responsible for maintaining an updated copy of the Plan at all times.

Table R-1 Record of Revisions and Amendments

Date	Organization Responsible for Revision/Amendment	Reviewing Organization	Description of Revision/Amendment
November 2005	AMEC Earth & Environmental, Inc.	MCIEAST-MCB CAMLEJ Environmental Management Division	Stormwater Outfall Monitoring Plan
June 2013	AH Environmental Consultants, Inc.	MCIEAST-MCB CAMLEJ Environmental Management Division	Updated Stormwater Outfall Monitoring Plan
August 2021	AH Environmental Consultants, Inc.	MCIEAST-MCB CAMLEJ Environmental Management Division	Updated Stormwater Outfall Monitoring Plan



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EXECUTIVE SUMMARY

The National Pollutant Discharge Elimination System (NPDES) program was established under the authority of the Federal Clean Water Act (CWA) of 1972. The current NPDES stormwater program includes requirements for industrial activities as defined by Title 40 of the United States (US) Code of Federal Regulations (CFR) 122.26 (b)(14), construction activities that disturb one acre or more, and any publicly owned and operated municipal separate storm sewer system (MS4). In North Carolina (NC), the NPDES stormwater program is administered by the Department of Environmental Quality (DEQ), Division of Energy, Mineral, and Land Resources (DEMLR).

Marine Corps Installation-East Marine Corps Base MCIEAST-MCB CAMLEJ (MCIEAST-MCB CAMLEJ) was issued NPDES permit number NCS000290 by NC DEQ DEMLR. The term for the current permit expires on 30 September 2021; however, NC DEQ DEMLR has also provided a draft NPDES permit. The new NPDES permit number NCS000290 will become effective on 1 October 2021 and will expire on 30 September 2026. The NPDES permit authorizes the point source discharge of stormwater runoff and specifies non-stormwater discharges from MCIEAST-MCB CAMLEJ (includes Marine Corps Air Station [MCAS] New River) to the receiving waters specified in the permit. The permit includes the requirements established for stormwater associated with industrial activities and municipal stormwater.

MCIEAST-MCB CAMLEJ's NPDES stormwater permit allows for development of a base-wide stormwater monitoring plan for stormwater associated with industrial activities as an alternative to implementing the requirements of the individual NC general permits for industrial stormwater identified in Section H of the MCIEAST-MCB CAMLEJ NPDES permit. This Stormwater Outfall Monitoring Plan (SWOMP) shall apply to any stormwater discharge outfall (SDO) at MCIEAST-MCB CAMLEJ (including MCAS New River) that receives runoff from a regulated industrial activity (as defined in the NPDES permit and in 40 CFR 122.26 (b)(14)). Implementation of the SWOMP consti-



tutes compliance with the monitoring requirements found in Section H of the NPDES permit.

The Naval Facilities Engineering Systems Command Mid-Atlantic Division (NAVFAC MIDLANT) contracted AH/BC Navy JV, LLC (operating in North Carolina as AH Environmental Consultants, Inc. [AH]), under Contract N62470-19-D-4001 (Delivery Order N4008520F6173), to update the MCIEAST-MCB CAMLEJ SWOMP.

ANALYTICAL MONITORING REQUIREMENTS

On May 9, 2013, MCIEAST-MCB CAMLEJ submitted a technical memorandum to NC DEQ DEMLR that sought approval of modifications to the analytical sampling points specified in the previous SWOMP based on the results of the 2012 Stormwater Pollution Prevention Plan (SWPPP) field assessments. The modifications were approved by NC DEQ DEMLR on May 20, 2013. These analytical sampling locations are still considered representative of the industrial activities found at MCIEAST-MCB CAMLEJ, and these sampling locations have remained the same since the May 2013 NC DEQ approval. Table E-1 summarizes the current representative industrial outfalls approved for analytical sampling.

Table E-1 Representative Outfalls for Analytical Monitoring

Base Area	Representative Outfall (Analytical Sampling Point ¹)	Industrial Activities Represented ²
Air Station	OAS-005	Air transportation operations; ground transportation operations; bulk fuel storage and transfer; warehousing and storage; wood product manufacturing
	OAS-018	Air transportation operations
Frenchs Creek	OFC-003	Ground transportation operations
	OHP-004	Ground transportation operations
Hadnot Point	OHP-008	Ground transportation operations; warehousing and storage; wood product manufacturing; recycling and scraps/salvage; hazardous material treatment, storage, or disposal facilities
Camp Geiger	OTC-003	Warehousing and storage; bulk fuel storage and transfer
Wallace Creek	OWC-001	Ground transportation operations

1) Outfalls designated as analytical sampling points must also be qualitatively monitored semi-annually.

2) As stated in the 2021 SWPPP report.



Table E-2 identifies the parameters required to be monitored at each representative outfall.

Table E-2 Analytical Sampling Parameters

Parameter	Measurement Frequency ¹	Sample Type	Units	Benchmark Value ³
Oil and Grease	Annual	Grab ²	milligrams per liter (mg/L)	15 mg/L
pH	Annual	Grab ²	standard units	Within the range 6.0 – 9.0
Total Suspended Solids (TSS)	Annual	Grab ²	mg/L	100 mg/L
Total Flow	Annual	N/A	million gallons	Not applicable (N/A)
Event Duration	Annual	N/A	minutes	N/A
Total Rainfall ⁴	Annual	N/A	inches	N/A

1) Measurement Frequency:

a) Annual: Once per year during a representative storm event, which is defined in the MCIEAST-MCB CAMLEJ Permit (Part VIII, Definitions) as “a storm event that measures greater than 0.1 inches of rainfall. The time between this storm event and the previous storm event measuring greater than 0.1 inches must be at least 72 hours. A single storm event may have a period of no precipitation of up to 10 hours. For example, if it rains but stops before producing any collectable discharge, a sample may be collected if the next rain producing a discharge begins within 10 hours.”

2) Grab Sample: Defined in the MCIEAST-MCB CAMLEJ Permit (Part VIII, Definitions) as “an individual sample collected instantaneously. Grab samples that will be directly analyzed or qualitatively monitored must be taken within the first 30 minutes of discharge.”

3) Benchmark values equivalent to values stated in NC DEQ General Permit Number NCG080000.

4) For each sampled representative storm event, the total precipitation must be recorded.

The analytical monitoring shall be completed according to the monitoring schedule presented in Table E-3.

Table E-3 Monitoring Schedule

Monitoring Period	Sample Number	Start Date	End Date
Year 1	1	1 October 2021	30 September 2022
Year 2	2	1 October 2022	30 September 2023
Year 3	3	1 October 2023	30 September 2024
Year 4	4	1 October 2024	30 September 2025
Year 5	5	1 October 2025	30 September 2026



QUALITATIVE MONITORING REQUIREMENTS

In addition to analytical sampling requirements, MCIEAST-MCB CAMLEJ performs stormwater discharge qualitative monitoring, or visual observations, at each designated outfall point, or visual observation point (VOP), listed in Table E-4. These outfalls are identified in the 2021 SWPPP update. Appendix B presents detailed information for each outfall.

The NPDES permit requires semi-annual visual observations at all regulated industrial SDOs, regardless of representative outfall status. NC DEQ requires the visual observations be performed twice per year, once in the spring (April – June) and once in the fall (September – November), at each industrial stormwater outfall.

Table E-4 Visual Observation Points

Base Area	Visual Observation Points ¹
Amphibious Base (AB)	OAB-001, OAB-002, OAB-003, OAB-006, OAB-007
Air Station (AS)	OAS-001, OAS-002, OAS-003, OAS-004, OAS-005 ² , OAS-006, OAS-008, OAS-010, OAS-014A, OAS-014B, OAS-018 ² , OAS-021, OAS-030, OAS-032, OAS-037
Courthouse Bay (CB)	OCB-001, OCB-013, OCB-014, OCB-016A, OCB-016B
Camp Johnson (CJ)	OCJ-001, OCJ-003, OCJ-004A, OCJ-004B
Frenchs Creek (FC)	OFC-001, OFC-002, OFC-003 ² , OFC-004A, OFC-004B, OFC-005, OFC-006A, OFC-006B, OFC-006C, OFC-008, OFC-009, OFC-012, OFC-013, OFC-026, OFC-027
Hadnot Point (HP)	OHP-001, OHP-002A, OHP-002B, OHP-003, OHP-004 ² , OHP-005, OHP-006A, OHP-006B, OHP-006C, OHP-007, OHP-008 ² , OHP-010, OHP-011, OHP-012, OHP-013A, OHP-013B, OHP-014, OHP-015, OHP-017, OHP-018A, OHP-018B, OHP-019A, OHP-019B, OHP-019C, OHP-019D, OHP-021A, OHP-021B, OHP-022, OHP-024, OHP-027, OHP-035, OHP-038, OHP-042, OHP-043, OHP-044, OHP-045
Landfill (LF)	OLF-001, OLF-002
Naval Hospital (NH)	ONH-001, ONH-002
Old Hospital (OH)	OOH-008
Rifle Range (RR)	ORR-001, ORR-003, ORR-012, ORR-013, ORR-014
Sandy Run (SR)	OSR-001
Camp Geiger (TC)	OTC-002, OTC-002B, OTC-003 ² , OTC-004A, OTC-004B, OTC-005
Wallace Creek (WC)	OWC-001 ² , OWC-002, OWC-003, OWC-004, OWC-005A, OWC-005B, OWF-001

1) VOPs based on the 2021 SWPPP report that identifies all regulated industrial outfalls.

2) These VOPs are also analytical sampling points.



Table E-5 identifies the required qualitative monitoring parameters for each industrial outfall.

Table E-5 Semi-Annual Qualitative Monitoring Parameters

Discharge Characteristics	Frequency	Monitoring Location ¹
Color	Semi-Annual	SDO
Odor	Semi-Annual	SDO
Clarity	Semi-Annual	SDO
Floating Solids	Semi-Annual	SDO
Suspended Solids	Semi-Annual	SDO
Foam	Semi-Annual	SDO
Oil Sheen	Semi-Annual	SDO
Other Indicators of Pollution	Semi-Annual	SDO

1) Monitoring Location: VOPs have been defined for each industrial SDO and are presented in Section 5: Visual Observation Point Locations.

SUMMARY OF SWOMP UPDATES

This 2021 SWOMP includes the addition and removal of several regulated industrial outfalls and associated VOPs. For VOPs that have been added, new markers will need to be installed to indicate their locations on base. Section 5: Visual Observation Point Locations includes specific observations and recommendations for VOPs and is organized by base area.

Table E-6 summarizes changes made to this report since 2013.



Table E-6 Summary of SWOMP Updates

VOP ID	Outfall ID	Summary of Changes
OAS-001	OAS-001	Drainage basin boundaries have been updated to account for construction of a new hangar.
OAS-008	OAS-008	Outfall was reclassified as regulated industrial. New VOP identified. Drainage basin boundary has also been updated to account for new construction.
OAS-010	OAS-010	Outfall was reclassified as regulated industrial. New VOP identified. Drainage basin boundary has also been updated to account for new construction.
OAS-014B	OAS-014	Proposed new VOP location.
OAS-032	OAS-032	Proposed new VOP location.
OAS-037	OAS-037	Outfall was reclassified as regulated industrial. New VOP identified.
OCB-016A	OCB-016	Newly delineated regulated industrial outfall. Two new VOPs identified.
OCB-016B	OCB-016	
OCJ-003	OCJ-003	Outfall was reclassified as regulated industrial. New VOP identified.
OFC-004A	OFC-004	VOP renamed to OFC-004A from OFC-004 (to allow for two VOPs at OFC-004).
OFC-004B	OFC-004	New VOP identified.
OFC-008	OFC-008	Proposed new VOP location.
OHP-006C	OHP-006	Proposed new VOP location.
OHP-007	OHP-007	Outfall was reclassified as regulated industrial. New VOP identified.
OHP-012	OHP-012	Proposed new VOP location.
OHP-014	OHP-014	Outfall was reclassified as regulated industrial. New VOP identified.
OHP-020	OHP-020	Outfall was reclassified as non-industrial. VOP removed from SWOMP.
OHP-027	OHP-027	Outfall was reclassified as regulated industrial. New VOP identified.
OHP-042	OHP-042	Newly delineated regulated industrial outfall. One new VOP identified.
OHP-043	OHP-043	Newly delineated regulated industrial outfall. One new VOP identified.
OHP-044	OHP-044	Newly delineated regulated industrial outfall. One new VOP identified.
OHP-045	OHP-045	Newly delineated regulated industrial outfall. One new VOP identified.
OOH-001	OOH-001	Outfall was reclassified as non-industrial. VOP removed from SWOMP.
OOH-008	OOH-008	Outfall was reclassified as regulated industrial. New VOP identified.
ORR-013	ORR-013	Proposed new VOP location.



Table E-6 Summary of SWOMP Updates (continued)

VOP ID	Outfall ID	Summary of Changes
OTC-002	OTC-002	Newly delineated regulated industrial outfall. One new VOP identified.
OTC-002B	OTC-002B	Outfall was reclassified as regulated industrial. New VOP identified. Drainage basin boundary has also been updated to account for new construction.
OTC-004	OTC-004	VOP removed from SWOMP to allow for two new VOPs to account for new construction.
OTC-004A	OTC-004	New VOP to account for new construction.
OTC-004B	OTC-004	New VOP to account for new construction.
OTC-008	OTC-008	Outfall was reclassified as non-industrial. VOP removed from SWOMP.
OWC-004	OWC-004	Newly delineated regulated industrial outfall. One new VOP identified.
OWC-005A	OWC-005	Newly delineated regulated industrial outfall. Two new VOPs identified.
OWC-005B	OWC-005	
OWF-002	OWF-002	Outfall was reclassified as non-industrial. VOP removed from SWOMP.



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1. INTRODUCTION

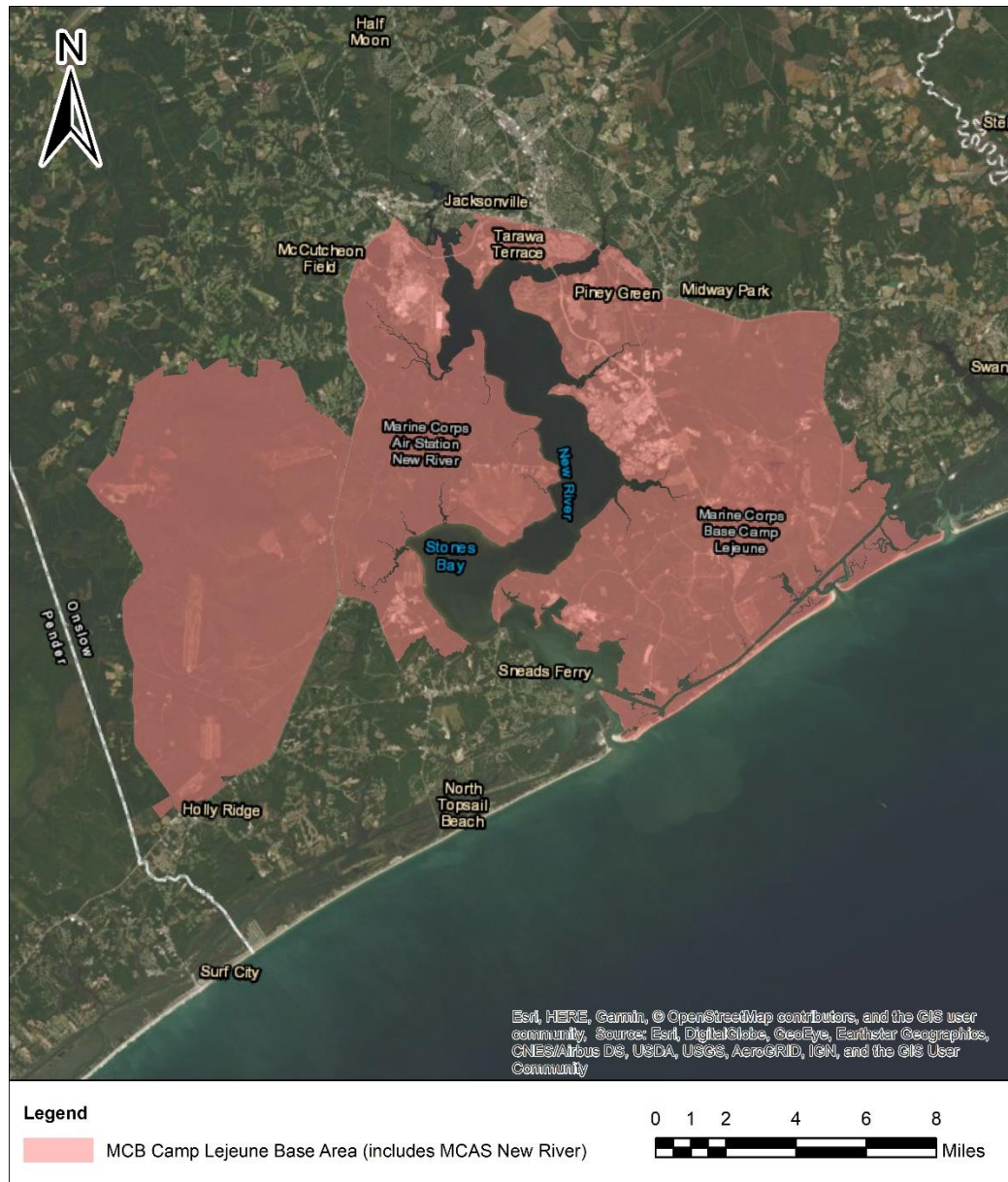
The Naval Facilities Engineering Systems Command Mid-Atlantic Division (NAVFAC MIDLANT) contracted AH/BC Navy JV, LLC (operating in North Carolina [NC] as AH Environmental Consultants Inc. [AH]), under Contract N62470-19-D-4001, Delivery Order N4008520F6173, to update the Stormwater Outfall Monitoring Plan (SWOMP) for Marine Corps Installations East – Marine Corps Base MCIEAST-MCB CAMLEJ (MCIEAST-MCB CAMLEJ).

1.1 BACKGROUND

MCIEAST-MCB CAMLEJ (including Marine Corps Air Station [MCAS] New River) occupies approximately 156,000 acres including roughly 11 miles of beaches. MCIEAST-MCB CAMLEJ operates a 15 million gallons per day advanced wastewater treatment plant, four water treatment plants, and a Subtitle D municipal solid waste landfill. The installation supports a population of active duty, dependent, retiree, and civilian employees numbering approximately 170,000. MCIEAST-MCB CAMLEJ and MCAS New River share various facilities and have common infrastructure and utilities; many aspects of the installations' administration and management overlap; as such, this SWOMP covers both installations. Figure 1-1 provides a vicinity map for MCIEAST-MCB CAMLEJ.



Figure 1-1 MCIEAST-MCB CAMLEJ Vicinity Map



1.2 STORMWATER DISCHARGE PERMIT

The National Pollutant Discharge Elimination System (NPDES) program was established under the authority of the Federal Clean Water Act (CWA) of 1972. Phase I of the NPDES stormwater program, established in 1990, focused on pollutant source reduction through site planning and responsible operational and procedural practices.



Phase I covered industrial activities defined by Title 40 of the United States (US) Code of Federal Regulations (CFR) 122.26 (b)(14), construction activities that disturbed five acres or more, and municipalities with populations of 100,000 or more that owned and operated a municipal separate storm sewer system (MS4). Phase II of the program expanded coverage to construction activities that disturbed one acre or more and any publicly owned and operated MS4. In NC, the NPDES stormwater program is administered by the NC Department of Environmental Quality (DEQ), Division of Energy, Mineral, and Land Resources (DEMLR).

NC DEQ DEMLR issued NPDES Permit Number NCS000290 to MCIEAST-MCB CAMLEJ (herein referred to as the MCIEAST-MCB CAMLEJ Permit). The term for the current permit expires on 30 September 2021; however, NC DEQ DEMLR has also provided a draft NPDES permit. The new NPDES permit number NCS000290 will become effective on 1 October 2021 and will expire on 30 September 2026. The MCIEAST-MCB CAMLEJ Permit (included as Appendix A) was issued pursuant to the requirements of NC General Statute 143-215.1 and the Memorandum of Agreement between NC and the US Environmental Protection Agency (EPA) dated May 9, 1994 (or as subsequently amended). The MCIEAST-MCB CAMLEJ Permit authorizes the point source discharge of stormwater runoff and specified non-stormwater discharges from MCIEAST-MCB CAMLEJ (including MCAS New River) to the receiving waters specified in the permit.

The purpose of this SWOMP is to satisfy the NPDES permit requirement that MCIEAST-MCB CAMLEJ develop a monitoring plan that covers water quality monitoring at outfalls that receive stormwater runoff from a regulated industrial activity. All regulated industrial activities at MCIEAST-MCB CAMLEJ are documented in the Stormwater Pollution Prevention Plan (SWPPP) (AH, 2021) that was also developed as a requirement of the NPDES permit. The SWPPP covers all regulated industrial activities defined in the NPDES permit and in 40 CFR 122.26 (b)(14), which contains eleven categories of industrial activity types and references Standard Industrial Classification (SIC) codes to aid in the classification industrial activities.



This SWOMP applies to any stormwater discharge outfall (SDO) at MCIEAST-MCB CAMLEJ that receives runoff from a regulated industrial activity. Implementation of the SWOMP constitutes compliance with the monitoring requirements found in Section H of the MCIEAST-MCB CAMLEJ Permit.

The SWOMP guides MCIEAST-MCB CAMLEJ personnel to collect valid and representative stormwater data. Appendix B lists the industrial SDOs identified in the 2021 SWPPP report (87 total industrial outfalls). This appendix provides the outfall identifier (ID), northing, easting, total drainage area in acres, receiving stream, regulated industrial activities with associated building or structure IDs, and monitoring status of each industrialized outfall. Table 1-1 lists receiving waters for MCIEAST-MCB CAMLEJ (as identified on the cover page of the NPDES permit and any other surface water that receives stormwater runoff from regulated industrial activities at MCIEAST-MCB CAMLEJ).



Table 1-1 Receiving Waters of MCIEAST-MCB CAMLEJ

Receiving Water	Classification ¹	TMDL / Listed 303(d) ²
Bear Creek	SA; HQW	Approved TMDL for Fecal Coliform, 2011 (not included in 2020 303(d) list)
Bearhead Creek	SB;NSW	No
Beaverdam Creek	SB; NSW	No
Brinson Creek	SC, NSW	303(d) listed impaired: copper and chlorophyll a (2020)
Cogdels Creek	SC; NSW	No
Courthouse Bay	SA; HQW	303(d) listed impaired: prohibited shellfish harvesting / fecal coliform (2020)
Cowhead Creek	SC;NSW	No
Edwards Creek	SC; HQW, NSW	No
Farnell Bay	SC; NSW	No
Frenchs Creek	SC; NSW	No
Morgan Bay	SC; NSW	No
Mott Creek	C; NSW	No
New River	SC; HQW, NSW (upstream portion) SA; HQW (downstream portion)	303(d) listed impaired: prohibited shellfish harvesting / fecal coliform, copper, and pH (2020)
Northeast Creek	SC; HQW, NSW	No
Scales Creek	SC; HQW, NSW	No
Shelter Swamp Creek	C;Sw	No
Southwest Creek	C; NSW (upstream portion) SC; HQW, NSW (downstream portion)	No
Stick Creek	SC; HQW, NSW	No
Stones Bay	SA;HQW	No
Stones Creek	SA; HQW	303(d) listed impaired: prohibited shellfish harvesting / fecal coliform (2020)
Strawhorn Creek	SC; HWQ, NSW	No
Wallace Creek	SB; NSW	No
Wilson Bay	SC; HQW, NSW	No

(1) As per NC DEQ's NC Surface Water Classification Map

Class C: Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner.

Class SC: All tidal salt waters protected for secondary recreation such as fishing, boating, and other activities involving minimal skin contact; fish and noncommercial shellfish consumption; aquatic life propagation and survival; and wildlife.

Class SB: Tidal salt waters protected for all SC uses in addition to primary recreation. Primary recreational activities include swimming, skin diving, water skiing, and similar uses involving human body contact with water where such activities take place in an organized manner or on a frequent basis.

Class SA: Tidal salt waters used for commercial shellfishing or marketing purposes that are also protected for all Class SC and Class SB uses. All SA waters are also HQW by supplemental classification.

High Quality Waters (HQW): Supplemental classification intended to protect waters that are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission.

Nutrient Sensitive Waters (NSW): Supplemental classification intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation.

Swamp Waters (Sw): Supplemental classification intended to recognize those waters which have low velocities and other natural characteristics which are different from adjacent streams.

(2) Waterbodies listed as impaired in the draft 2020 303(d) list published by NC DEQ and/or waterbodies subject to an approved Total Maximum Daily Load (TMDL).



1.3 STORMWATER OUTFALL MONITORING PLAN FORMAT

The SWOMP presents information in six sections with supplemental information provided in the appendices.

- **Section 1: Introduction** – contains background and summary information, the content and format of the SWOMP, and a list of the receiving waters for MCIEAST-MCB CAMLEJ.
- **Section 2: Outfall Monitoring Requirements** – outlines the outfall monitoring requirements. This section lists the rules, which, if followed, will enable MCIEAST-MCB CAMLEJ to meet the monitoring requirements stated in the NPDES Permit. The rules are presented as a synopsis of the sampling requirements.
- **Section 3: Stormwater Sample Collection** – serves as a comprehensive set of instructions for MCIEAST-MCB CAMLEJ's sampling personnel. This section is designed as a stand-alone section that should be distributed to each of the sampling crew members.
- **Section 4: Analytical Sampling Point Locations** – provides detailed information on industrial outfalls with both analytical sampling and visual observation points.
- **Section 5: Visual Observation Point Locations** – provides detailed information on industrial outfalls with visual observation points.
- **Section 6: References and Works Consulted** – lists references cited and works consulted for development of this document.



2. OUTFALL MONITORING REQUIREMENTS

This section of the SWOMP details the outfall monitoring requirements included in the MCIEAST-MCB CAMLEJ Permit. This section is divided into the following four sub-sections.

- Section 2.1: Analytical Monitoring Requirements – describes the analytical monitoring requirements for the seven representative industrial outfalls.
- Section 2.2: Qualitative Monitoring / Visual Observation Point Requirements – describes the qualitative (also referred to as visual) monitoring requirements for all 87 industrial outfalls. Qualitative monitoring point locations are also referred to as visual observation points (VOPs).
- Section 2.3: Analytical Sampling and Visual Observation Point Requirements – details the requirements for site selection of analytical sampling points and VOPs.
- Section 2.4: Reporting and Recordkeeping Requirements – summarizes the reporting and recordkeeping requirements included in the MCIEAST-MCB CAMLEJ Permit.

2.1 ANALYTICAL MONITORING REQUIREMENTS

MCIEAST-MCB CAMLEJ implements an analytical monitoring program in accordance with the NPDES permit requirements. Analytical samples are collected annually from seven (7) representative outfalls distributed throughout MCIEAST-MCB CAMLEJ. Analytical sampling points are located at outfalls selected to represent the regulated industrial activities present at MCIEAST-MCB CAMLEJ, which are primarily ground and air transportation operations.

On May 9, 2013, MCIEAST-MCB CAMLEJ submitted a technical memorandum to NC DEQ DEMLR that sought approval of modifications to the analytical sampling points specified in the previous SWOMP based on the results of the 2012 SWPPP field assessments. The modifications were approved by NC DEQ DEMLR on May 20, 2013. These analytical sampling locations are still considered representative of the industrial activities found at MCIEAST-MCB CAMLEJ, and these sampling locations have remained the same since the May 2013 NC DEQ approval. Table 2-1 summarizes the current representative industrial outfalls approved for analytical sampling.



Table 2-1 Representative Outfalls for Analytical Monitoring

Base Area	Representative Outfall (Analytical Sampling Point ¹)	Industrial Activities Represented ²
Air Station	OAS-005	Air transportation operations; ground transportation operations; bulk fuel storage and transfer; warehousing and storage; wood product manufacturing
	OAS-018	Air transportation operations
Frenchs Creek	OFC-003	Ground transportation operations
Hadnot Point	OHP-004	Ground transportation operations
	OHP-008	Ground transportation operations; warehousing and storage; wood product manufacturing; recycling and scraps/salvage; hazardous material treatment, storage, or disposal facilities
Camp Geiger	OTC-003	Warehousing and storage; bulk fuel storage and transfer
Wallace Creek	OWC-001	Ground transportation operations

1) Outfalls designated as analytical sampling points must also be qualitatively monitored semi-annually.

2) As stated in the 2021 SWPPP report.

Analytical sampling is to be performed annually at each representative outfall for all five years of the permit coverage. Analytical results from sampling must be submitted to NC DEQ DEMLR using the Annual Summary Data Monitoring Report (DMR) form for the sampling period. All analytical monitoring must be performed during a representative storm event, which is defined as “a storm event that measures greater than 0.1 inches of rainfall. The time between this storm event and the previous storm event measuring greater than 0.1 inches must be at least 72 hours. A single storm event may have a period of no precipitation of up to 10 hours. For example, if it rains but stops before producing any collectable discharge, a sample may be collected if the next rain producing a discharge begins within 10 hours.”

Grab samples shall be obtained within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of the initiation of a discharge that results from a representative storm event. Each sample shall be preserved in accordance with applicable US EPA requirements (refer to Section 3.2: Sample Collection and Analysis for more information).

Additional information to be obtained during the monitoring event (as required by the MCIEAST-MCB CAMLEJ Permit) shall be recorded and reported with the SDO Moni-



toring Report form. Appendix D provides a blank SDO Monitoring Report. The SWPPP committee must maintain completed originals of the form onsite for at least five (5) years.

The storm event characteristics to be recorded include date, exact location, duration of the storm event, total rainfall amount, and the duration between the storm event sampled and the end of the previous storm event.

In the event sampling an outfall is not possible due to the absence of measurable discharge during a particular testing period, MCIEAST-MCB CAMLEJ shall provide written notification to NC DEQ DEMLR using the annual DMR form.

Table 2-2 identifies the parameters required to be monitored at each representative outfall.

Table 2-2 Analytical Sampling Parameters

Parameter	Measurement Frequency ¹	Sample Type	Units	Benchmark Value ³
Oil and Grease	Annual	Grab ²	milligrams per liter (mg/L)	15 mg/L
pH	Annual	Grab ²	standard units	Within the range 6.0 – 9.0
Total Suspended Solids (TSS)	Annual	Grab ²	mg/L	100 mg/L
Total Flow	Annual	N/A	million gallons	Not applicable (N/A)
Event Duration	Annual	N/A	minutes	N/A
Total Rainfall ⁴	Annual	N/A	inches	N/A

1) Measurement Frequency:

a) Annual: Once per year during a representative storm event, which is defined in the MCIEAST-MCB CAMLEJ Permit (Part VIII, Definitions) as “a storm event that measures greater than 0.1 inches of rainfall. The time between this storm event and the previous storm event measuring greater than 0.1 inches must be at least 72 hours. A single storm event may have a period of no precipitation of up to 10 hours. For example, if it rains but stops before producing any collectable discharge, a sample may be collected if the next rain producing a discharge begins within 10 hours.”

2) Grab Sample: Defined in the MCIEAST-MCB CAMLEJ Permit (Part VIII, Definitions) as “an individual sample collected instantaneously. Grab samples that will be directly analyzed or qualitatively monitored must be taken within the first 30 minutes of discharge.”

3) Benchmark values equivalent to values stated in NC DEQ General Permit Number NCG080000.

4) For each sampled representative storm event, the total precipitation must be recorded.



2.1.1 Analytical Monitoring Schedule

The analytical monitoring shall be completed according to the monitoring schedule presented in Table 2-3.

Table 2-3 Monitoring Schedule

Monitoring Period	Sample Number	Start Date	End Date
Year 1	1	1 October 2021	30 September 2022
Year 2	2	1 October 2022	30 September 2023
Year 3	3	1 October 2023	30 September 2024
Year 4	4	1 October 2024	30 September 2025
Year 5	5	1 October 2025	30 September 2026

2.1.2 Benchmark Analytical Values

Analytical monitoring results are compared to the benchmark values presented in Table 2-2. When an analytical result exceeds a benchmark value (or falls outside of the benchmark range, in the case of pH), MCIEAST-MCB CAMLEJ Environmental Management Division (EMD) personnel conduct an investigation into the potential cause of the exceedance. EMD personnel conduct site visits at each facility within the drainage area contributing to an SDO where an exceedance has occurred. A site visit includes visual inspection of the facilities and associated grounds and interviews with applicable personnel. Based on the results of the investigation, EMD personnel evaluate and select corrective actions for implementation. If the cause of the exceedance cannot be identified during the investigation, a follow up sampling event is conducted during the next measurable storm event.

2.2 QUALITATIVE MONITORING / VISUAL OBSERVATION POINT REQUIREMENTS

In addition to analytical sampling requirements, MCIEAST-MCB CAMLEJ performs stormwater discharge qualitative monitoring, or visual observations, at each designated outfall point, or VOP, listed in Table 2-4. These outfalls are identified in the 2021 SWPPP update. Appendix B presents detailed information for each outfall.



The NPDES permit requires semi-annual visual observations at all industrial SDOs, regardless of representative outfall status. NC DEQ requires the visual observations be performed twice per year, once in the spring (April – June) and once in the fall (September – November), at each industrial stormwater outfall. Visual monitoring is conducted for the purpose of evaluating the effectiveness of the SWPPP program and assessing new or potential sources of stormwater pollution.

Table 2-4 Visual Observation Points

Base Area	Visual Observation Points ¹
Amphibious Base (AB)	OAB-001, OAB-002, OAB-003, OAB-006, OAB-007
Air Station (AS)	OAS-001, OAS-002, OAS-003, OAS-004, OAS-005 ² , OAS-006, OAS-008, OAS-010, OAS-014A, OAS-014B, OAS-018 ² , OAS-021, OAS-030, OAS-032, OAS-037
Courthouse Bay (CB)	OCB-001, OCB-013, OCB-014, OCB-016A, OCB-016B
Camp Johnson (CJ)	OCJ-001, OCJ-003, OCJ-004A, OCJ-004B
Frenchs Creek (FC)	OFC-001, OFC-002, OFC-003 ² , OFC-004A, OFC-004B, OFC-005, OFC-006A, OFC-006B, OFC-006C, OFC-008, OFC-009, OFC-012, OFC-013, OFC-026, OFC-027
Hadnot Point (HP)	OHP-001, OHP-002A, OHP-002B, OHP-003, OHP-004 ² , OHP-005, OHP-006A, OHP-006B, OHP-006C, OHP-007, OHP-008 ² , OHP-010, OHP-011, OHP-012, OHP-013A, OHP-013B, OHP-014, OHP-015, OHP-017, OHP-018A, OHP-018B, OHP-019A, OHP-019B, OHP-019C, OHP-019D, OHP-021A, OHP-021B, OHP-022, OHP-024, OHP-027, OHP-035, OHP-038, OHP-042, OHP-043, OHP-044, OHP-045
Landfill (LF)	OLF-001, OLF-002
Naval Hospital (NH)	ONH-001, ONH-002
Old Hospital (OH)	OOH-008
Rifle Range (RR)	ORR-001, ORR-003, ORR-012, ORR-013, ORR-014
Sandy Run (SR)	OSR-001
Camp Geiger (TC)	OTC-002, OTC-002B, OTC-003 ² , OTC-004A, OTC-004B, OTC-005
Wallace Creek (WC)	OWC-001 ² , OWC-002, OWC-003, OWC-004, OWC-005A, OWC-005B, OWF-001

1) VOPs based on the 2021 SWPPP report that identifies all regulated industrial outfalls.

2) These VOPs are also analytical sampling points.

Outfalls where analytical monitoring is performed are not exempt from qualitative monitoring requirements. Qualitative monitoring does not need to be performed during a representative storm event. Table 2-5 identifies the required qualitative monitoring parameters for each industrial outfall.



Table 2-5 Semi-Annual Qualitative Monitoring Parameters

Discharge Characteristics	Frequency	Monitoring Location ¹
Color	Semi-Annual	Designated VOP(s) for each SDO
Odor		
Clarity		
Floating Solids		
Suspended Solids		
Foam		
Oil Sheen		
Erosion or Deposition at the Outfall		
Other Indicators of Pollution		

1) Monitoring Location: VOPs have been defined for each industrial SDO and are presented in Section 5: Visual Observation Point Locations.

Appendix D provides a blank SDO Qualitative Monitoring Report. The SWPPP committee must maintain completed originals of the form onsite for at least five (5) years. Appendix E provides guidance for numerically rating the required qualitative monitoring parameters.

Visual observations of significant stormwater pollution at an SDO shall prompt further investigations into the potential sources and causes of the pollution. Based on the investigations, MCIEAST-MCB CAMLEJ EMD personnel evaluate and select corrective actions for implementation. The SWPPP committee maintains a written record of this process.

If MCIEAST-MCB CAMLEJ is unable to complete qualitative monitoring in a given period as a result of adverse climatic conditions, the SWPPP committee must maintain documentation of the reason for not performing the visual observations. Adverse weather conditions that may prohibit visual monitoring of stormwater discharge outfalls include weather conditions that create dangerous conditions for personnel (e.g., local flooding, high winds, hurricanes, tornadoes, electrical storms). When conducting visual monitoring of outfalls, sampling personnel are required to follow standard safety practices and wear proper safety equipment. Entry of confined spaces is regulated by the Occupational Safety and Health Administration (OSHA) and requires special training and certification.



If qualitative monitoring coincides with a permitted non-stormwater discharge at an outfall, MCIEAST-MCB CAMLEJ shall separately monitor and report the parameters as required under the non-stormwater discharge requirements (described in the MCIEAST-MCB CAMLEJ Permit), in addition to completing the SDO Qualitative Monitoring Report.

When conducting wet weather visual monitoring at outfalls that receive off-site runoff, the effects of the off-site runoff can be minimized by conducting the visual observation within the first ten minutes of stormwater discharge at the VOP.

2.3 ANALYTICAL SAMPLING AND VISUAL OBSERVATION LOCATIONS

Analytical sampling point and VOP locations should always coincide with the current MCIEAST-MCB CAMLEJ SWPPP report. As part of the 2021 SWOMP development, AH assisted with selecting updated VOP locations based on the 2021 SWPPP findings (note: there were no changes required for the analytical sampling locations based on the 2021 SWPPP findings). Section 4: Analytical Sampling Point Locations and Section 5: Visual Observation Point Locations provide mapping and photographs of the analytical sampling points and VOPs.

In the event that the locations of analytical sampling points and/or VOPs need to be changed, MCIEAST-MCB CAMLEJ must notify NC DEQ DEMLR. Ideally, the location should be the actual point of stormwater discharge ("the outfall"); however, valid samples and visual observations can be obtained from a variety of locations. Typical sampling and observation locations include the end of a pipe or culvert, locations along a ditch or channel, and locations within the stormwater collection system such as at a manhole or curb inlet. A location where precise channel geometry can be measured is preferred.

Taking samples and conducting field observations at the point of discharge is not always feasible. In such cases, select the closest upstream location that is still representative of the entire discharge. In some instances, due to access problems, two separate VOPs are required for a single outfall. In all cases, sample collection points and VOPs must be upstream of waters classified by the State of NC.



Important criteria in selecting an analytical sampling point / VOP location include:

- Site access and personal safety
- Representativeness of the stormwater discharge
- Need for logistical support
- Other interferences

MCIEAST-MCB CAMLEJ should document industrial operations within the monitored outfall's drainage area. Modifications in the drainage area may influence analytical sampling point site selection.

If new analytical sampling points or VOPs are required in the future, the criteria for the selection of monitoring locations should be considered. Site preparation for new monitoring locations shall include improving access, marking the sampling sites, removing brush, and installing ladders or handholds, if needed.

Analytical sampling points and VOPs that are tidally influenced should be sampled (and/or observed) during low tide conditions. If outfalls need sampling or observation during high, rising, or lowering tidal conditions, the work should be accomplished at an upstream location. If piped, the sample or observation should be taken at the next upstream stormwater structure, where tidal conditions are not influencing stormwater flow. Based on their locations and photographic evidence of visible high-water marks on pipes, structures, and vegetation, the following SDOs will likely experience tidal influence:

- OAB-001
- OAB-002
- OAB-003
- OAB-006
- OAS-003
- OCJ-002
- OHP-015

2.4 REPORTING AND RECORDKEEPING REQUIREMENTS

This section presents the reporting and record keeping requirements included in MCIEAST-MCB CAMLEJ's current NPDES permit.



2.4.1 Annual Monitoring Reports

Results of stormwater outfall sampling, analyzed in accordance with the terms of this SWOMP and the MCIEAST-MCB CAMLEJ Permit, shall be submitted annually to NC DEQ DEMLR using the annual DMR form. Appendix F provides a blank annual DMR form. The annual submittals shall be submitted to DEMLR no later than 30 days from the date MCIEAST-MCB CAMLEJ receives the sampling results from the third-party laboratory.

If no stormwater discharge has occurred from any of the representative analytical outfalls during the reporting period, MCIEAST-MCB CAMLEJ is required to submit an annual DMR, within 30 days of the end of the sampling period, giving all required information and indicating "No Flow" as per NC Administrative Code T15A 02B .0506.

MCIEAST-MCB CAMLEJ shall record the required qualitative monitoring observations on the SDO Qualitative Monitoring Report form provided by DEMLR (blank form provided in Appendix D). MCIEAST-MCB CAMLEJ shall retain the completed qualitative monitoring forms onsite; however, visual monitoring results are not required to be submitted to DEMLR, except upon DEMLR's specific request to do so.

2.4.2 Test Procedures for Analysis of Pollutants

Test procedures for the analysis of pollutants shall conform to the Environmental Management Commission regulations published pursuant to NC GS 143-215.63 et seq, the Water and Air Quality Reporting Acts, and to regulations published pursuant to Section 304(g), 33 US Code 1314, of the Federal Water Pollution Control Act, as Amended, and Title 40 CFR 136.

To meet the intent of the monitoring required by this permit, all test procedures must produce minimum detection and reporting levels and all data generated must be reported down to the minimum detection or lower reporting level of the procedure. The following list provides the appropriate analytical testing code to be furnished to the compliance laboratory on the chain of custody form:



- Oil and Grease, EPA 1664A
- Total Suspended Solids (TSS), EPA 160.2
- pH, EPA 150.2 (note: pH is field measured and is not analyzed by the compliance laboratory)

2.4.3 Records Retention

Copies of analytical monitoring results and visual monitoring records shall be maintained onsite with the SWPPP and the SWOMP, respectively. MCIEAST-MCB CAMLEJ shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by the NPDES permit, for a period of at least five (5) years from the date of expiration of the permit. This period may be extended by request of NC DEQ DEMLR.

2.4.4 Procedure for Annual Submittals

All annual monitoring reports shall be submitted electronically to NC DEQ DEMLR or mailed to the following address:

- Department of Environmental Quality
Division of Energy, Mineral, and Land Resources – Stormwater Program
1612 Mail Service Center
Raleigh, North Carolina 27699-1612

All annual monitoring reports submitted to DEMLR, other than those submitted electronically, shall be signed by a duly authorized representative. A person is duly authorized only under the following circumstances:

- The authorization is made in writing by a principal executive officer or ranking elected official;
- The authorization specified either an individual or a position having responsibility for the overall operation of a regulated facility or activity or an individual or position having overall responsibility for environmental/stormwater matters; and
- The written authorization is submitted to NC DEQ DEMLR.



Any person signing an annual monitoring report shall make the following certification:

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

2.4.5 Twenty-Four Hour Noncompliance Reporting

MCIEAST-MCB CAMLEJ shall report to NC DEQ DEMLR any noncompliance that may constitute an imminent threat to health or the environment. Information shall be provided orally within 24 hours from the time MCIEAST-MCB CAMLEJ became aware of the circumstances. A written submission shall also be provided within 5 days of the time MCIEAST-MCB CAMLEJ becomes aware of the circumstances.

The written submission shall contain the following information:

- A description of the noncompliance and its causes
- The period of noncompliance, including exact dates and times
- If the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue
- Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance



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3. STORMWATER SAMPLE COLLECTION

MCIEAST-MCB CAMLEJ's current NPDES permit requires periodic compliance sampling to be performed at each of the designated outfalls listed in Table 2-1 of this document. MCIEAST-MCB CAMLEJ performs analytical sampling only during a representative storm event. The process of stormwater sampling is composed of three key elements that will ensure a valid representative sample is collected each time:

- Planning for a representative storm event
- Sample collection and analysis of analytical parameters
- Collection of non-analytical parameters

Personnel assigned to the task of stormwater sampling should be dutifully trained and well aware of any health and safety requirements associated with the task. Sampling personnel should be aware of any confined space requirements and other such hazards (chemical, biological, physical) that may be present at the representative outfalls prior to sample collection. Supervisory level personnel should prepare their staff adequately to remain in compliance with US EPA order 1440.2, *Health and Safety Requirements for Employees Engaged in Field Activities*. The following subsections provide detailed information for MCIEAST-MCB CAMLEJ to meet its regulatory obligations.

3.1 PLANNING FOR A REPRESENTATIVE STORM EVENT

Stormwater samples must be collected during a representative storm event, which is defined as "a storm event that measures greater than 0.1 inches of rainfall. The time between this storm event and the previous storm event measuring greater than 0.1 inches must be at least 72 hours. A single storm event may have a period of no precipitation of up to 10 hours. For example, if it rains but stops before producing any collectable discharge, a sample may be collected if the next rain producing a discharge begins within 10 hours."



An additional consideration for planning purposes includes the requirement to collect a stormwater sample with a grab sample technique. This sampling method requires that the sample is collected within the first 30 minutes of a representative storm event.

Numerous issues may be encountered during any given sampling event. The primary issue is a lack of rainfall preventing a representative storm event from occurring during sampling attempts. With vigilance, this issue can be avoided by closely monitoring all incoming weather patterns. It is recommended that MCIEAST-MCB CAMLEJ monitor all significant incoming storm events prior to the beginning of any sampling event.

MCIEAST-MCB CAMLEJ may use one of many online resources to determine the likelihood of a representative storm event. Comparing the short-term precipitation forecast against active radar increases the likelihood of identifying a representative storm event. The following online resources are recommended for planning purposes:

- <https://www.weather.com>
- <https://www.wunderground.com>
- <https://forecast.weather.gov>

Once a potential representative storm event has been identified, sampling personnel should prepare for field work.

3.2 SAMPLE COLLECTION AND ANALYSIS

Sampling personnel should prepare for a representative storm event in advance. There are many steps that can be taken prior to a representative storm event to ensure collection of a valid representative sample. The following guidance has been prepared to ensure that the sampling procedures and subsequent results remain in compliance with US EPA and NC DEQ guidelines. The sampling methodologies and protocols used in this plan were originally provided by, and are further detailed in, US EPA document 833-8-92-001, *NPDES Stormwater Sampling Guidance Document*.



3.2.1 Initial Preparations for Sampling

In conjunction with identifying when a representative storm event will occur, sampling personnel should prepare in advance of the storm. There are ten parameters to be collected during each representative storm event (date, time, location, event duration, total rainfall, duration between storm events, TSS, oil and grease, pH, and total flow). Of these ten parameters, three parameters require analytical analysis. Table 3-1 provides an overview of the containers required for sample collection and analytical analysis.

Table 3-1 Sample Container Summary

Parameter ¹	Sample Type	Container Type	Preservative Type	Sample Volume	Holding Time
TSS	Grab ²	HDPE ³ x 1	4°C ³ Holding	1,000 mL ³	7 Days
Oil and Grease	Grab ²	Glass x 2	1 mL, 1:1 HCl @ 4°C	1,000 mL	28 Days
pH	Grab ²	HDPE x 1	4°C Holding	250 mL	Immediate

1) Sampling Frequency: TSS, oil and grease, and pH shall be sampled annually.

2) Grab Sample: Defined in the NPDES permit (Part VIII, Definitions) as “an individual sample collected instantaneously. Grab samples that will be directly analyzed or qualitatively monitored must be taken within the first 30 minutes of discharge.”

3) °C = degrees Celsius; HDPE = high density polyethylene; mL = milliliter

Prepare sample containers for use just prior to a representative storm event. This will ensure effectiveness of the preservatives and decrease the chance of contaminating the sample containers prior to their use.

Sampling personnel should also prepare and maintain a sample collection kit prior to the representative storm event to ensure all needed equipment will be on hand. As some analytical parameters have short holding times, it is essential to be as prepared as possible to expedite the entire sample collection process. The following items are recommended for inclusion within the sample collection kit:



SAMPLE COLLECTION EQUIPMENT

- Distilled / reverse osmosis water wash bottle (for rinsing pH probe)
- Sampling extension pole
- Field calibrated pH meter
- pH buffer solution singles for field calibration
- Nitrile gloves (without powder)
- One 500-1,000 mL accessory container

SHIPPING EQUIPMENT

- Chain-of-custody (COC) forms
- Packing tape
- Sealable plastic bags, 1-gallon size
- Protective carrying container / insulated cooler for samples

PERSONAL ITEMS

- Applicable personal protection equipment & traffic cones
- Clip board or field book
- Writing implements (ink pen or pencil)
- Fine-tip permanent marker (for sample bottle labeling)
- Wrist watch / cellular phone
- Contact information of supervisor

An additional component of field preparation should include an effort to partially complete sample container labels and associated COC forms prior to sample collection. This will shorten time in the field as well as expedite the timely delivery of collected samples to the analytical laboratory. The below section discusses information that must be recorded on the sampling containers and the associated COC forms.

The majority of the sample collection details may be added to the COC forms prior to sample collection with the exception of the time and date of the sample collection. Depending on the laboratory used, sampling personnel may need to include an indication of whether or not the sample is a composite or grab sample.

3.2.2 Sample Collection and Shipment Procedures

When sample collection takes place, sampling personnel should arrive at the outfall(s) within 30 minutes of the beginning of the representative storm event. Additionally,



sampling personnel should note when the representative storm event begins and ends (the duration of the storm event is required on the annual DMR form). Sampling personnel should comply with any health and safety plan associated with the sampling task. Any access or ingress / egress issues should be appropriately addressed prior to sampling.

As the NPDES permit specifically requires that samples are to be collected using a “grab” method, it is essential that sampling personnel use the following recommended procedures for taking grab samples identified in US EPA document 833-8-92-001, *NPDES Stormwater Sampling Guidance Document*:

- Fill out sample container labels and the COC to the maximum extent possible prior to the sampling event.
- Take a cooler with ice to the sampling location.
- Take the grab sample from the horizontal and vertical center of the channel.
- Avoid stirring up bottom sediments in the channel.
- Hold the container so the opening faces upstream.
- Avoid touching the inside of the container to prevent contamination.
- Keep the sample free of uncharacteristic floating debris.
- Due to the relatively low sample volume to be collected, it will be easiest to collect each of the samples directly into their individual containers.
- If taking numerous grab samples, keep the samples separate and labeled clearly.
- Use applicable safety precautions.

The work flow to collect each sample is as follows:

1. Note the time and date on the sample container label and the COC.
2. Open the sample container and lower it into the stream with the opening facing upstream. Try to avoid collecting solids or other floatables.
3. Fill the container to the appropriate volume (usually 95% of the total volume of the container). Do not overfill the container as this will result in the loss of preservative, if present.
4. Raise the sampling container from the stream and replace the lid.
5. Dry the container, if possible, and ensure the label is still legible. If the label is not legible, fill the label with the appropriate details again.
6. Once the labels and COC are in agreement, place the sample container into the sampling cooler / transport container.



While collecting samples, sampling personnel should fill the 500-1,000 mL accessory vessel with stream / outfall flow water. With a properly calibrated pH meter, measure the pH and temperature of the water and record the results on the field notes and the COC; these results will also be recorded on the SDO Monitoring Report.

In addition to these procedures, sampling personnel should be aware that certain sampling containers should not be used to fill other sampling containers (e.g., pre-preserved containers). Also, when using pre-preserved sample containers, samplers should take care to not overfill the container. When using a commercial or other such National Environmental Laboratory Accreditation Conference (NELAC) certified laboratory, sample containers will typically be pre-preserved and previously decontaminated. If sampling equipment and containers require decontamination, follow the procedures provided in 40 CFR Part 136.3.

Once sample collection is complete, prepare the samples for shipment. At this point, sampling personnel should complete and sign the COC. Information such as sample ID, date, and time should match each sample container label. Once the COC is complete, the samples should be shipped or transported directly to the compliance laboratory. If the samples are delivered by hand to the laboratory by sampling personnel, the samples may not require any additional packing material apart from ice. However, if the samples are shipped, they should be prepared and protected from potential damage and leaks that may occur during shipment. Generally, an ample amount of ice and minimal bubble wrap will provide adequate protection.

Once the sample containers have been prepared for shipment, place the completed and signed COC into a water proof / protective container within the shipping container. Close the shipping container and seal it with packaging tape. Apply a tamper evident custody seal to the opening of the container to indicate if any tampering occurs. This custody seal will contain the time and date of release / shipment, as well as the names of sampling personnel. Once finished, the packed container may be shipped using a third-party delivery service such as Federal Express (FedEx) or United Parcel Service (UPS).



3.3 COLLECTION OF NON-ANALYTICAL PARAMETERS

Once a sampling event is complete, determine the remaining three reportable parameters (as provided in Table 2-2):

- Total Flow
- Event duration
- Total rainfall

Total Flow (Volume in Million Gallons)

The determination of total flow should be determined by either:

- Measured continuously
- Calculated based on the area draining to the outfall, the built-upon (impervious) area, and the total amount of rainfall
- Estimated by the measurement of flow at 20-minute intervals during the rainfall event

MCIEAST-MCB CAMLEJ currently uses a spreadsheet that calculates total flow based on the area draining to the outfall, the impervious area, and the total amount of rainfall using the Simple Method. Appendix G provides a blank version of this spreadsheet. The spreadsheet uses the calculation method found in Schueler, 1987, Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban [Best Management Practices] BMPs, published by the Metropolitan Washington Council of Governments. This method uses the following equations:

$$R = (0.05 + (0.009 \times I)) \times \frac{P}{12}$$

Where:

- R = total runoff, in cubic feet per square foot of drainage area.
- I = percent imperviousness of the drainage area (percentage of pavement and roof areas within total area draining to the outfall). Example: input 85% as 85.
- P = precipitation, in inches.
- 0.05 and 0.009 are empirical coefficients.

After the total runoff (R) is calculated, the total flow volume for an outfall can be calculated as follows:



$$V_{\text{Total, Cubic Feet}} = R \times A$$

Where:

- $V_{\text{Total, Cubic Feet}}$ = total flow volume, in cubic feet.
- R = total runoff, in cubic feet per square foot of drainage area.
- A = total drainage basin area / total area draining to outfall, in square feet.

The annual DMR form requests the total flow volume be reported in million gallons (MG). Converting V_{Total} from cubic feet to million gallons is accomplished as shown below:

$$V_{\text{Total, MG}} = (7.48 \times 10^{-6}) \times V_{\text{Total, Cubic Feet}}$$

Where:

- $V_{\text{Total, MG}}$ = total flow volume, in million gallons.
- $V_{\text{Total, Cubic Feet}}$ = total flow volume, in cubic feet.

A second, more complex method for calculating total flow volume involves measuring the conveyance (channel or pipe) geometry and the slope of the conveyance, determining the roughness coefficient, and then measuring the depth of flow at constant time intervals during the storm event. These measurements can be used in conjunction with Manning's Equation to calculate total flow volume. MCIEAST-MCB CAMLEJ does not currently utilize this method to calculate total flow volume; however, Appendix H provides step by step instructions for determining total flow using this method. These instructions are provided in case composite samples are ever required at MCIEAST-MCB CAMLEJ (or if MCIEAST-MCB CAMLEJ elects to install gauging meters to measure flow depths).

Event Duration

As noted previously, the total duration of the representative storm event is recorded by the sampling personnel during a sampling event. Precipitation data at the weather station referenced below may also be queried to determine event duration. Once the



duration and rainfall total have been determined, these values shall be recorded on the annual DMR form.

Total Rainfall

Total rainfall is determined by monitoring local precipitation data that is published by The Weather Underground, a commercial internet weather service (or any similar provider of local precipitation data). This weather service provides precipitation data for discrete storm events as well as other weather-related data. Rainfall data from the following weather station adequately applies to each analytical outfall at MCIEAST-MCB CAMLEJ:

- KNCMARIN2 – located on Old Hospital Point along Julian C. Smith Boulevard at MCIEAST-MCB CAMLEJ.



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4. ANALYTICAL SAMPLING POINT LOCATIONS

Under MCIEAST-MCB CAMLEJ's current NPDES permit, analytical sampling is required at representative outfalls having water quality characteristics that typify industrial outfalls at MCIEAST-MCB CAMLEJ. These outfalls should receive stormwater runoff from drainage basins that encompass typical industrial activity occurring at MCIEAST-MCB CAMLEJ. Outfalls designated for analytical monitoring are also subject to visual monitoring requirements, which are discussed in Section 5: Visual Observation Point Locations. Table 4-1 contains the current representative industrial outfalls approved for analytical sampling.

Table 4-1 Representative Outfalls for Analytical Monitoring

Base Area	Representative Outfall (Analytical Sampling Point ¹)	Industrial Activities Represented
Air Station	OAS-005	Air transportation operations; ground transportation operations; hazardous material treatment, storage, or disposal; bulk fuel storage and transfer; warehousing and storage; recycling and scraps/salvage; wood products manufacturing
	OAS-018	Air transportation operations
Frenchs Creek	OFC-003	Ground transportation operations
Hadnot Point	OHP-004	Ground transportation operations
	OHP-008	Ground transportation operations; warehousing and storage; recycling and scraps/salvage; wood product manufacturing
Camp Geiger	OTC-003	Warehousing and storage; bulk fuel storage and transfer
Wallace Creek	OWC-001	Ground transportation operations

1) Outfalls designated as analytical sampling points must also be visually monitored.

The following summary rules apply to these outfalls:

- Analytical monitoring of these outfalls must be performed during a representative storm event.
- Analytical monitoring will be performed according to the monitoring requirements in Table 2-2 and the monitoring schedule in Table 2-3.
- Visual monitoring will be performed semi-annually, once in the spring (April – June) and once in the fall (September – November).

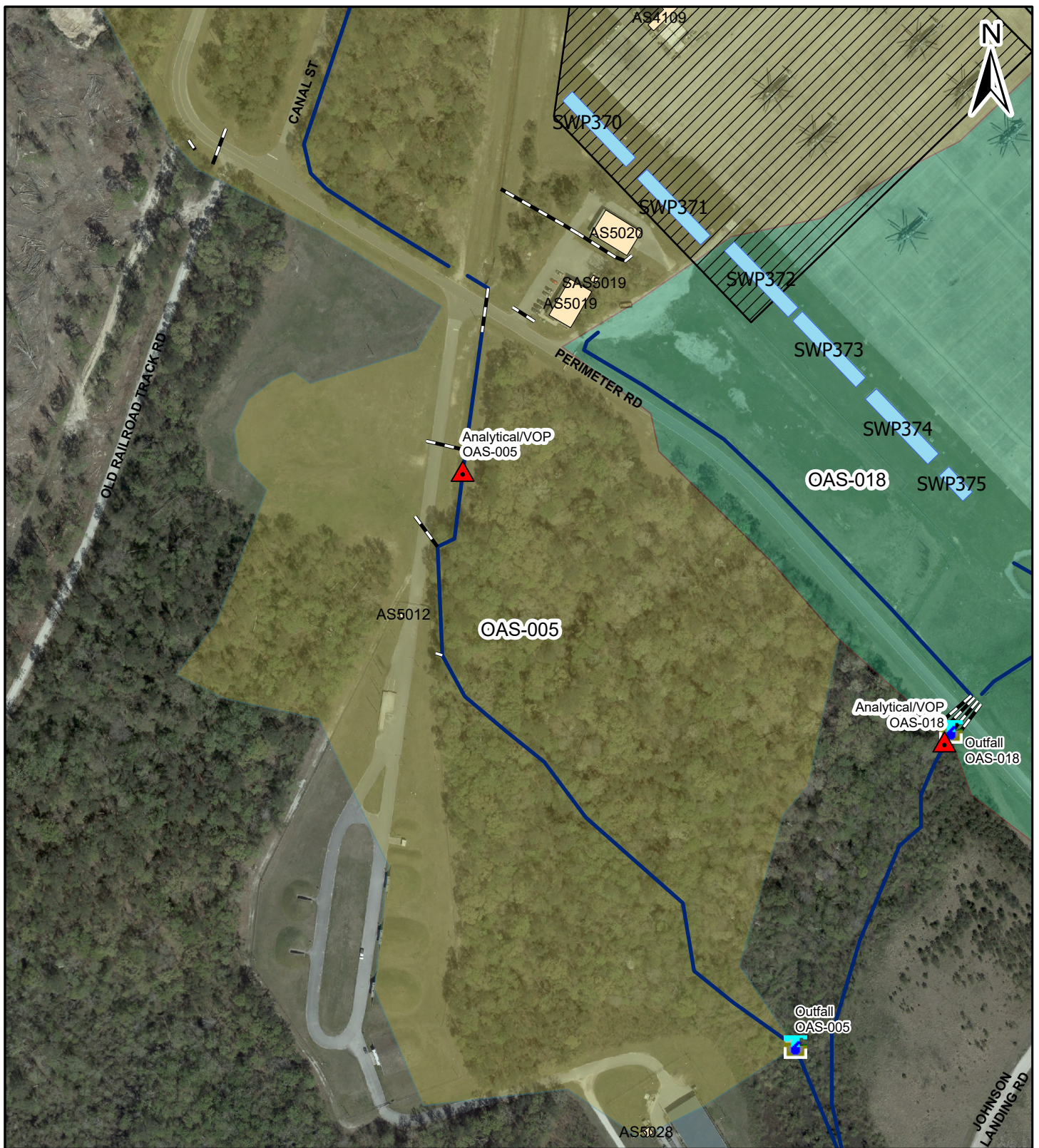


This section provides mapping and site photos for the seven (7) representative outfalls for analytical and visual monitoring. Table 4-2 summarizes these outfalls and contains their x- and y-coordinates (i.e., northing and easting) as well as their associated map and photo figures.

Table 4-2 Analytical Sampling Point Figures

Representative Outfall (Analytical Sampling Point)	X-coordinate¹ (feet)	Y-coordinate¹ (feet)	Map Figure	Photo Figure
OAS-005	902328.60	12608877.64	4-1	4-2
OAS-018	941692.86	12587475.10	4-3	4-4
OFC-003	904730.05	12620074.08	4-5	4-6
OHP-004	934954.30	12598324.44	4-7	4-8
OHP-008	938187.96	12591130.61	4-9	4-10
OTC-003	940633.10	12593304.85	4-11	4-12
OWC-001	903208.17	12608383.47	4-13	4-14

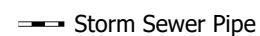
1) Universal Transverse Mercator (UTM) geographic coordinate system, North American Datum 1983 (NAD83).



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/3/2021
 By: CJM

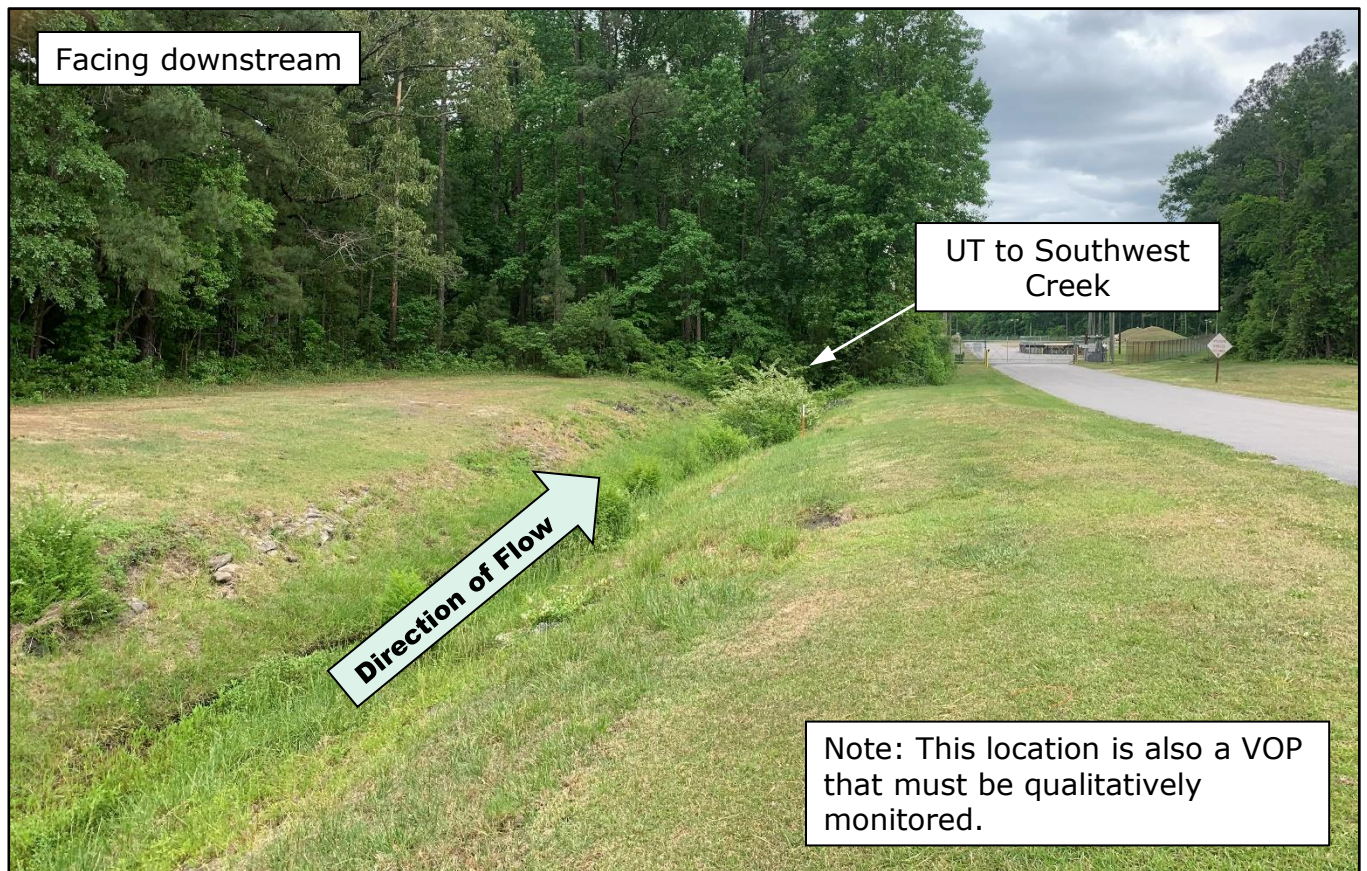
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 Feet

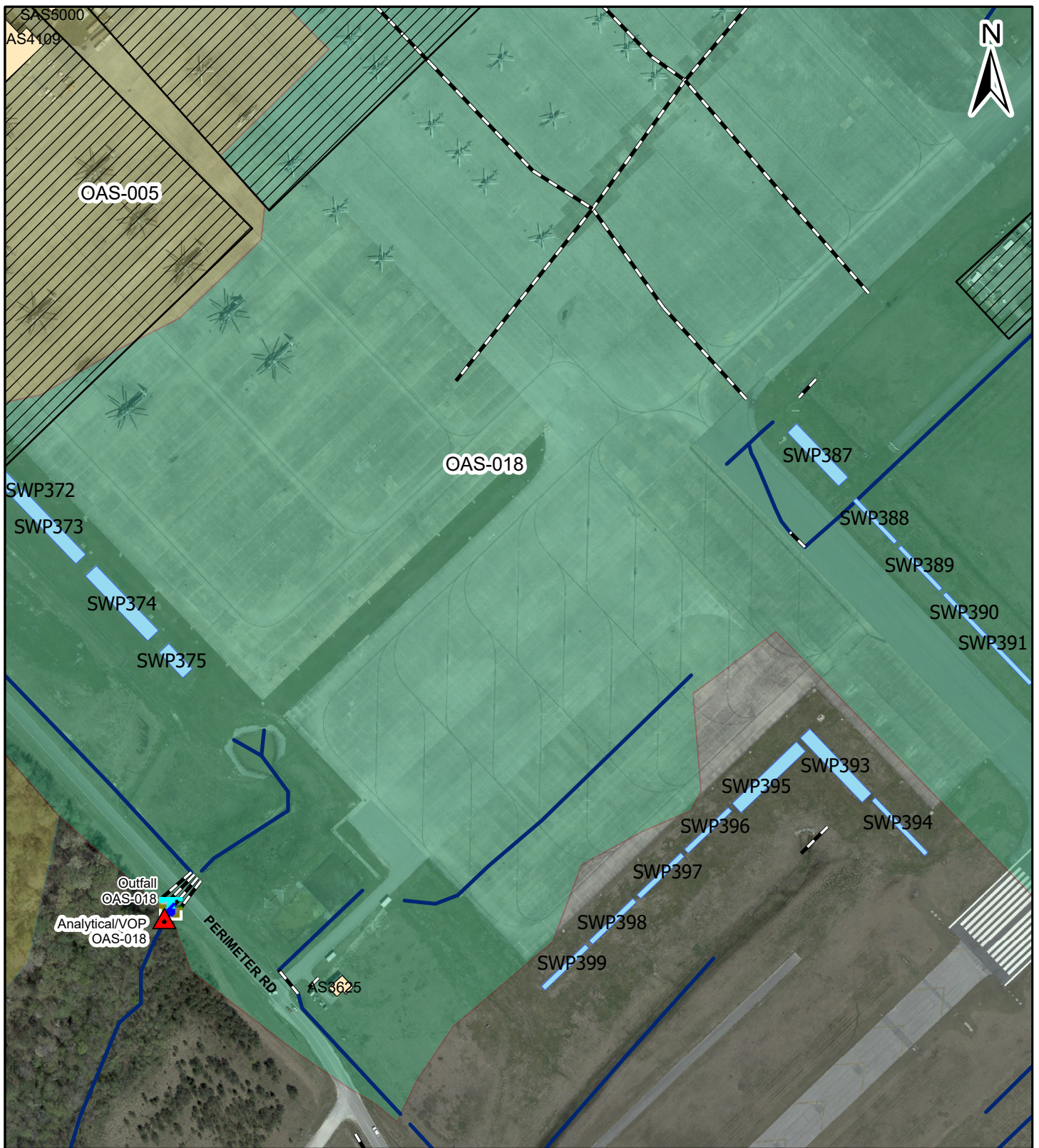
Legend



Analytical Sampling Points
Outfall No. OAS-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 4-1

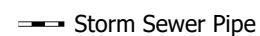
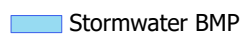




Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/3/2021
 By: CJM

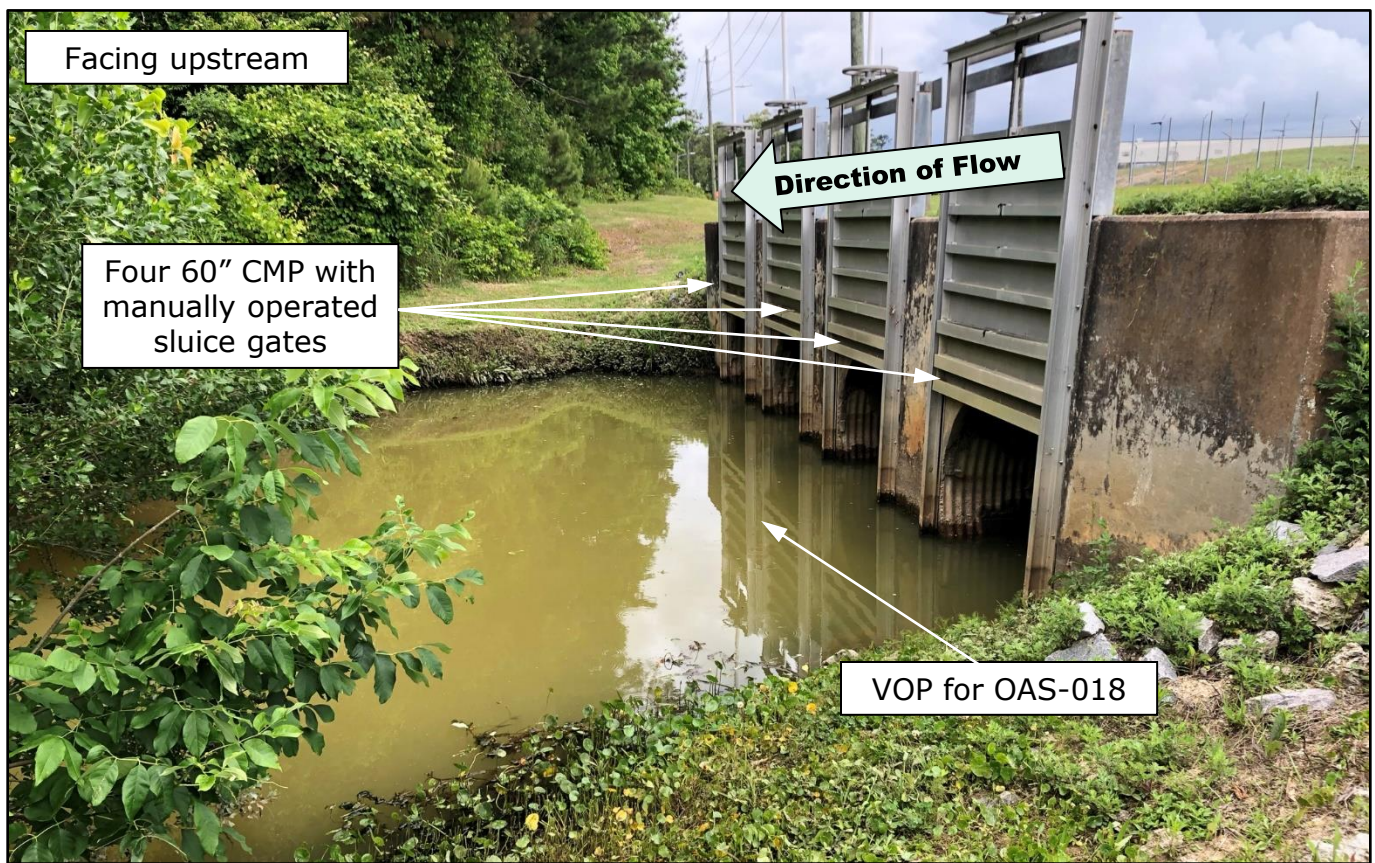
0 100 200
 Feet

Legend



Analytical Sampling Points
Outfall No. OAS-018
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 4-3



Facing upstream

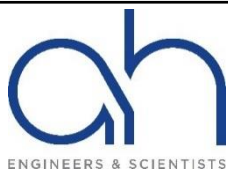


Facing downstream



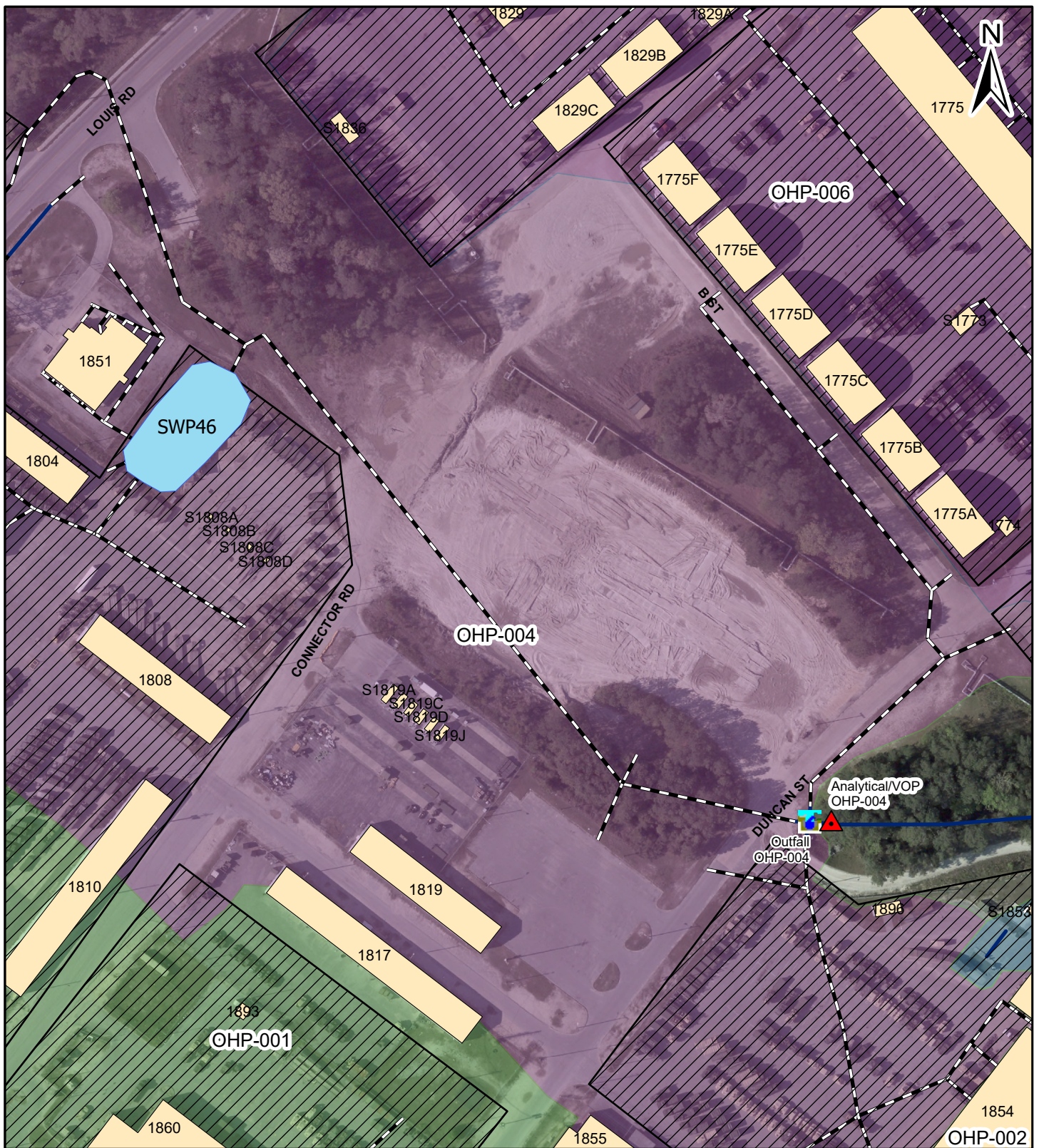
UT to Cowhead
Creek

Note: This location is also a VOP
that must be qualitatively
monitored.



Analytical Sampling Points
Outfall No. OFC-003
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
4-6



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/3/2021
 By: CJM

0 100 200
 Feet

Legend

▲ VOP

▲ Analytical/VOP

■ Stormwater Outfall

■ Stormwater BMP

■ Building

■ Facility Boundary

■ Catch Basin

■ Storm Sewer Pipe

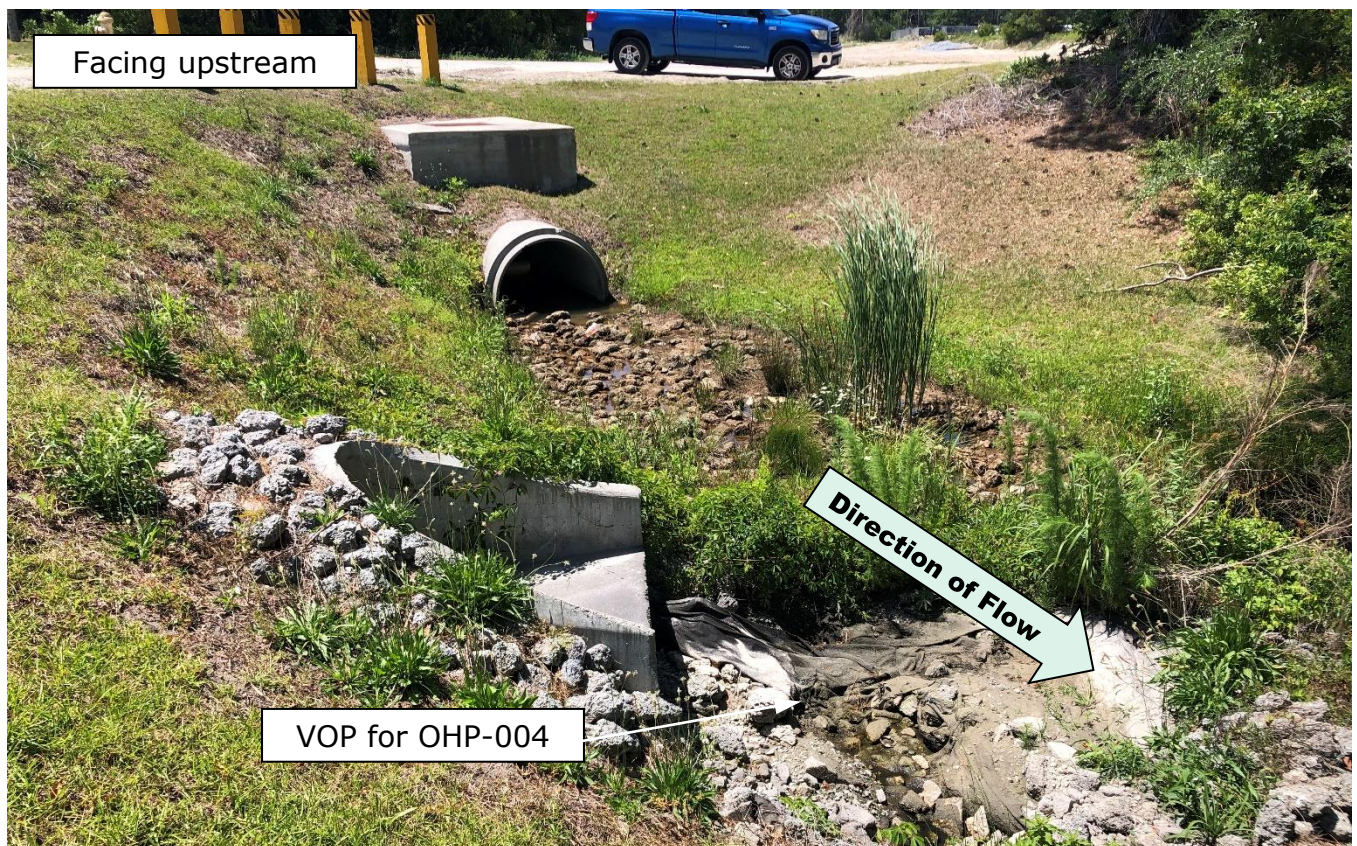
— Surface Watercourse

■ Drainage Basin



Analytical Sampling Points
Outfall No. OHP-004
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 4-7





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/3/2021
 By: CJM

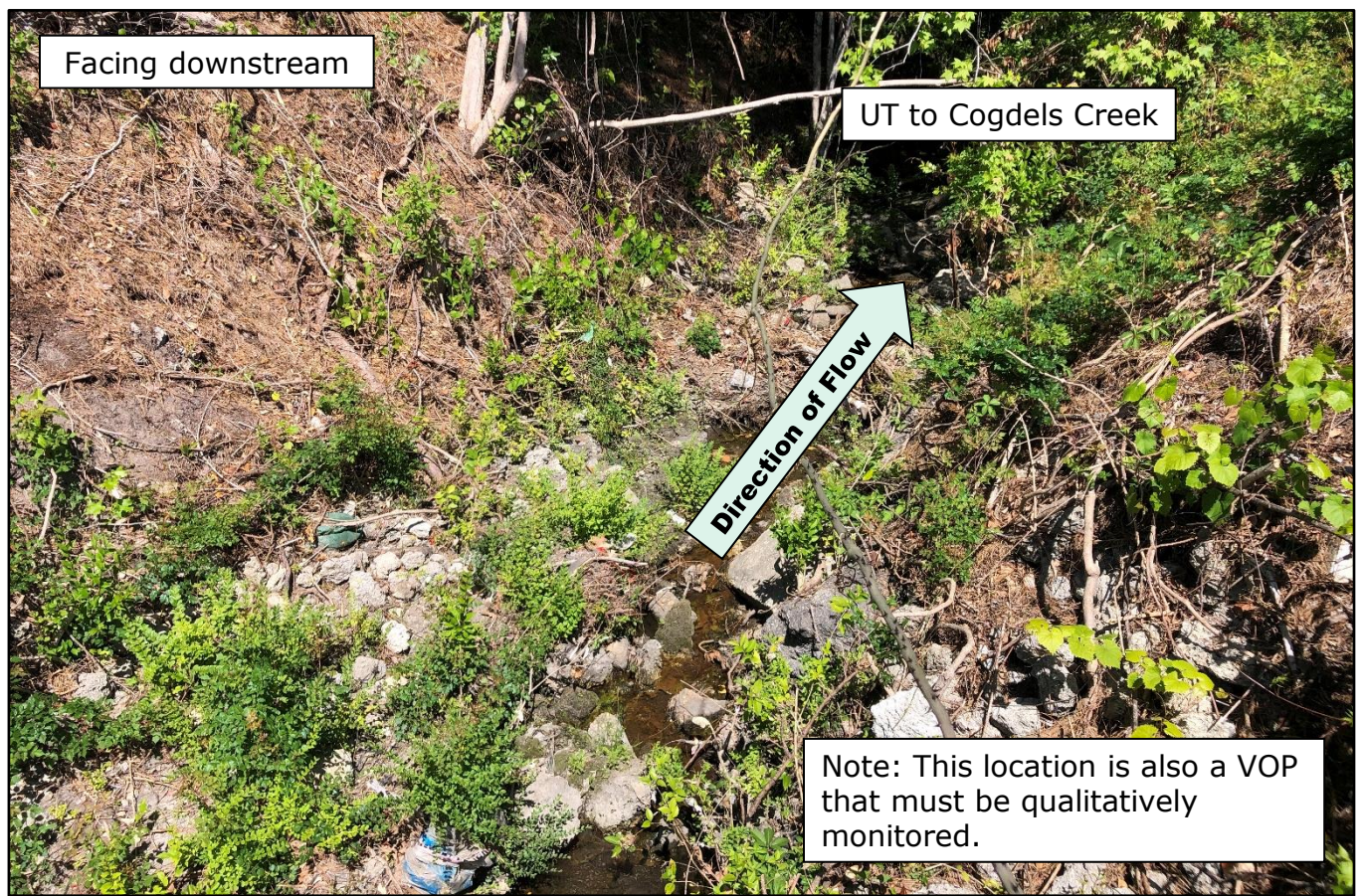
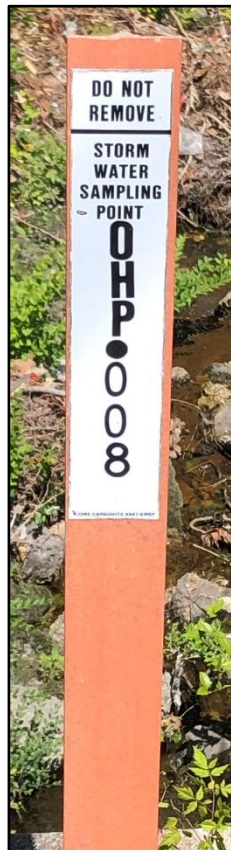
0 100 200
 Feet

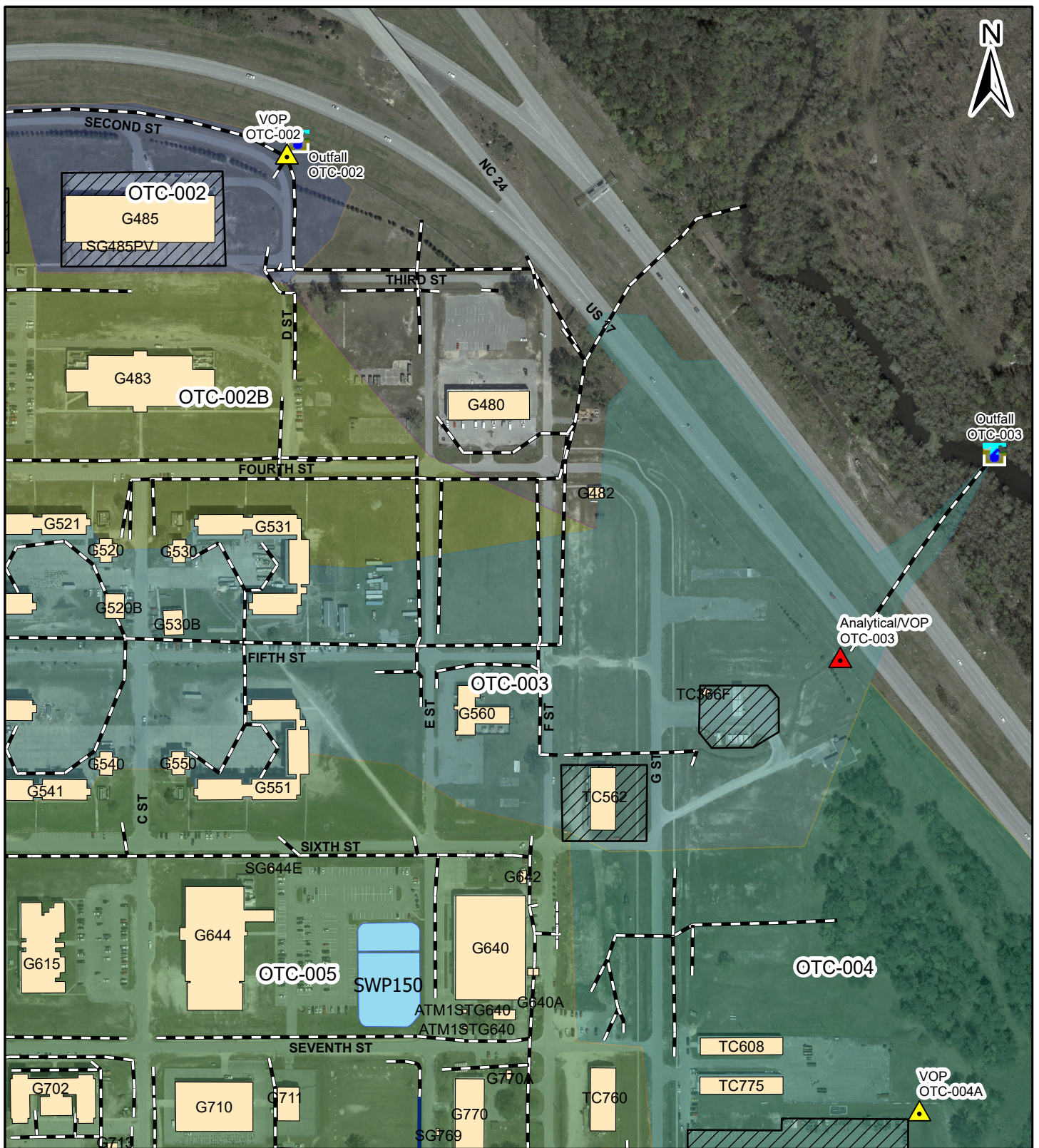
Legend



Analytical Sampling Points Outfall No. OHP-008 Stormwater Outfall Monitoring Plan Marine Corps Base Camp Lejeune, North Carolina

Figure
 4-9





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/3/2021
 By: CJM

0 100 200 400
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP

Building



Facility Boundary



Catch Basin



Storm Sewer Pipe

Surface Watercourse

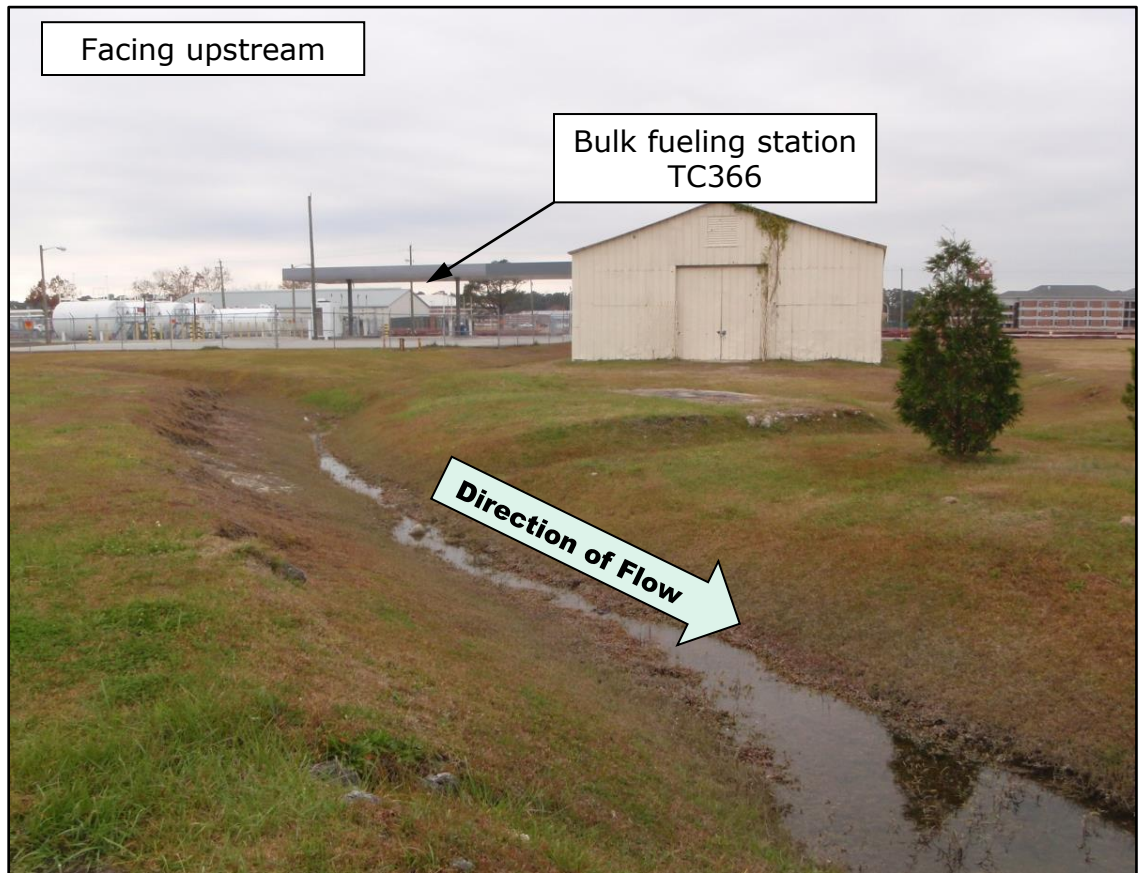


Drainage Basin



Analytical Sampling Points
Outfall No. OTC-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 4-11





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/3/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



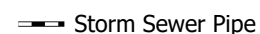
Building



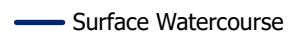
Facility Boundary



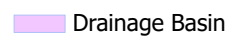
Catch Basin



Storm Sewer Pipe



Surface Watercourse



Drainage Basin



Analytical Sampling Points
Outfall No. OWC-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 4-13





5. VISUAL OBSERVATION POINT LOCATIONS

Under the MCIEAST-MCB CAMLEJ Permit, 80 outfalls are subject to only visual monitoring requirements. VOPs are required for each outfall that receives stormwater runoff from a facility engaging in regulated industrial activity. Table 5-1 contains the VOPs associated with industrial outfalls identified in the 2021 SWPPP update. This table does not include VOPs for outfalls requiring both analytical and visual monitoring (refer to Section 4: Analytical Sampling Point Locations).

The following summary rules apply to these outfalls:

- No analytical tests are required at these outfalls.
- Visual monitoring of these outfalls does not need to be performed during a representative storm event.
- Visual monitoring will be performed twice per year, once in the spring (April – June) and once in the fall (September – November).

This section provides mapping and site photos for the 80 outfalls, with 97 associated VOPs, that only require qualitative monitoring. Note that Section 4: Analytical Sampling Point Locations includes seven additional outfalls with seven associated VOPs, for a total of 87 outfalls and 104 associated VOPs. This section is subdivided by base area (e.g., Frenchs Creek, Hadnot Point, Wallace Creek). Table 5-1 summarizes these outfalls and references the associated map and photo figures.



Table 5-1 Visual Observation Point Figures

Base Area	VOP	Section Number	Map Figure	Photo Figure
Amphibious Base (AB)	OAB-001	5.1	5-1	5-2
	OAB-002		5-3	5-4
	OAB-003		5-5	5-6
	OAB-006		5-7	5-8
	OAB-007		5-9	5-10
Air Station (AS)	OAS-001	5.2	5-11	5-12
	OAS-002		5-13	5-14
	OAS-003		5-15	5-16
	OAS-004		5-17	5-18
	OAS-006		5-19	5-20
	OAS-008		5-21	5-22
	OAS-010		5-23	5-24
	OAS-014A		5-25	5-26
	OAS-014B			5-27
	OAS-021		5-28	5-29
	OAS-030		5-30	5-31
	OAS-032		5-32	5-33
	OAS-037		5-34	5-35
Courthouse Bay (CB)	OCB-001	5.3	5-36	5-37
	OCB-013		5-38	5-39
	OCB-014		5-40	5-41
	OCB-016A		5-42	5-43
	OCB-016B			5-44
Camp Johnson (CJ)	OCJ-001	5.4	5-45	5-46
	OCJ-003		5-47	5-48
	OCJ-004A		5-49	5-50
	OCJ-004B			5-51
Frenchs Creek (FC)	OFC-001	5.5	5-52	5-53
	OFC-002		5-54	5-55
	OFC-004A		5-56	5-57
	OFC-004B			5-58
	OFC-005		5-59	5-60
	OFC-006A		5-61	5-62
	OFC-006B			5-63
	OFC-006C			5-64
	OFC-008		5-65	5-66
	OFC-009		5-67	5-68
	OFC-012		5-69	5-70
	OFC-013		5-71	5-72
	OFC-026		5-73	5-74
	OFC-027		5-75	5-76



Table 5-1 Visual Observation Point Figures (continued)

Base Area	VOP	Section Number	Map Figure	Photo Figure
Hadnot Point (HP)	OHP-001	5.6	5-77	5-78
	OHP-002A		5-79	5-80
	OHP-002B			5-81
	OHP-003		5-82	5-83
	OHP-005		5-84	5-85
	OHP-006A		5-86	5-87
	OHP-006B			5-88
	OHP-006C			5-89
	OHP-007		5-90	5-91
	OHP-010		5-92	5-93
	OHP-011		5-94	5-95
	OHP-012		5-96	5-97
	OHP-013A		5-98	5-99
	OHP-013B			5-100
	OHP-014		5-101	5-102
	OHP-015		5-103	5-104
	OHP-017		5-105	5-106
	OHP-018A		5-107	5-108
	OHP-018B			5-109
	OHP-019A		5-110	5-111
	OHP-019B			5-112
	OHP-019C			5-113
	OHP-019D			5-114
	OHP-021A		5-115	5-116
	OHP-021B			5-117
	OHP-022		5-118	5-119
	OHP-024		5-120	5-121
	OHP-027		5-122	5-123
	OHP-035		5-124	5-125
	OHP-038		5-126	5-127
	OHP-042		5-128	5-129
	OHP-043		5-130	5-131
	OHP-044		5-132	5-133
	OHP-045		5-134	5-135
Landfill (LF)	OLF-001	5.7	5-136	5-137
	OLF-002		5-138	5-139
Naval Hospital (NH)	ONH-001	5.8	5-140	5-141
	ONH-002		5-142	5-143
Old Hospital (OH)	OOH-008	5.9	5-144	5-145
Rifle Range (RR)	ORR-001	5.10	5-146	5-147
	ORR-003		5-148	5-149
	ORR-012		5-150	5-151
	ORR-013		5-152	5-153
	ORR-014		5-154	5-155
Sandy Run (SR)	OSR-001	5.11	5-156	5-157



Table 5-1 Visual Observation Point Figures (continued)

Base Area	VOP	Section Number	Map Figure	Photo Figure
Camp Geiger (TC)	OTC-002	5.12	5-158	5-159
	OTC-002B		5-160	5-161
	OTC-004A		5-162	5-163
	OTC-004B			5-164
	OTC-005		5-165	5-166
Wallace Creek (WC)	OWC-002	5.13	5-167	5-168
	OWC-003		5-169	5-170
	OWC-004		5-171	5-172
	OWC-005A		5-173	5-174
	OWC-005B			5-175
	OWF-001		5-176	5-177



5.1 AMPHIBIOUS BASE (AB)

This section provides mapping and photos of VOPs located in the Amphibious Base area. Table 5-2 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-2 Amphibious Base VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OAB-001	927332.45	12566180.07	-
OAB-002	927074.49	12565791.92	-
OAB-003	926654.78	12565461.49	-
OAB-006	927218.42	12566029.98	Replace missing VOP marker.
OAB-007	925489.60	12566253.53	-

1) UTM geographic coordinate system, NAD83.



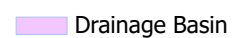
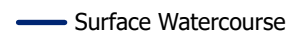
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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

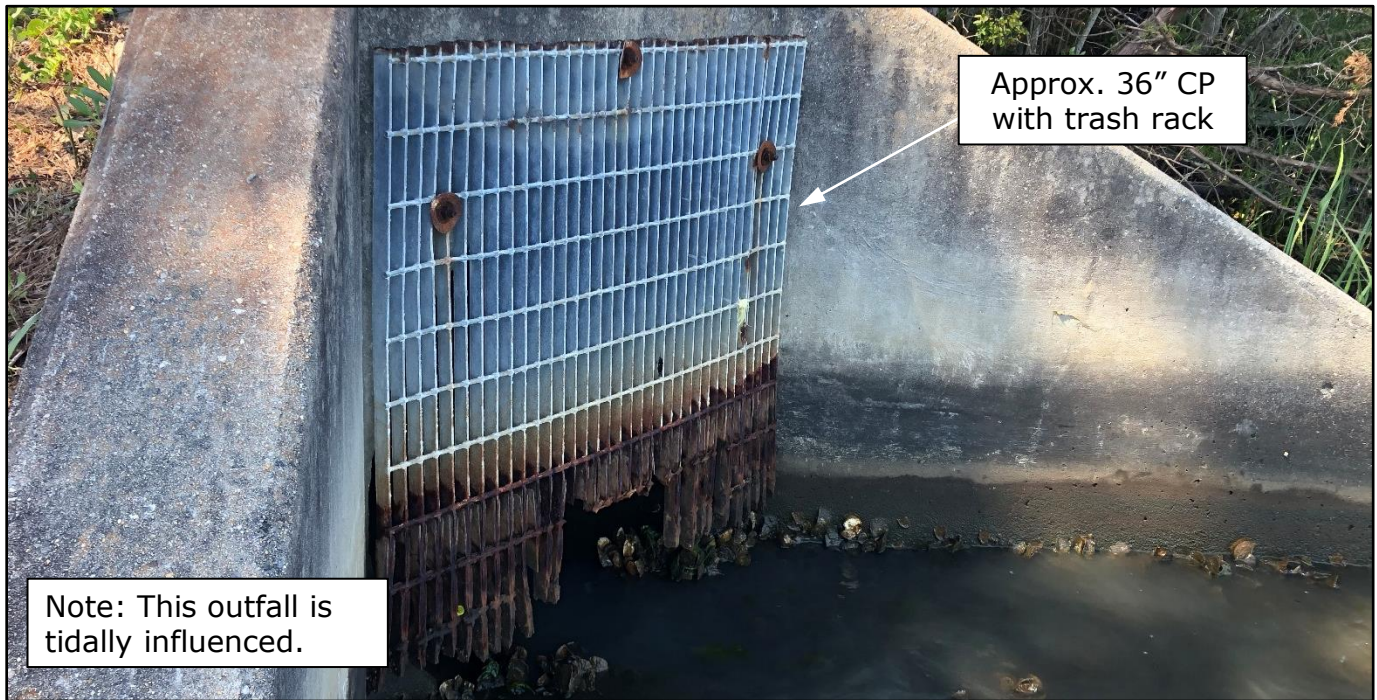
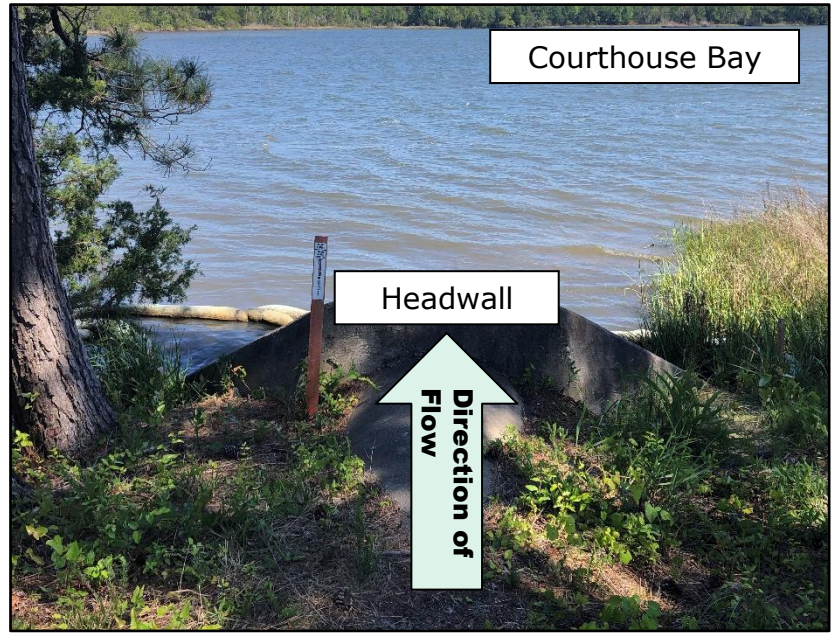
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OAB-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-1





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



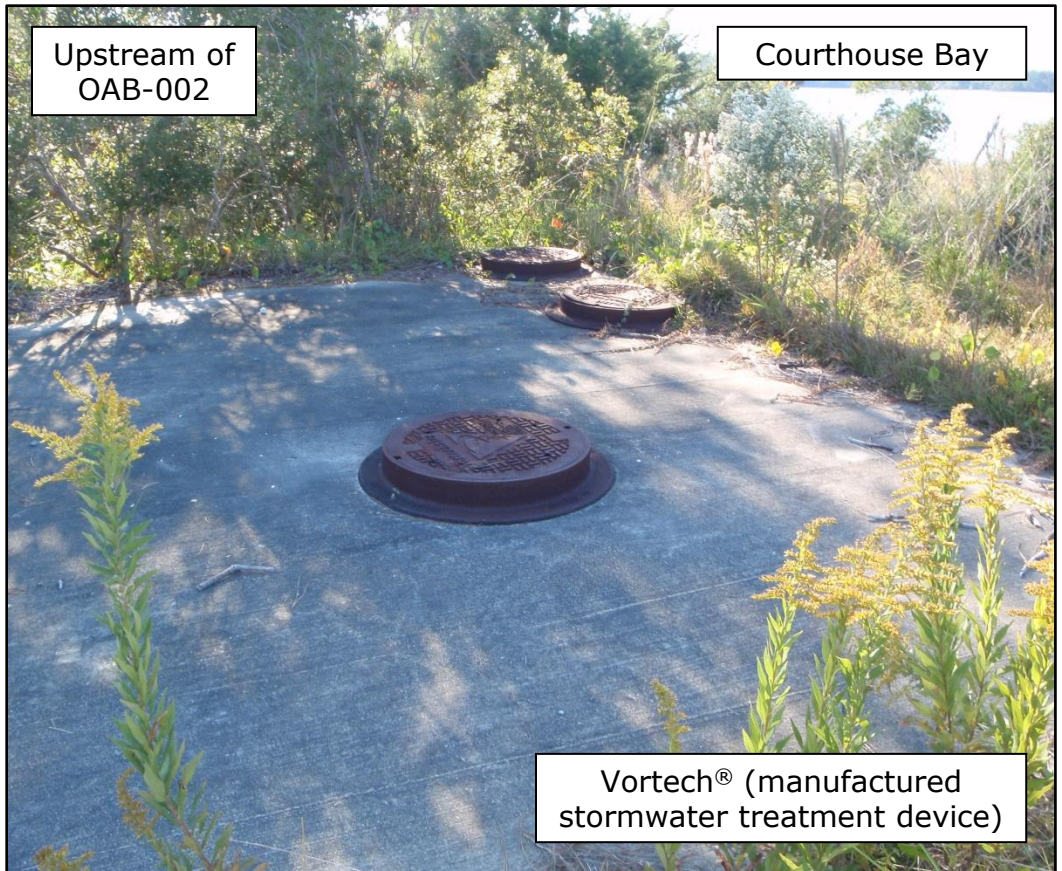
Visual Observation Points
Outfall No. OAB-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-3



Upstream of
OAB-002

Courthouse Bay



Vortech® (manufactured
stormwater treatment device)



Approx. 24" x 12"
elliptical CP

Note: This outfall is
tidally influenced.



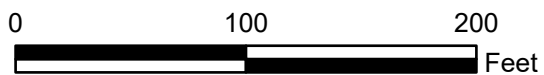
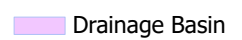
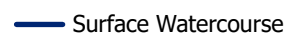
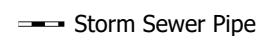
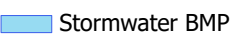
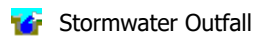
Visual Observation Points
Outfall No. OAB-002
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-4



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend



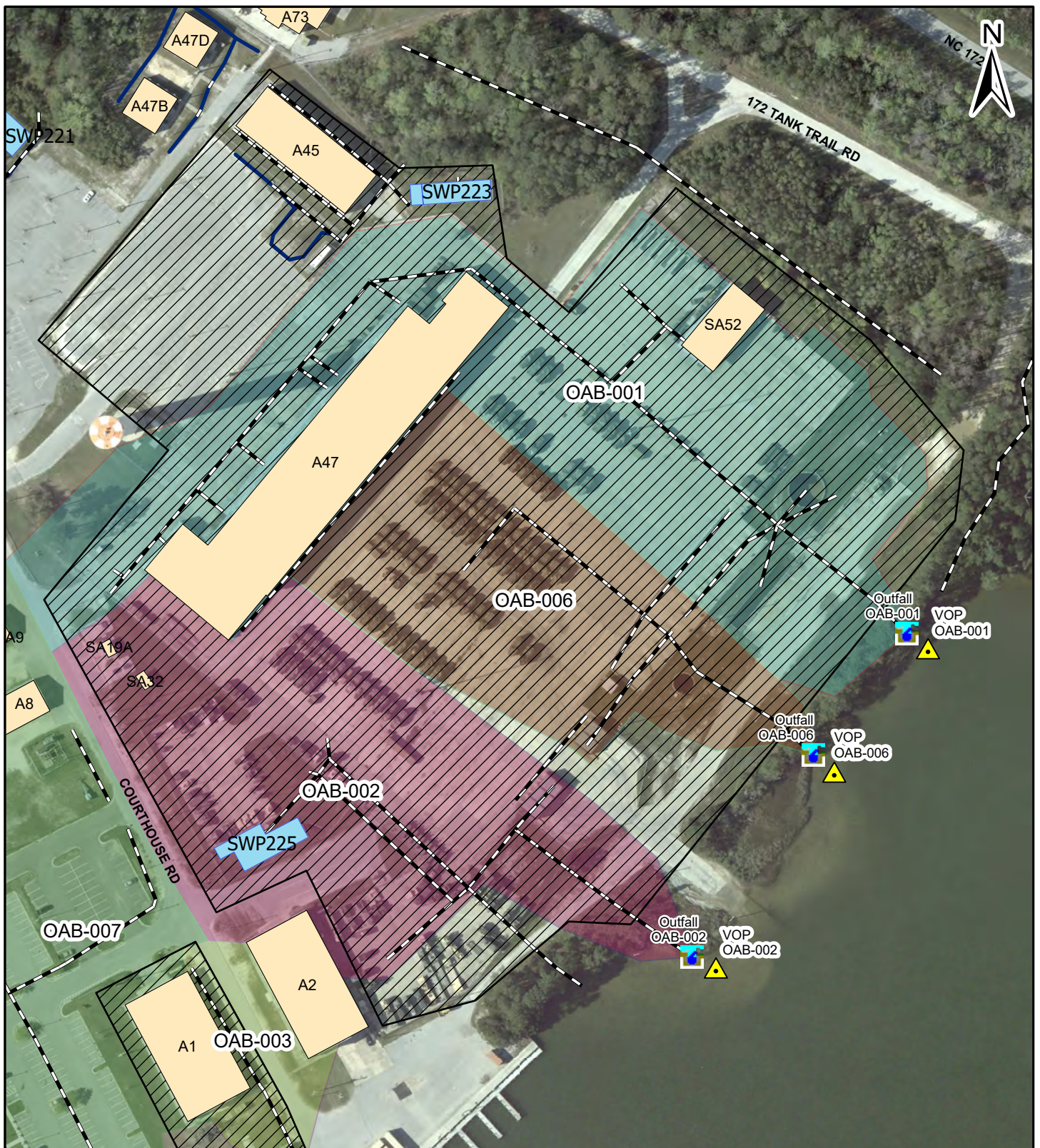
Visual Observation Points
Outfall No. OAB-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-5



Visual Observation Points
Outfall No. OAB-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-6



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

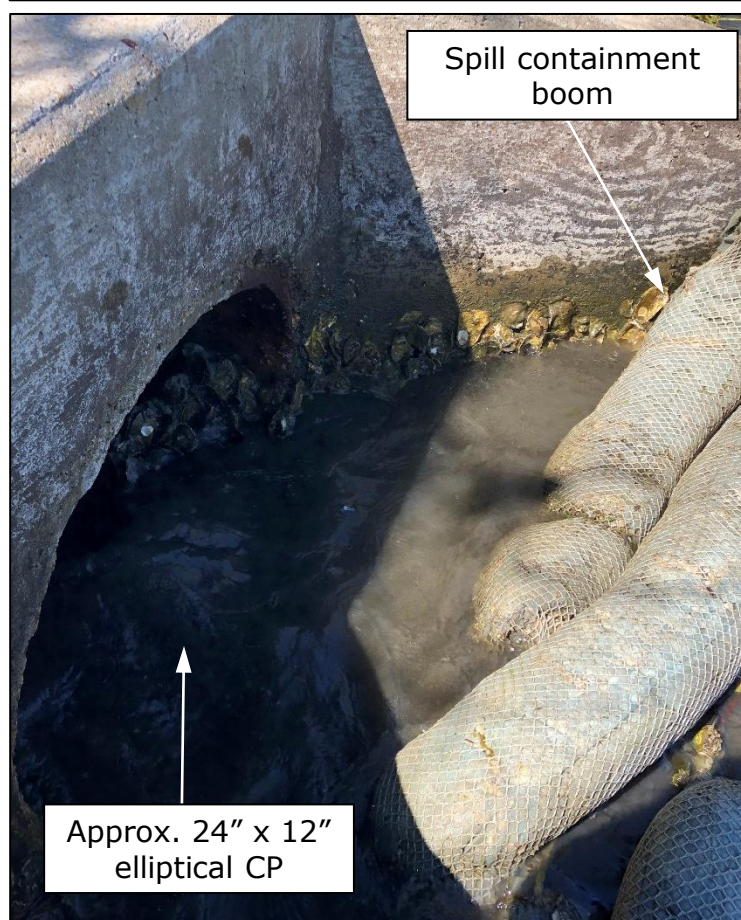
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OAB-006
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-7



Visual Observation Points
Outfall No. OAB-006
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-8



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

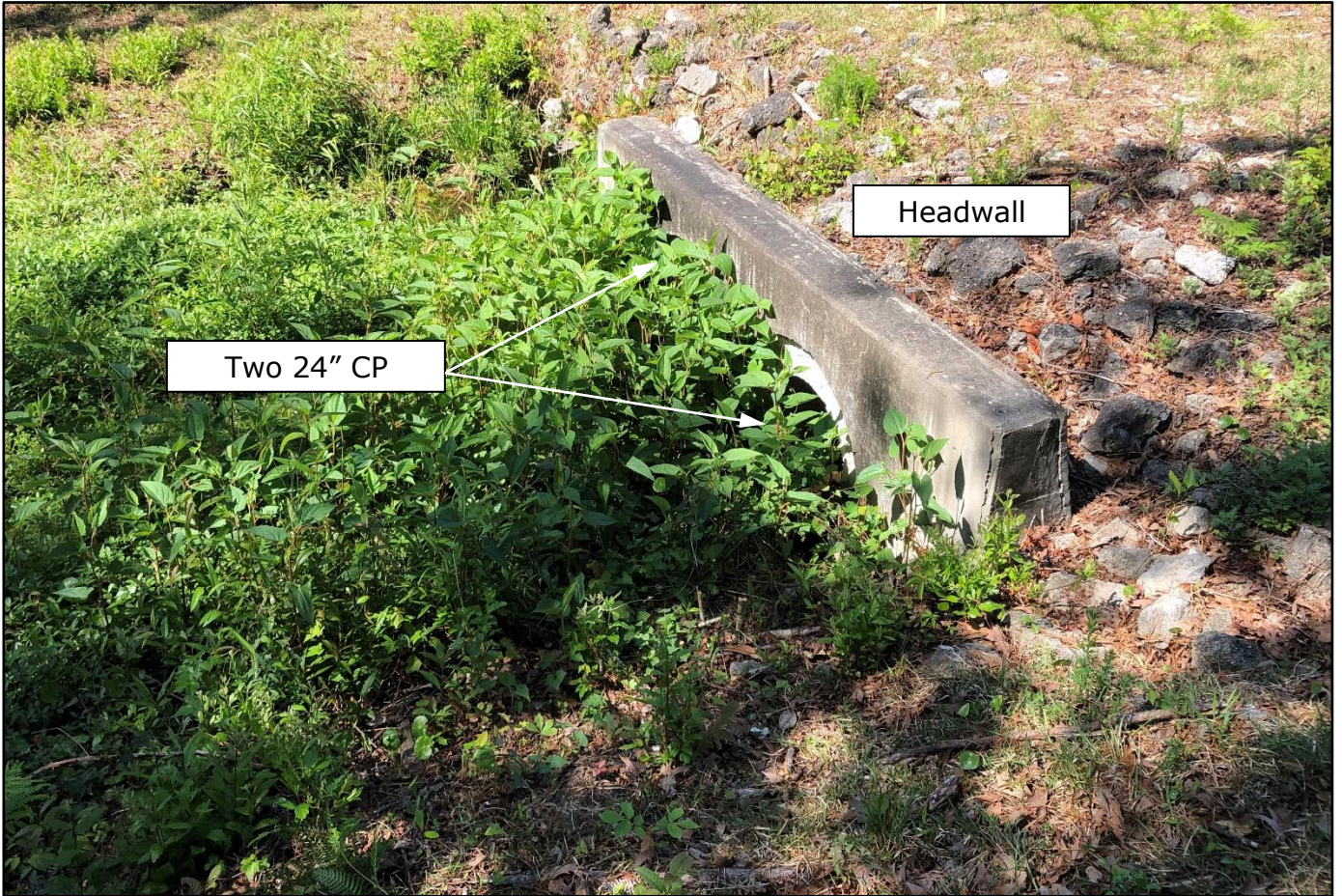
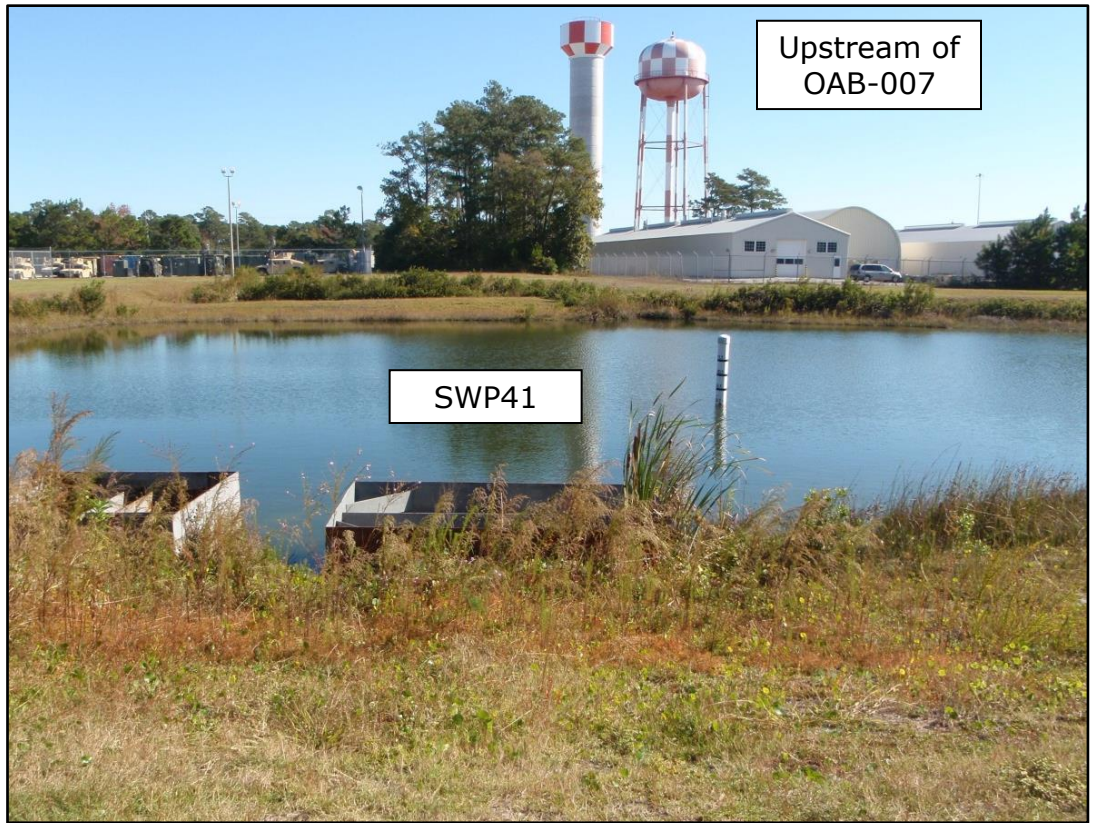
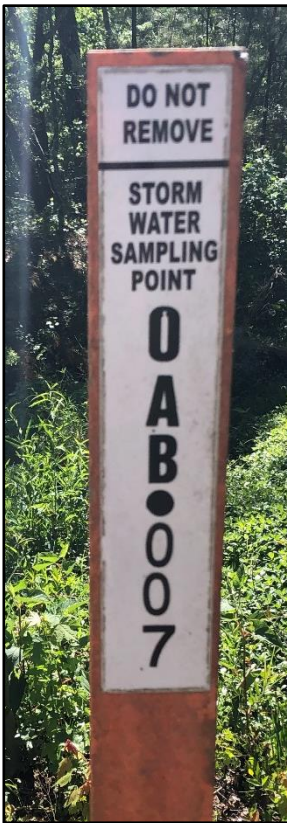
Legend



Visual Observation Points
Outfall No. OAB-007
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-9





**Visual Observation Points
Outfall No. OAB-007
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina**

**Figure
5-10**



5.2 AIR STATION (AS)

This section provides mapping and photos of VOPs located in the Air Station area. Table 5-3 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-3 Air Station VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OAS-001	910088.57	12606683.77	Install VOP marker (newly added VOP).
OAS-002	910271.89	12609443.18	-
OAS-003	910616.63	12610278.13	Replace missing VOP marker.
OAS-004	901211.81	12610202.33	Replace missing VOP marker.
OAS-006	901275.51	12610814.60	-
OAS-008	910208.42	12607828.24	Install VOP marker (newly added VOP).
OAS-010	910013.67	12609006.72	Install VOP marker (newly added VOP).
OAS-014A	907039.57	12607619.09	-
OAS-014B	907319.32	12607104.98	Install VOP marker (newly added VOP).
OAS-021	908898.99	12612477.64	-
OAS-030	907484.42	12615385.68	Replace missing VOP marker.
OAS-032	904838.29	12615160.02	Install VOP marker (newly added VOP).
OAS-037	909892.16	12605624.72	Install VOP marker (newly added VOP).

1) UTM geographic coordinate system, NAD83.



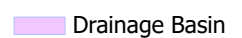
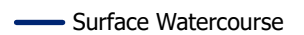
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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

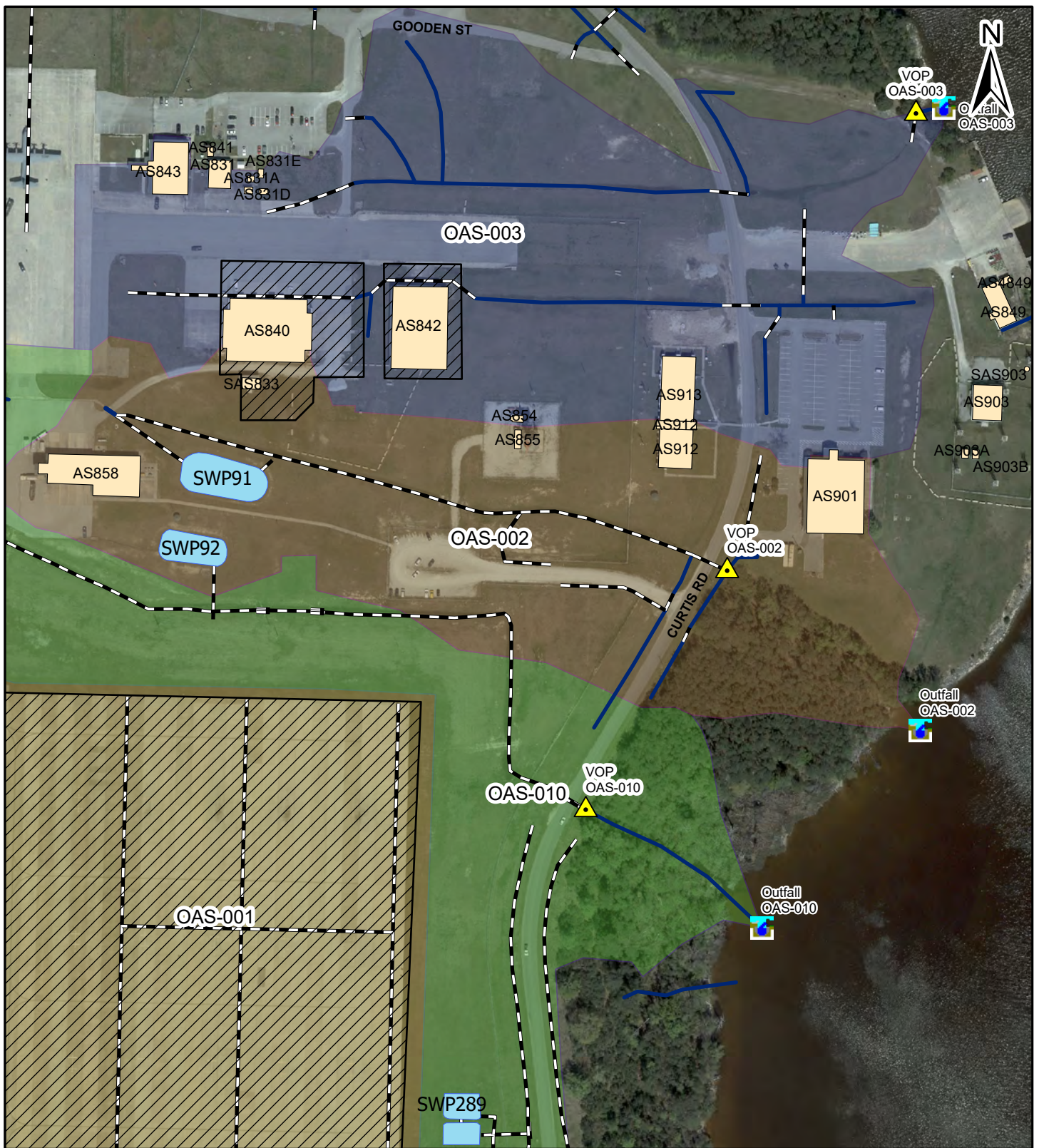
Legend



Visual Observation Points
Outfall No. OAS-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-11





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

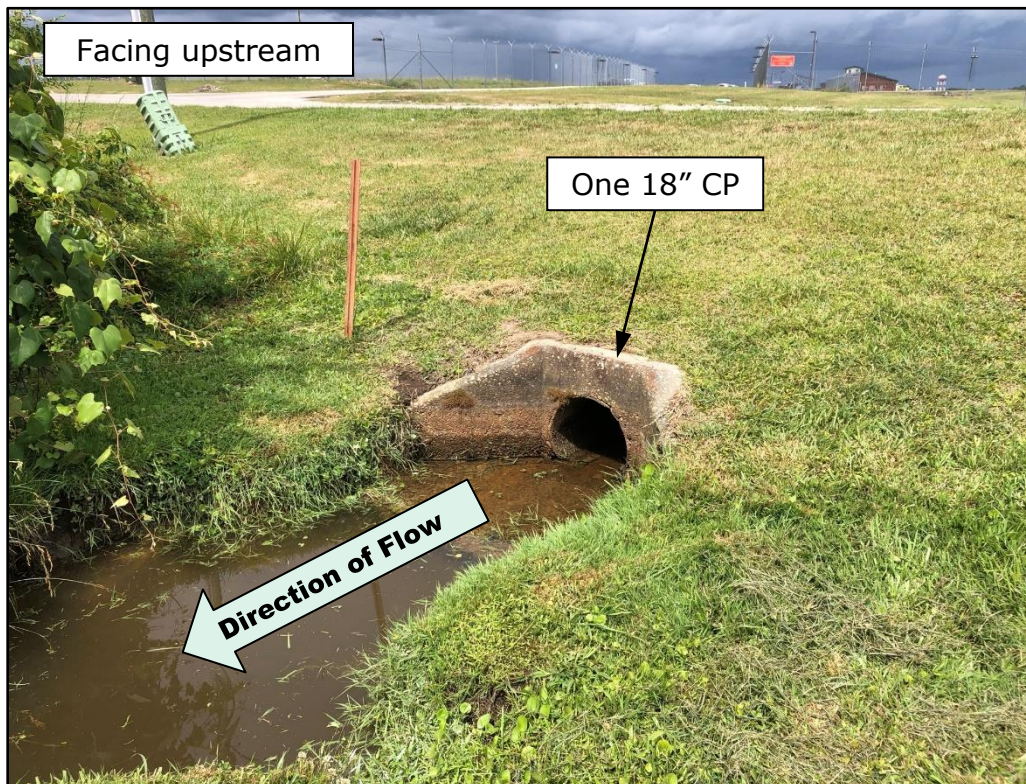
Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



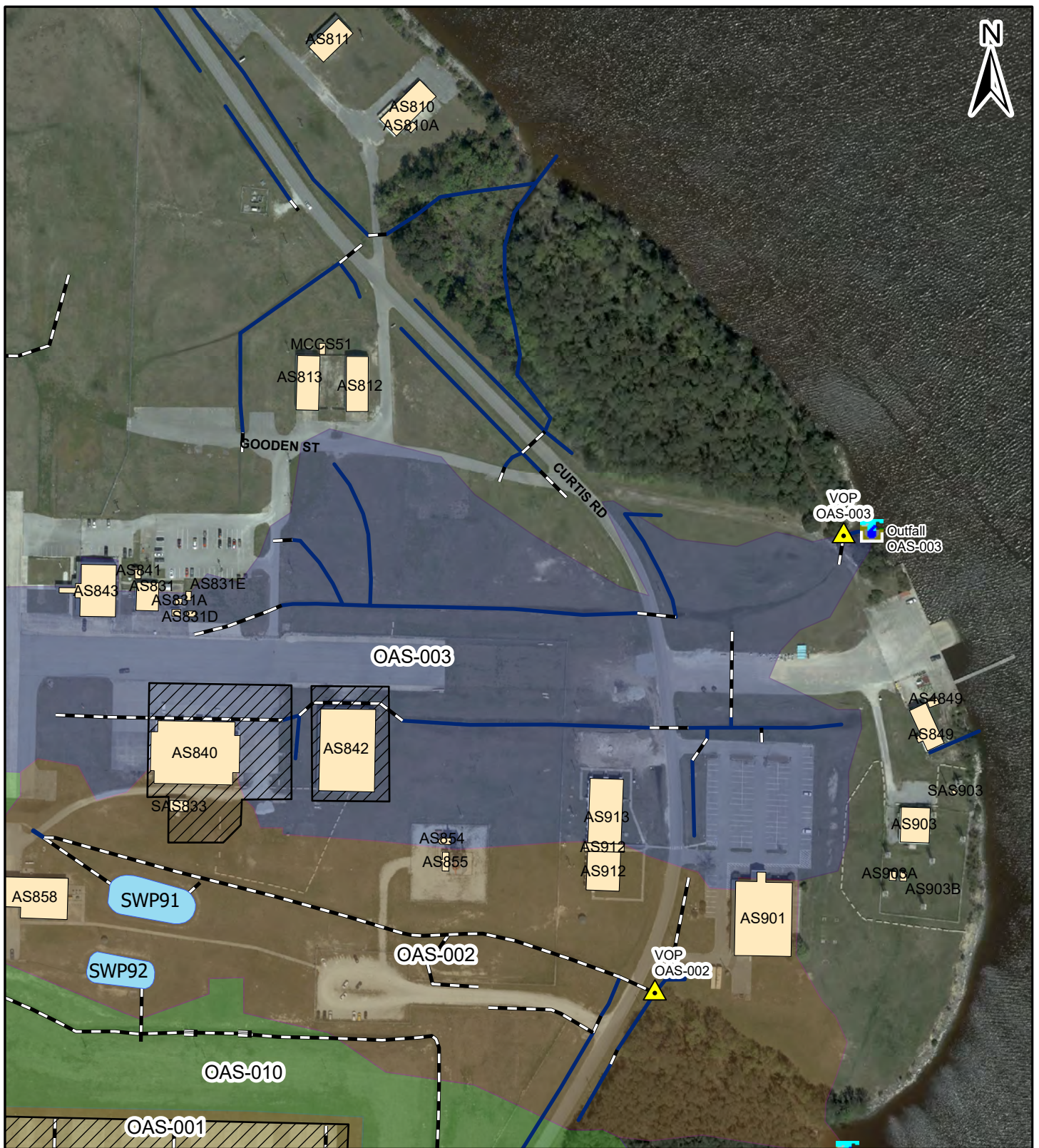
Visual Observation Points
Outfall No. OAS-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-13



Visual Observation Points
 Outfall No. OAS-002
 Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-14



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



Building



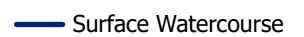
Facility Boundary



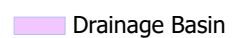
Catch Basin



Storm Sewer Pipe



Surface Watercourse

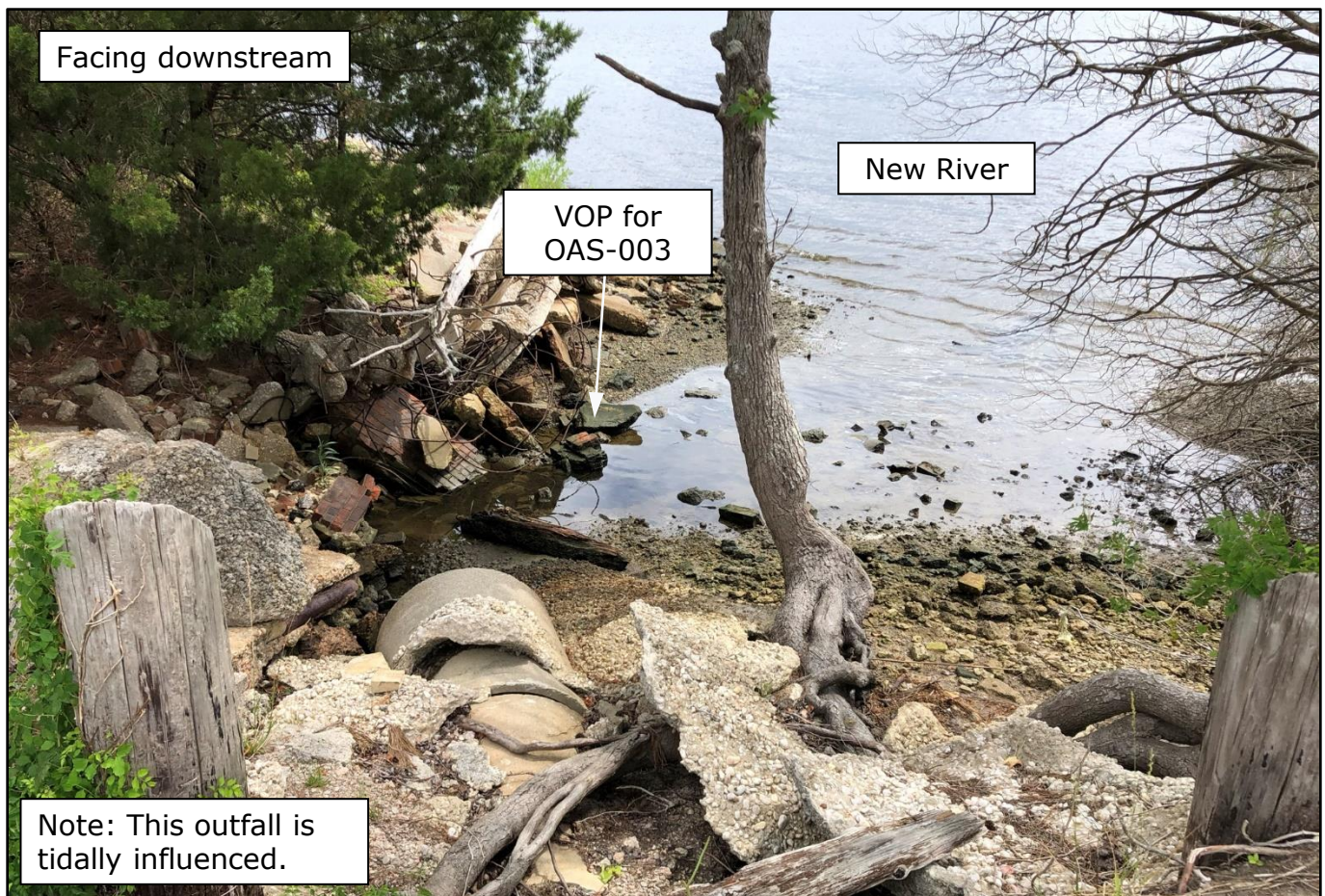


Drainage Basin



Visual Observation Points
Outfall No. OAS-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-15





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend



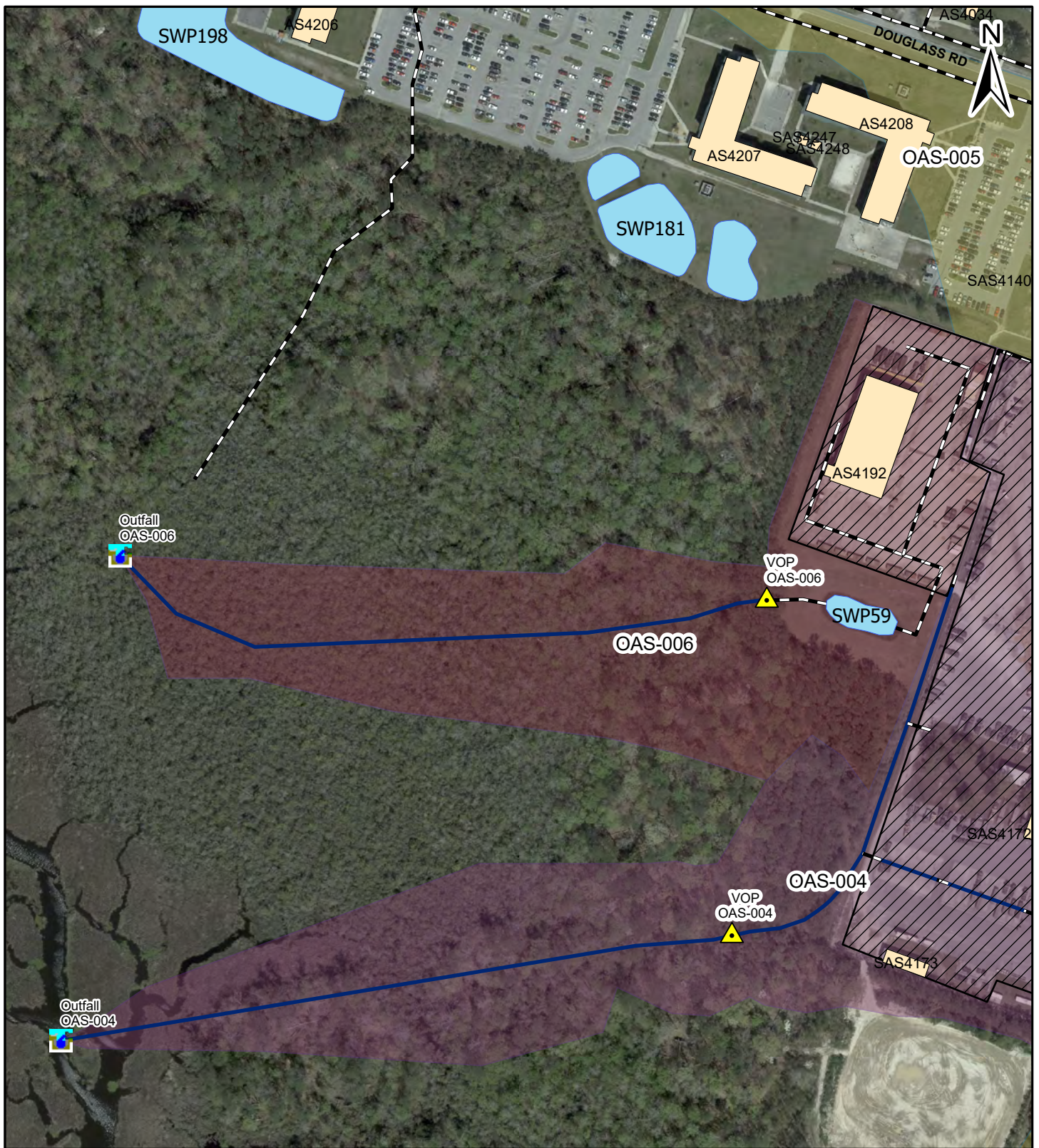
Visual Observation Points
Outfall No. OAS-004
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-17



Visual Observation Points
Outfall No. OAS-004
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

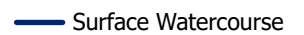
Figure
 5-18



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



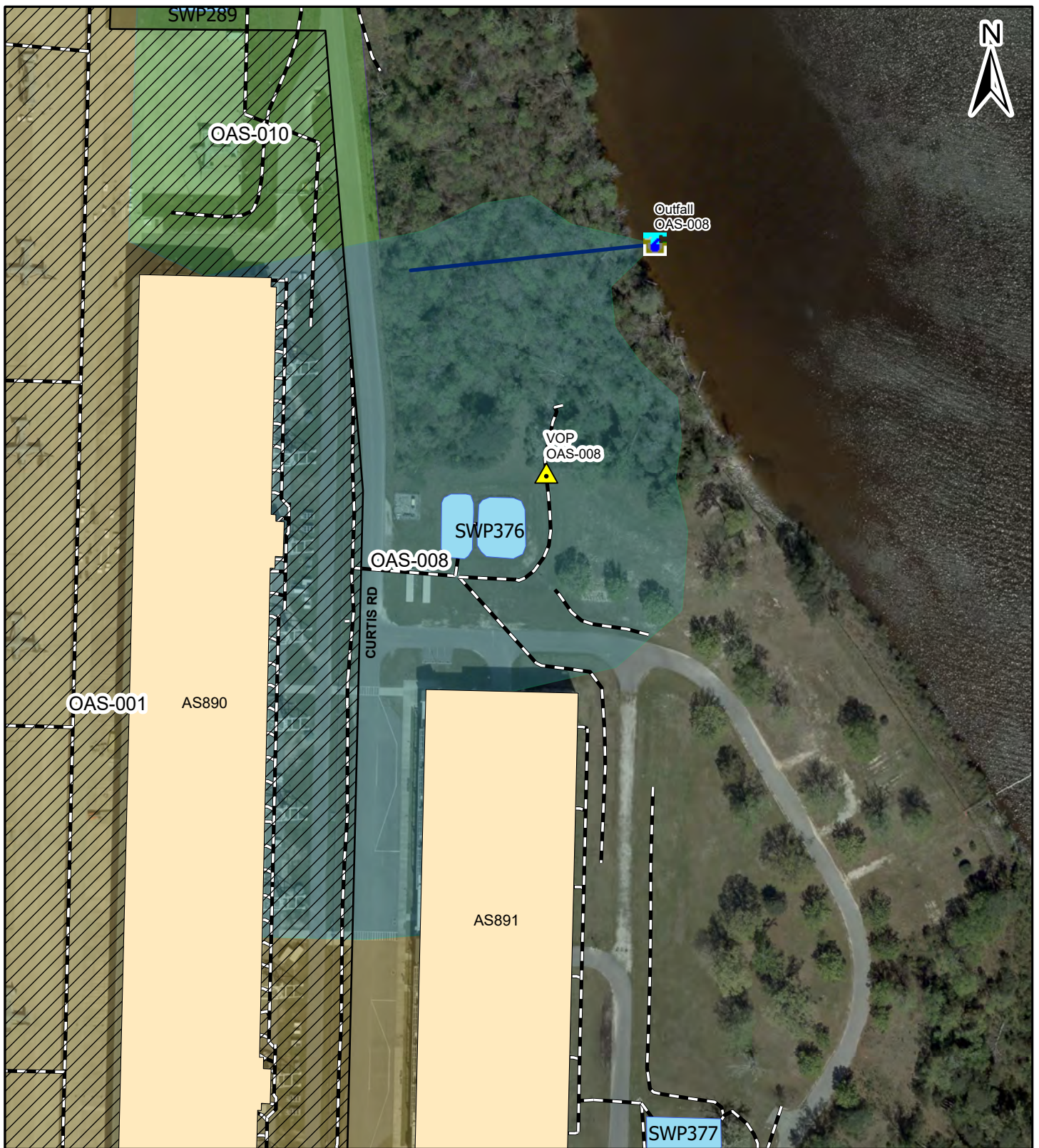
Visual Observation Points
Outfall No. OAS-006
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-19



Visual Observation Points
Outfall No. OAS-006
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-20



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

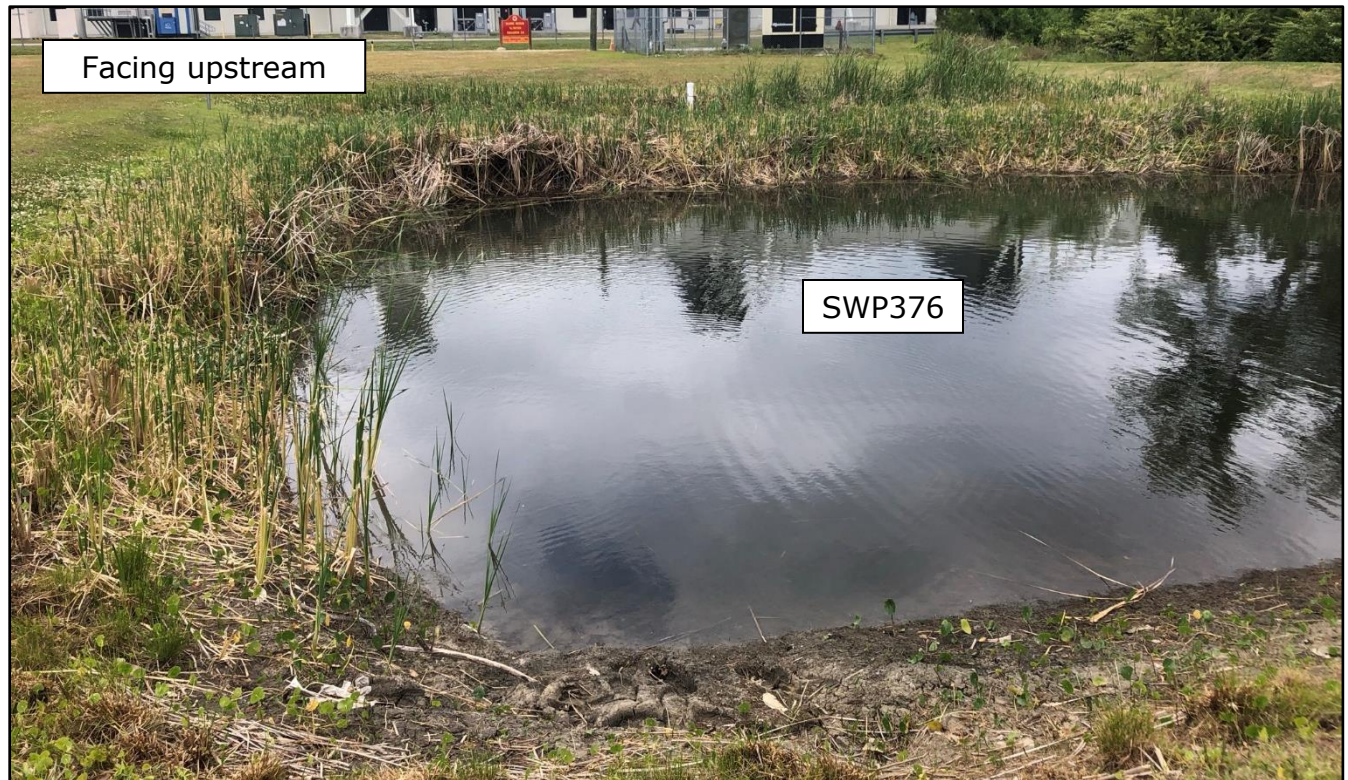
0 100 200
 Feet

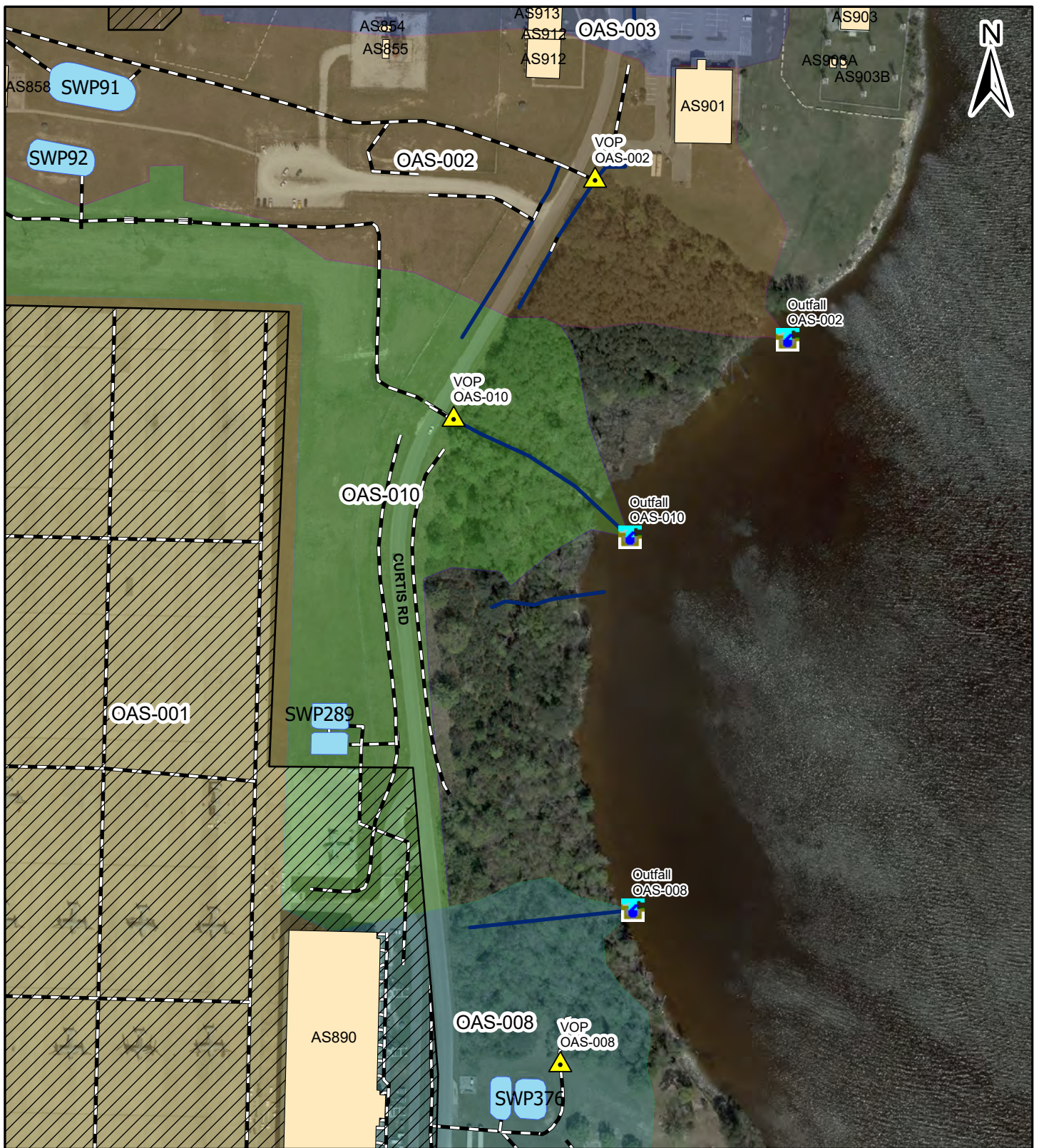
Legend



Visual Observation Points
Outfall No. OAS-008
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-21





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OAS-010
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-23

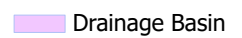
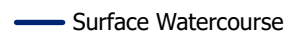
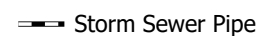
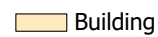
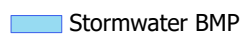




Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OAS-014
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

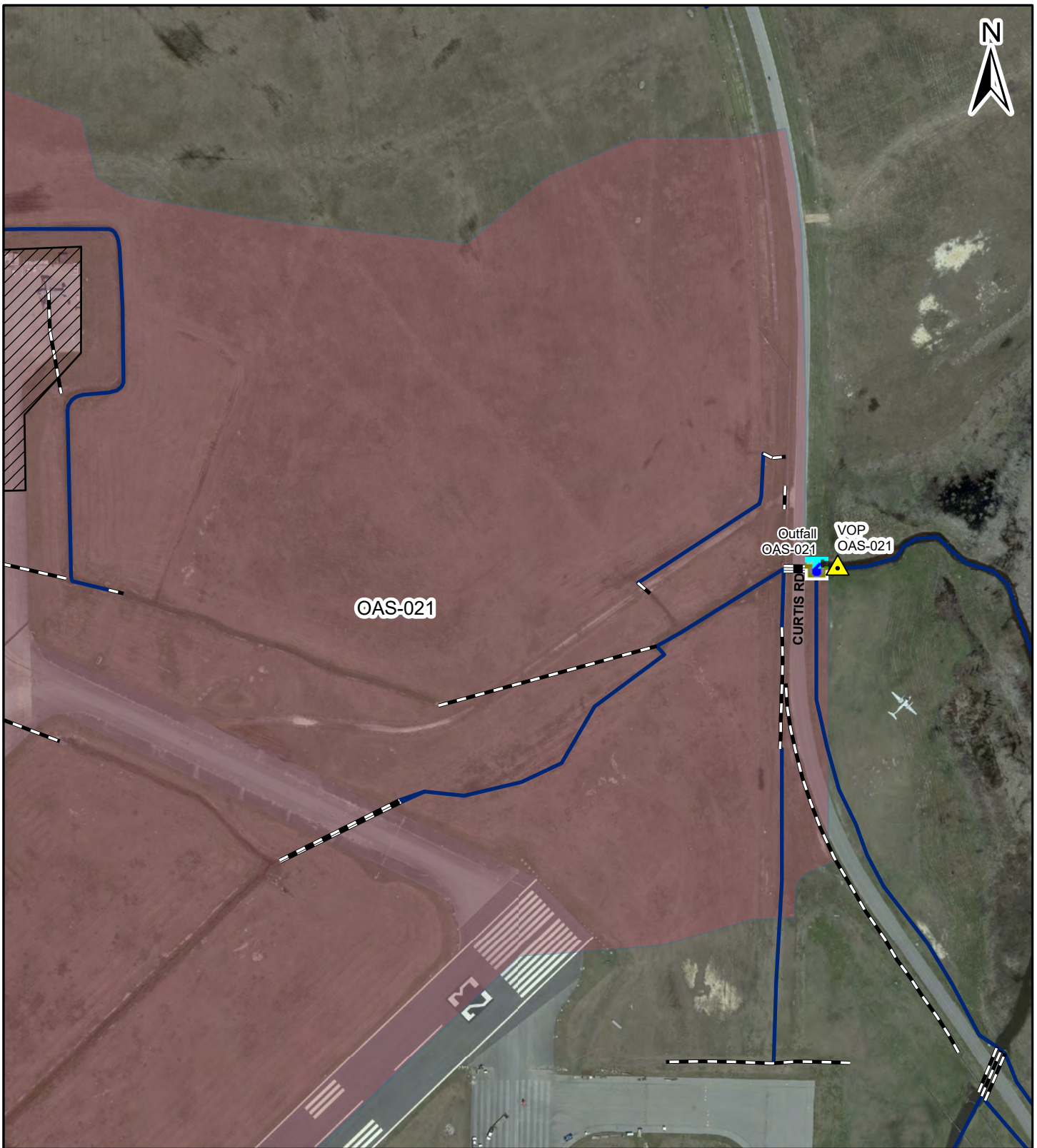
Figure
 5-25



Visual Observation Points
Outfall No. OAS-014A
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-26





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend

▲ VOP

▲ Analytical/VOP

■ Stormwater Outfall

■ Stormwater BMP

■ Building

■ Facility Boundary

■ Catch Basin

■ Storm Sewer Pipe

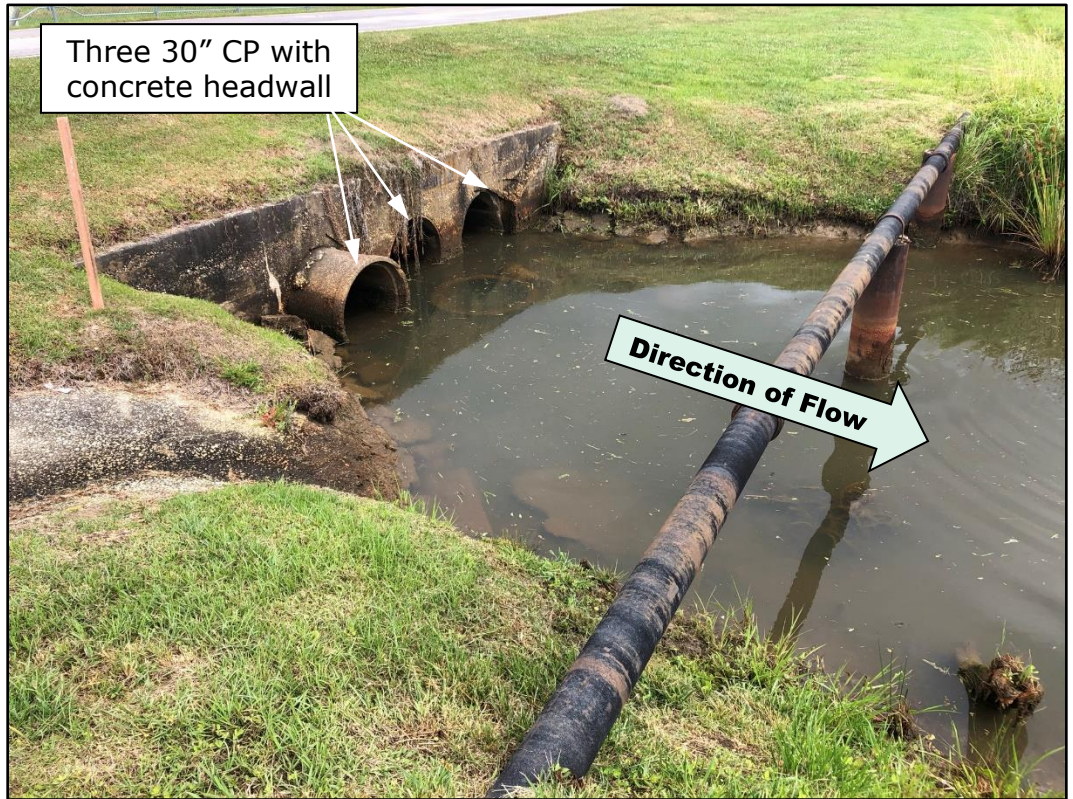
— Surface Watercourse

■ Drainage Basin



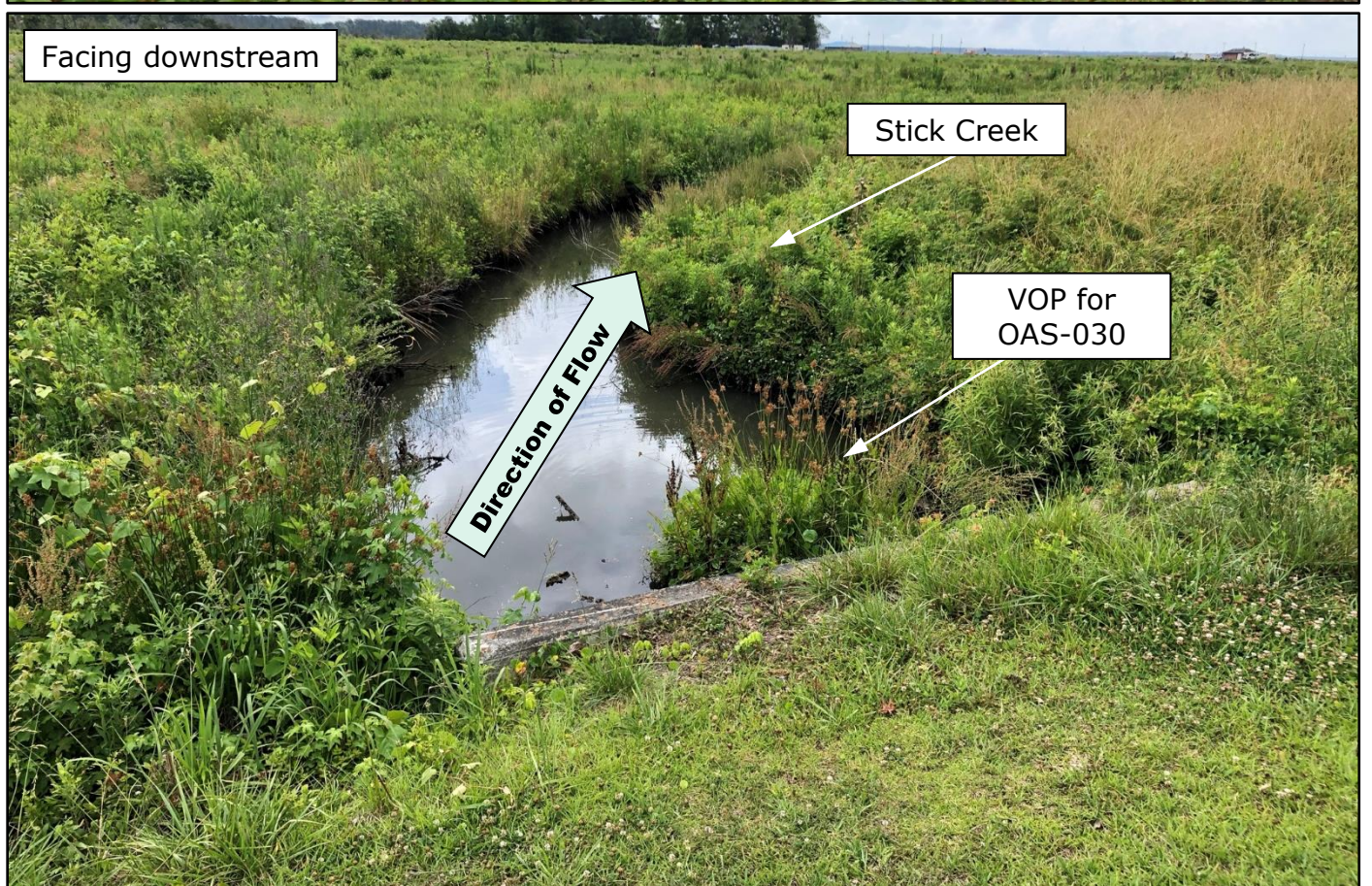
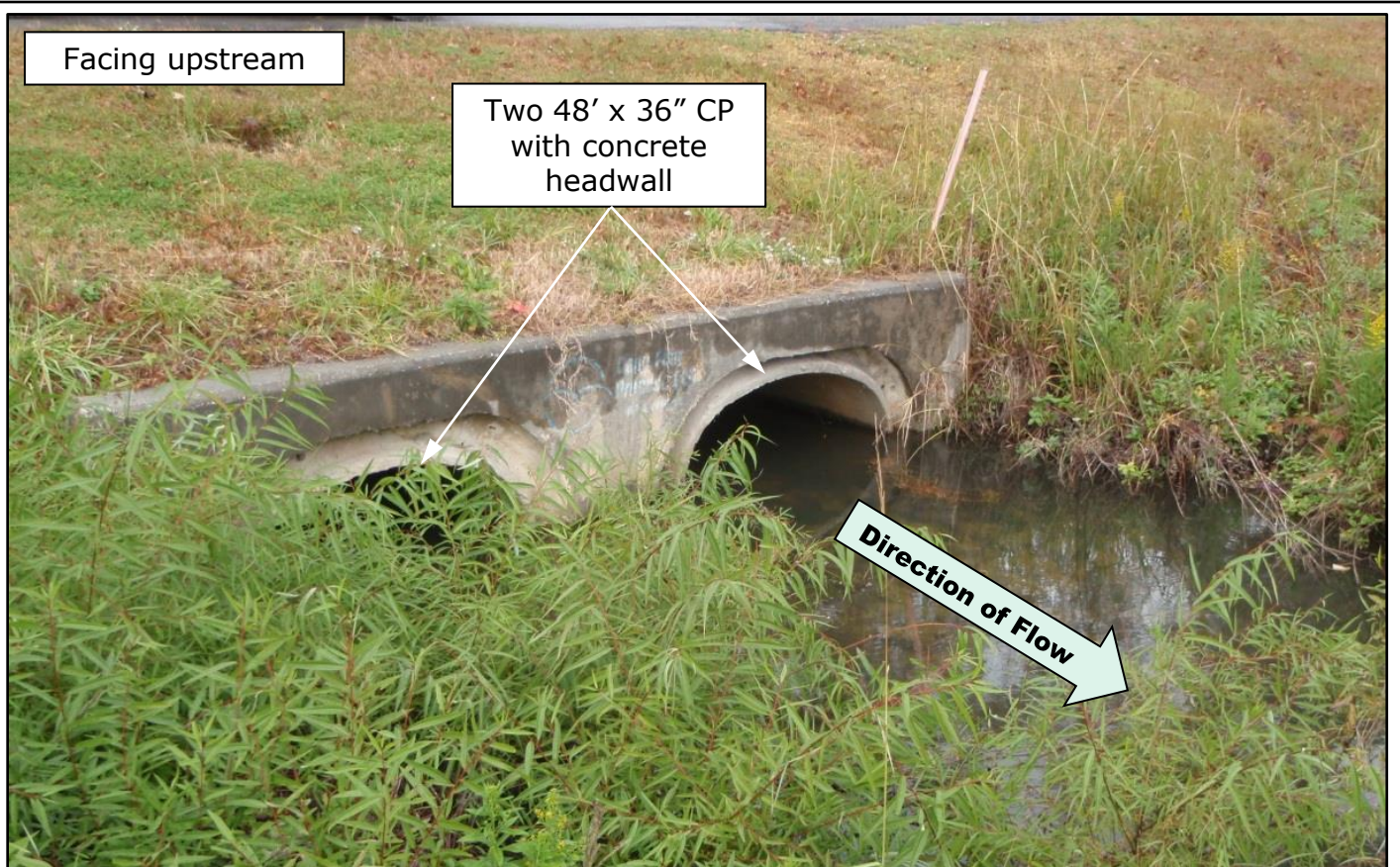
Visual Observation Points
Outfall No. OAS-021
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-28



Visual Observation Points
Outfall No. OAS-021
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-29



Facing downstream

Direction of Flow

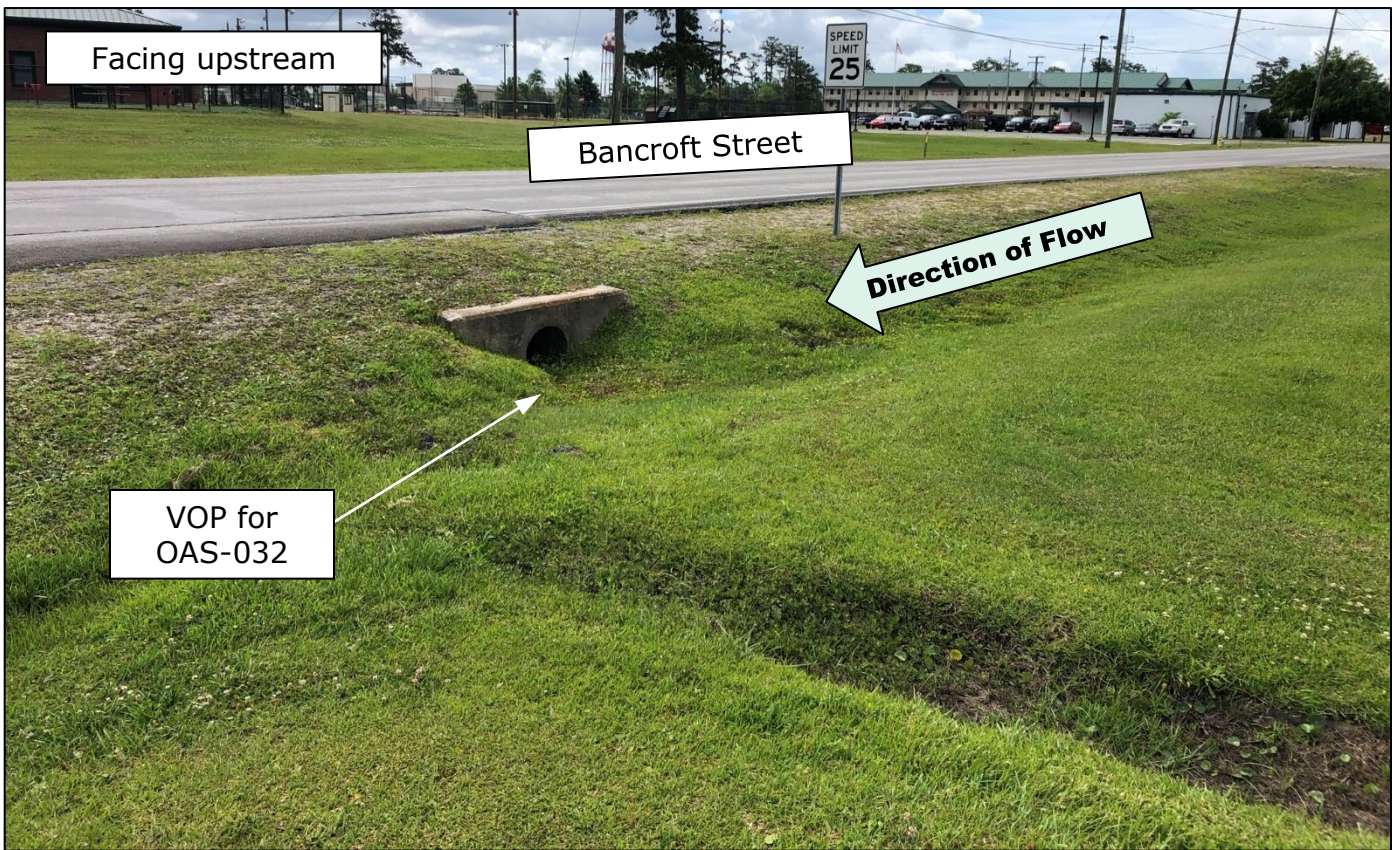


Facing upstream

Bancroft Street

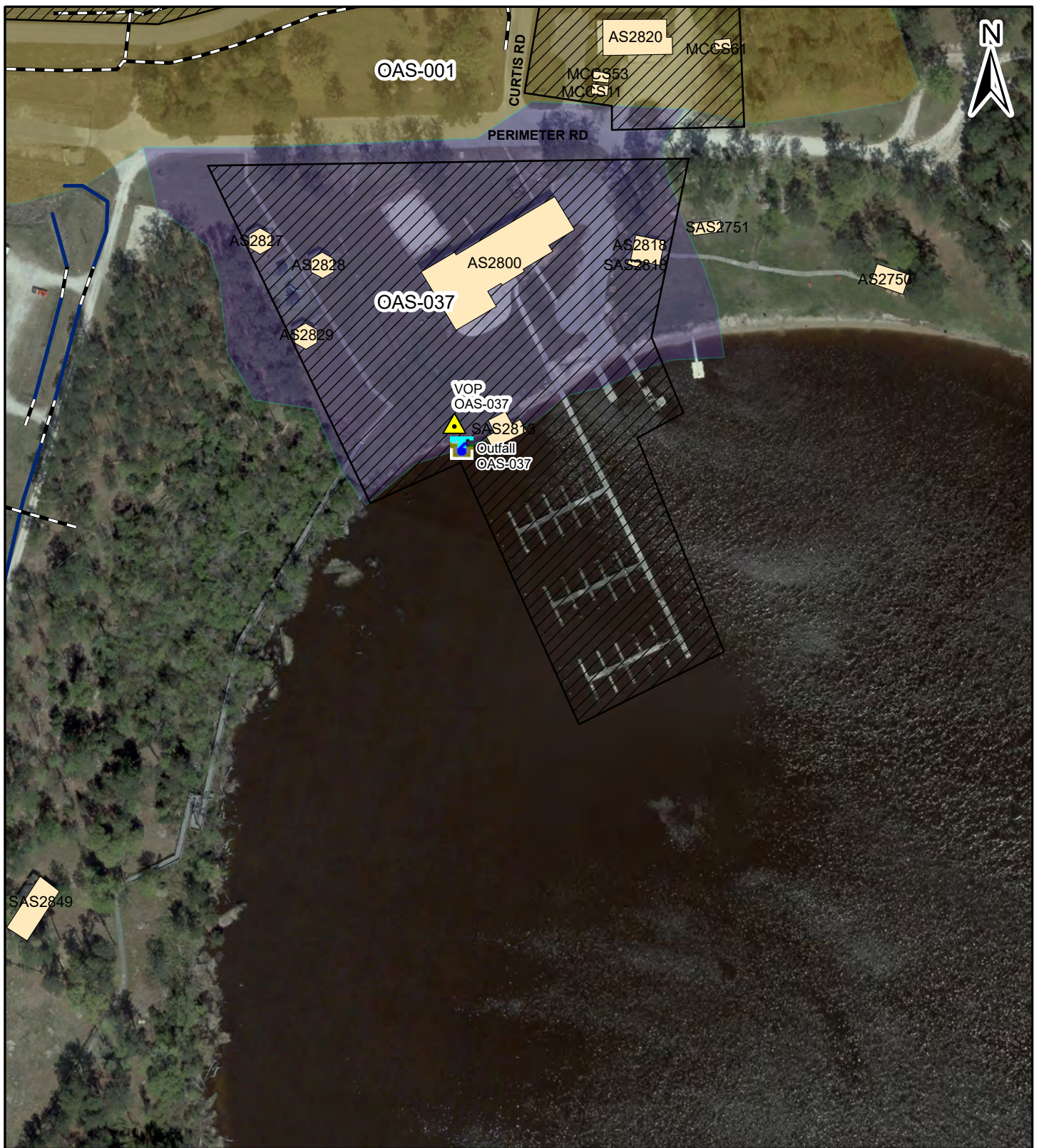
Direction of Flow

VOP for
OAS-032



Visual Observation Points
Outfall No. OAS-032
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-33



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



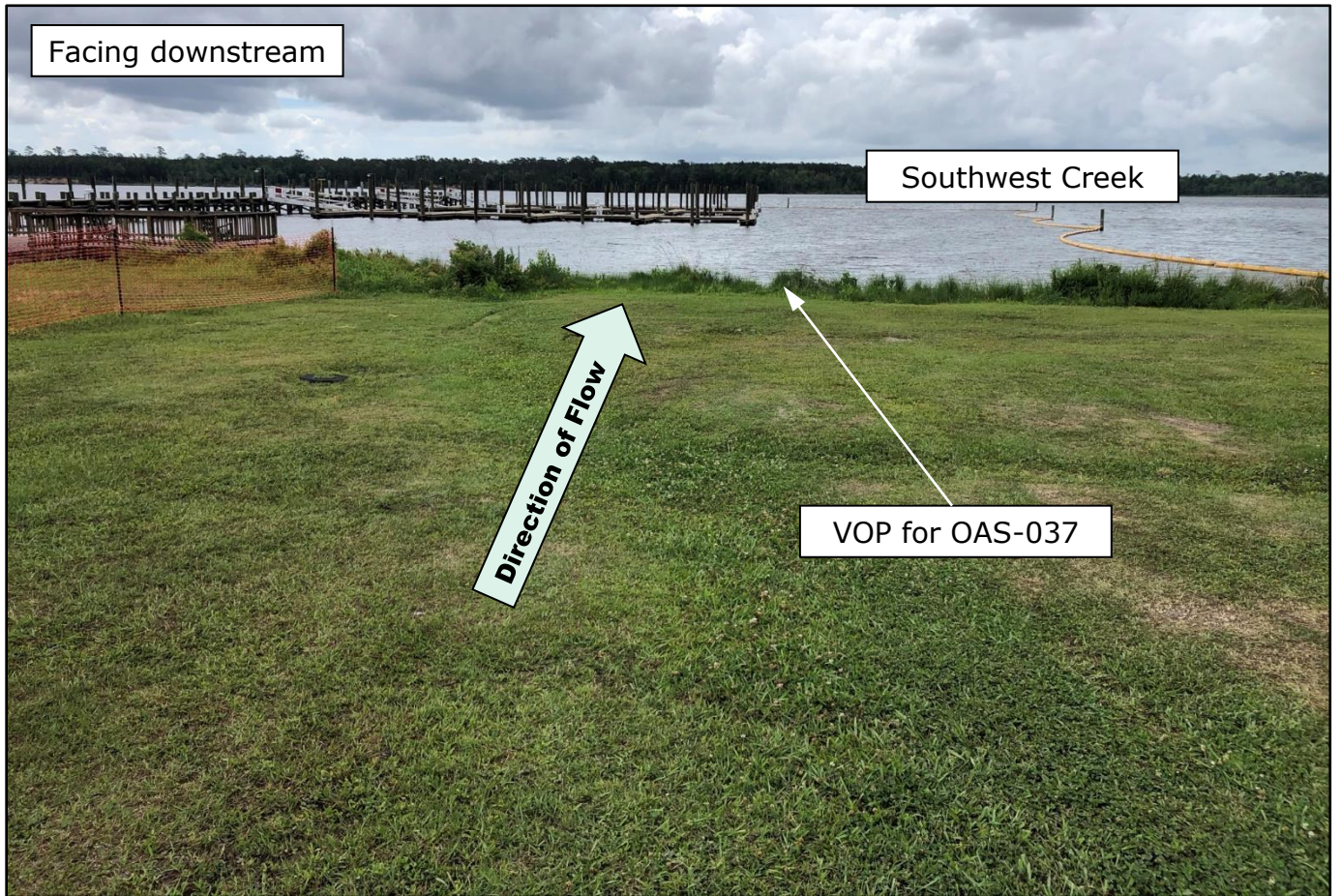
Visual Observation Points
Outfall No. OAS-037
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-34

Facing upstream



Facing downstream



Visual Observation Points
Outfall No. OAS-037
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-35



5.3 COURTHOUSE BAY (CB)

This section provides mapping and photos of VOPs located in the Courthouse Bay area. Table 5-4 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

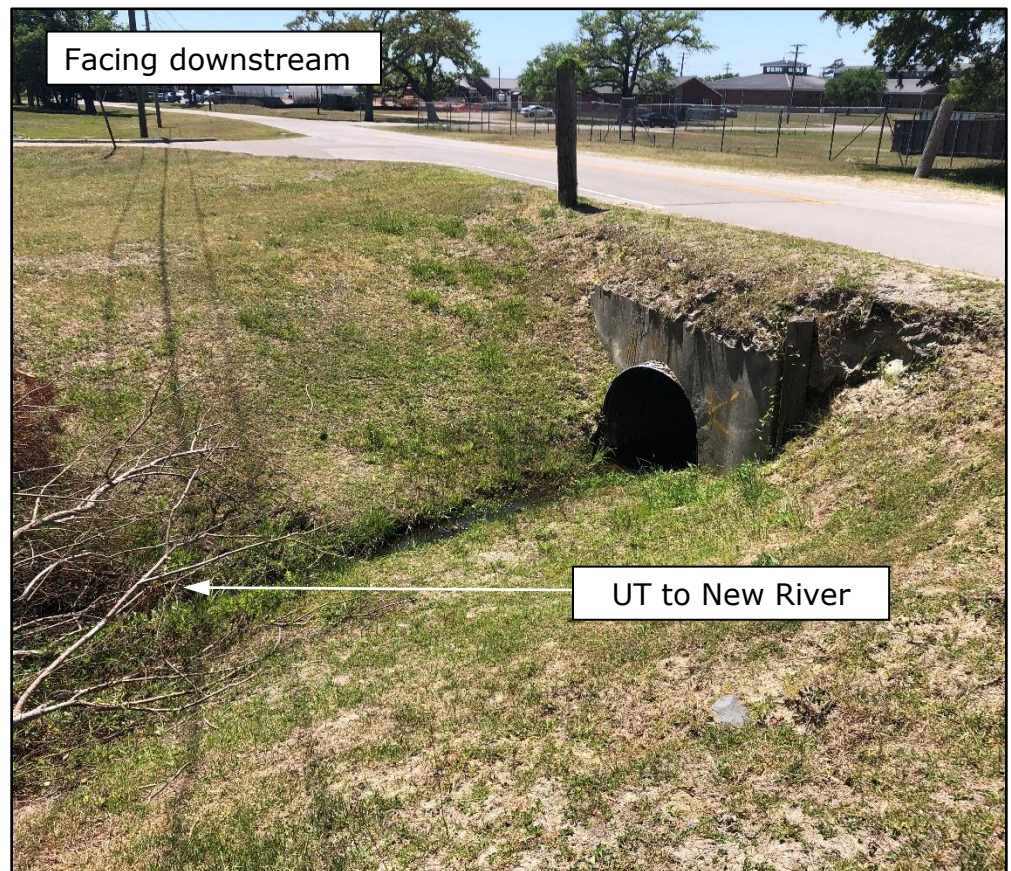
Table 5-4 Courthouse Bay VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OCB-001	929827.59	12562219.83	-
OCB-013	931239.38	12562179.47	Replace damaged VOP marker.
OCB-014	932500.48	12564217.49	-
OCB-016A	932123.47	12562700.10	Install VOP marker (newly added VOP).
OCB-016B	931537.33	12562993.90	Install VOP marker (newly added VOP).

1) UTM geographic coordinate system, NAD83.

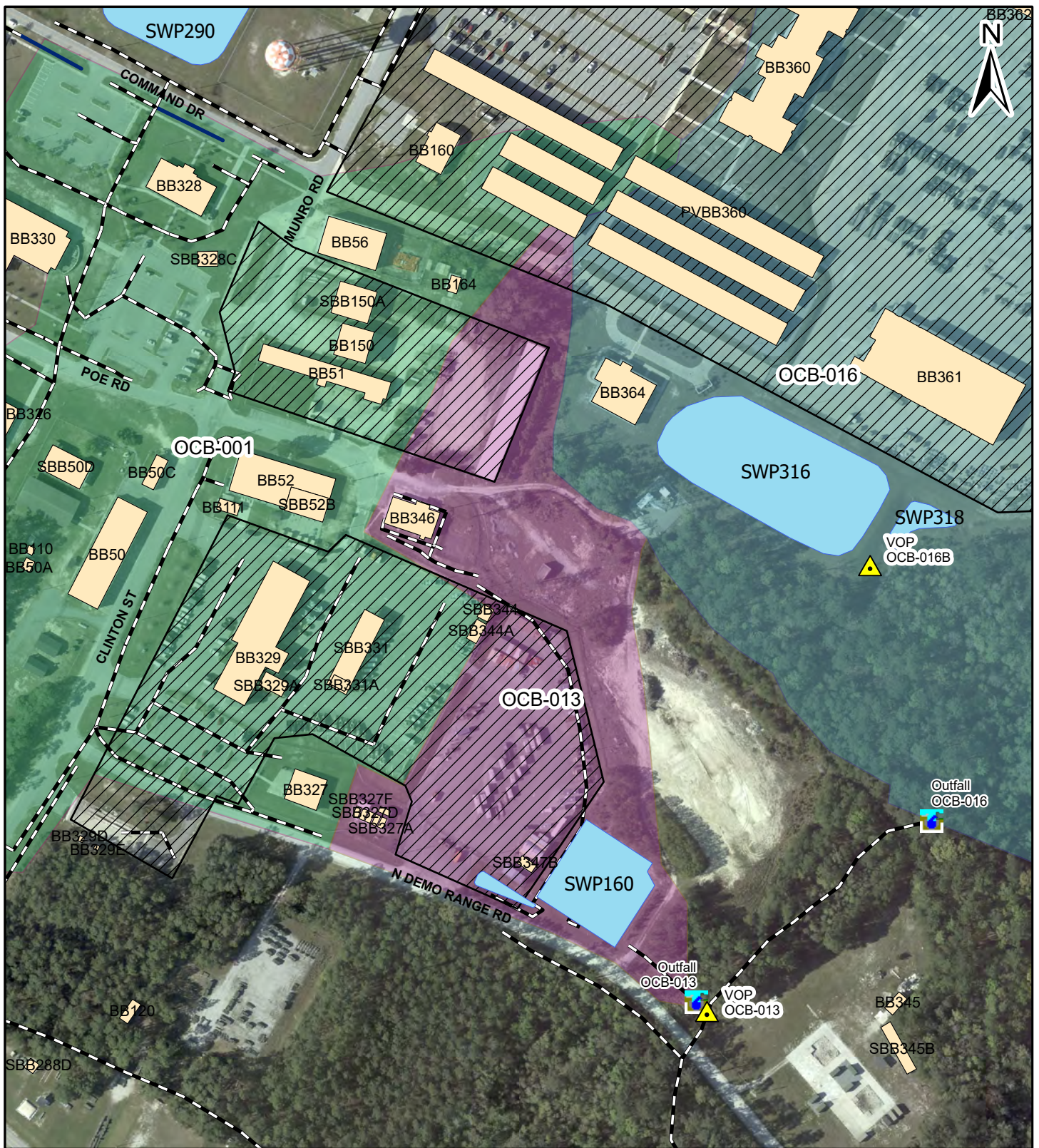


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Visual Observation Points
Outfall No. OCB-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

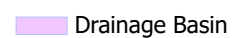
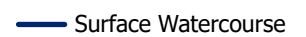
Figure
5-37



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OCB-013
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-38

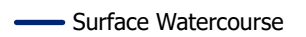
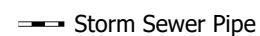
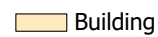




Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

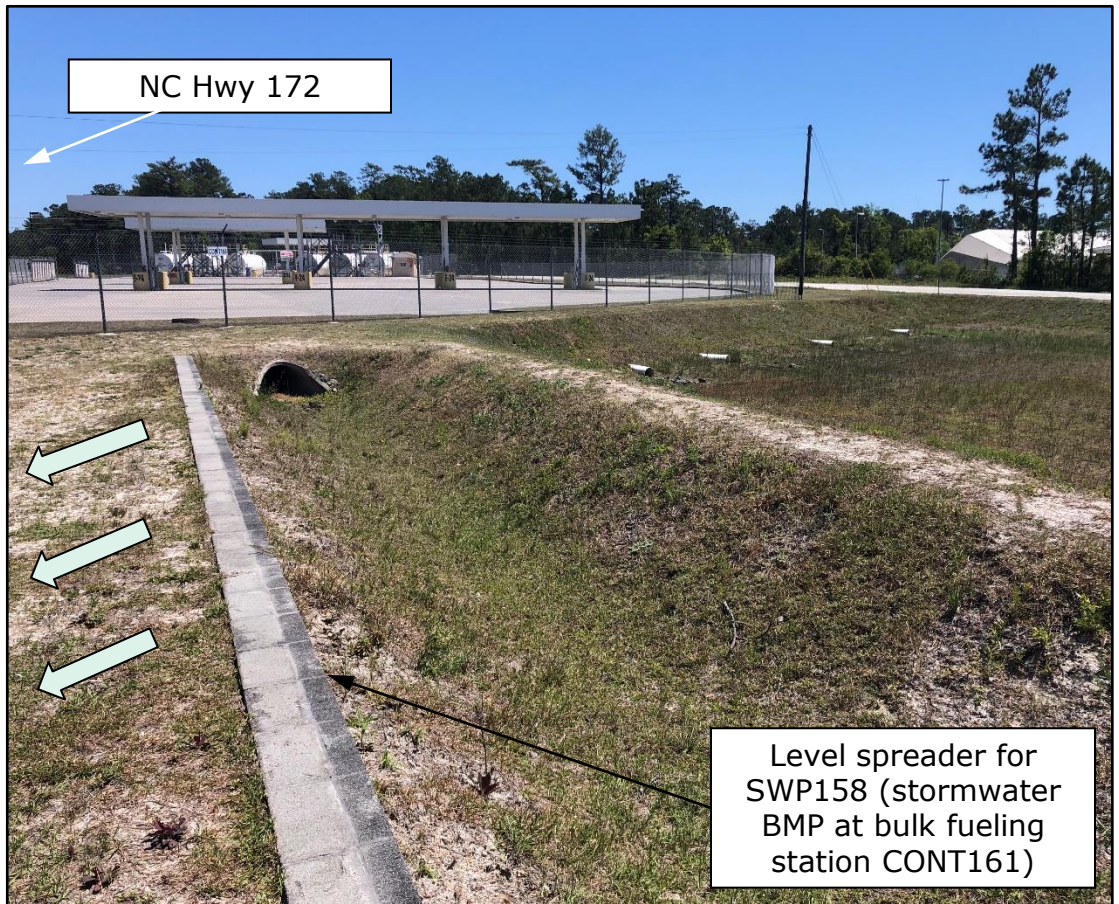
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OCB-014
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-40





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



Building



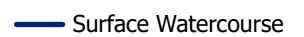
Facility Boundary



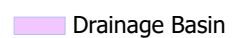
Catch Basin



Storm Sewer Pipe



Surface Watercourse

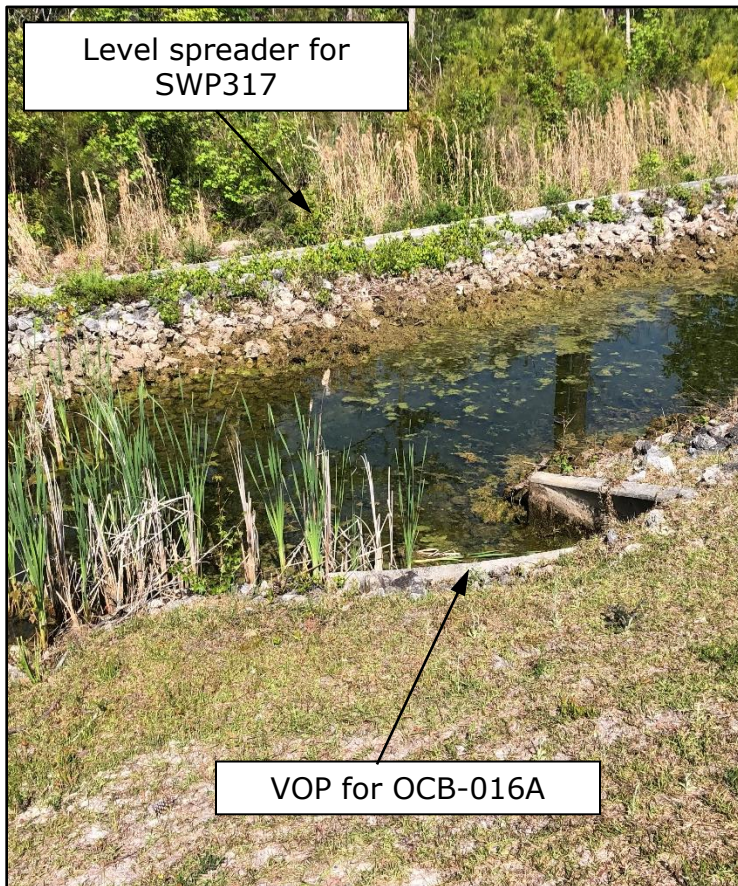


Drainage Basin



Visual Observation Points
Outfall No. OCB-016
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-42



**Visual Observation Points
Outfall No. OCB-016A
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina**

Figure
5-43



Visual Observation Points
Outfall No. OCB-016B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-44



5.4 CAMP JOHNSON (CJ)

This section provides mapping and photos of VOPs located in the Camp Johnson area. Table 5-5 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-5 Camp Johnson VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OCJ-001	917671.44	12616189.91	VOP marker could not be located due to heavy overgrowth. Clear area and replace marker if necessary.
OCJ-003	916975.87	12615817.23	Install VOP marker (newly added VOP).
OCJ-004A	915123.64	12619604.97	Move VOP marker from pond interior to the pond outlet pipe.
OCJ-004B	915166.27	12619610.88	VOP marker hidden beneath heavy overgrowth. Move marker to a more visible location or clear the area.

1) UTM geographic coordinate system, NAD83.



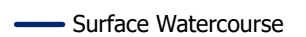
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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



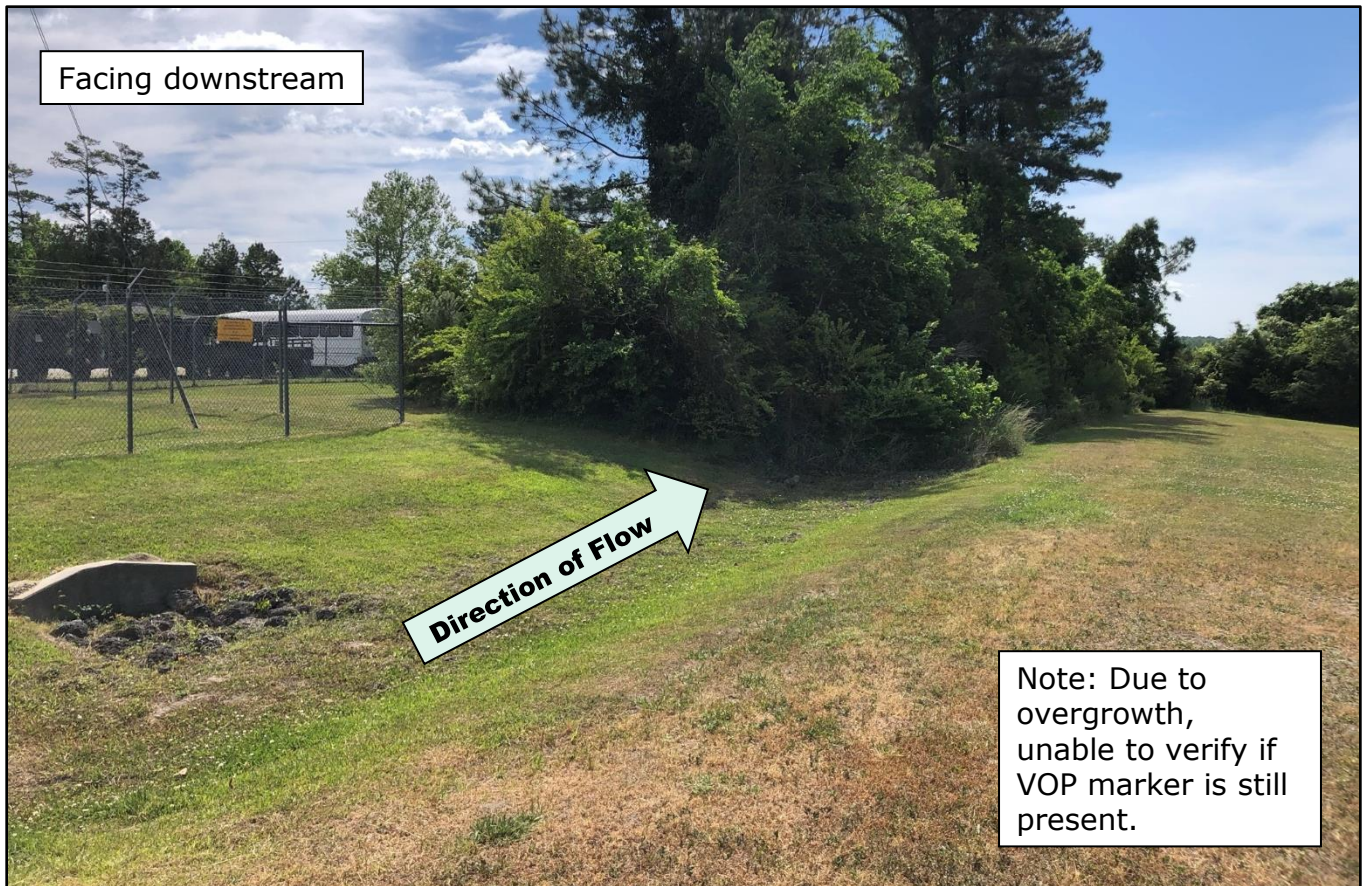
Visual Observation Points
Outfall No. OCJ-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-45

Facing upstream



Facing downstream



Note: Due to overgrowth, unable to verify if VOP marker is still present.



Visual Observation Points
Outfall No. OCJ-001
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-46



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

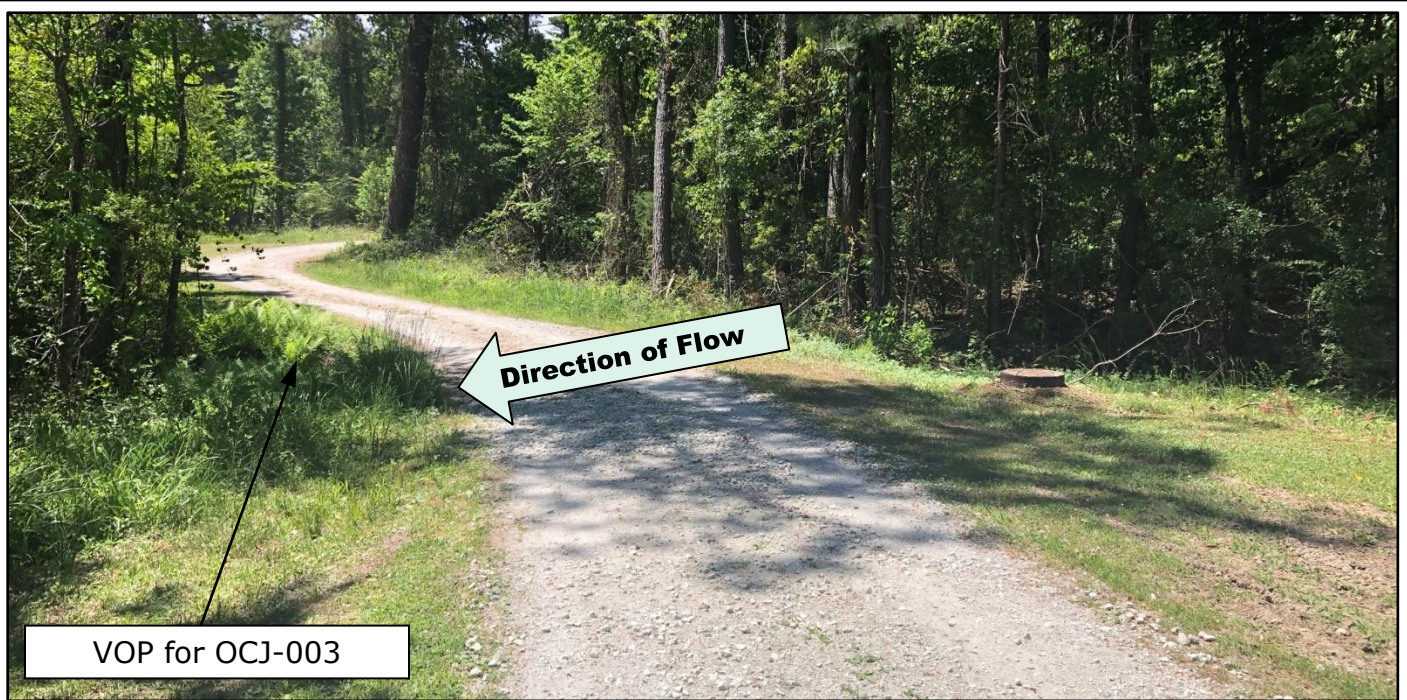
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OCJ-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-47



Visual Observation Points
Outfall No. OCJ-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-48



Visual Observation Points
Outfall No. OCJ-004A
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-50



Visual Observation Points
Outfall No. OCJ-004B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-51



5.5 FRENCHS CREEK (FC)

This section provides mapping and photos of VOPs located in the Frenchs Creek area. Table 5-6 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-6 Frenchs Creek VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OFC-001	941492.82	12585609.77	-
OFC-002	940114.78	12584556.95	-
OFC-004A	945556.68	12588241.66	Relabel marker to reflect the name change from OFC-004 to OFC-004A.
OFC-004B	945965.09	12588138.74	Install VOP marker (newly added VOP).
OFC-005	941842.57	12586919.26	-
OFC-006A	944307.04	12590468.80	Replace missing VOP marker.
OFC-006B	944149.53	12590235.74	Replace missing VOP marker.
OFC-006C	943711.29	12590031.54	Replace missing VOP marker.
OFC-008	941844.31	12589919.52	Install VOP marker (newly added VOP).
OFC-009	942432.09	12589800.57	-
OFC-012	940671.69	12589812.05	-
OFC-013	943838.05	12591166.91	Replace missing VOP marker.
OFC-026	939306.56	12588269.79	-
OFC-027	942772.40	12591203.51	-

1) UTM geographic coordinate system, NAD83.



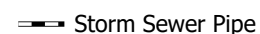
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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

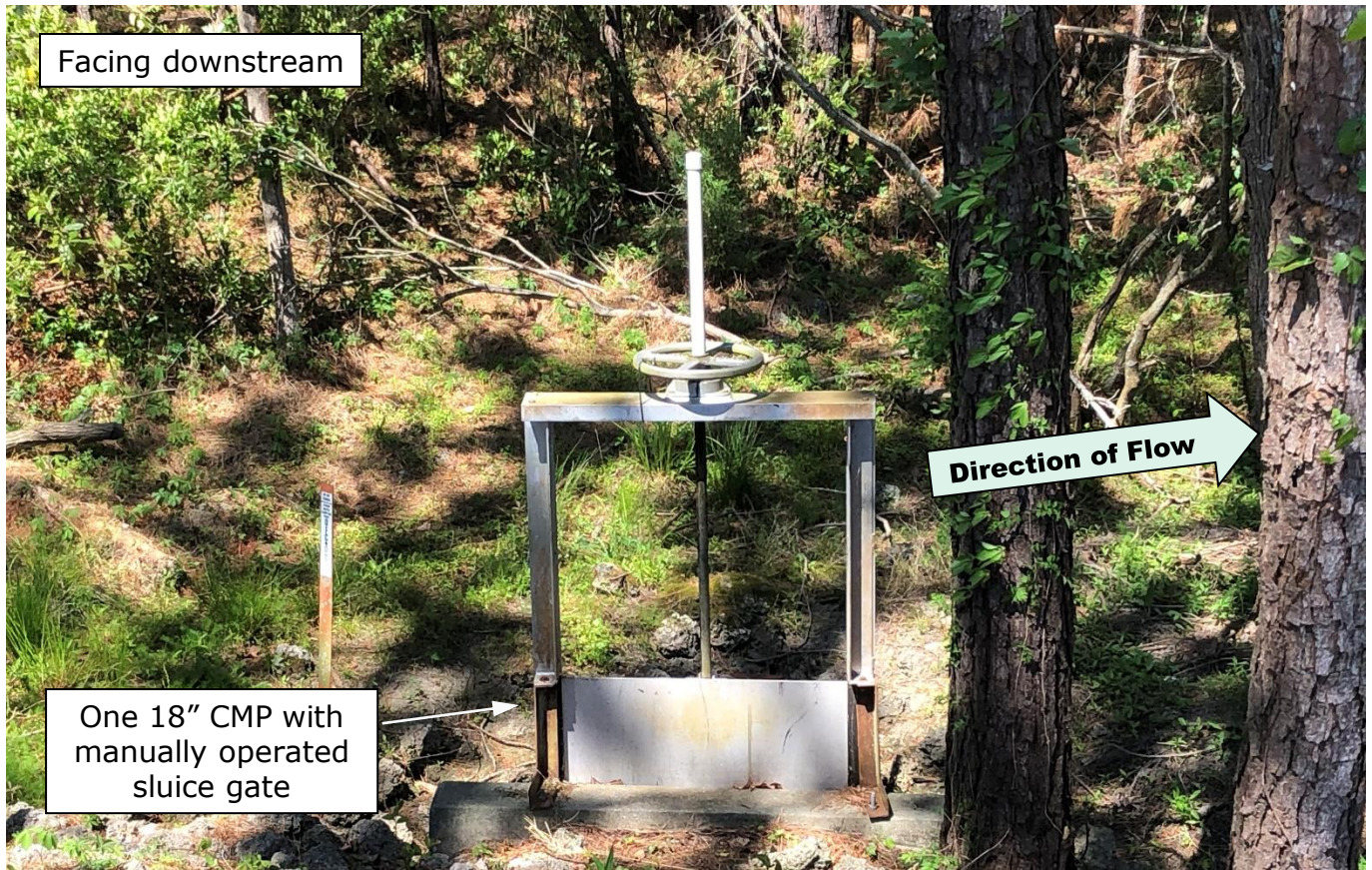
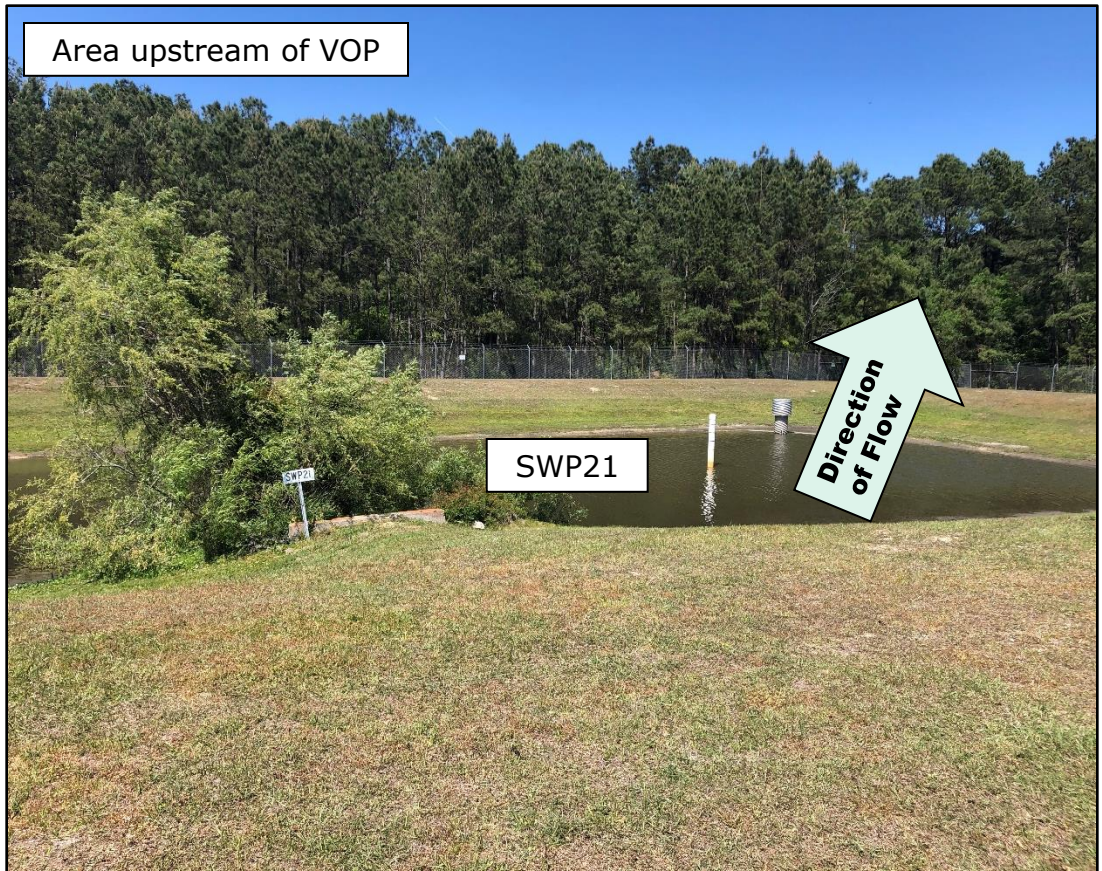
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OFC-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-52



Visual Observation Points
Outfall No. OFC-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-53



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

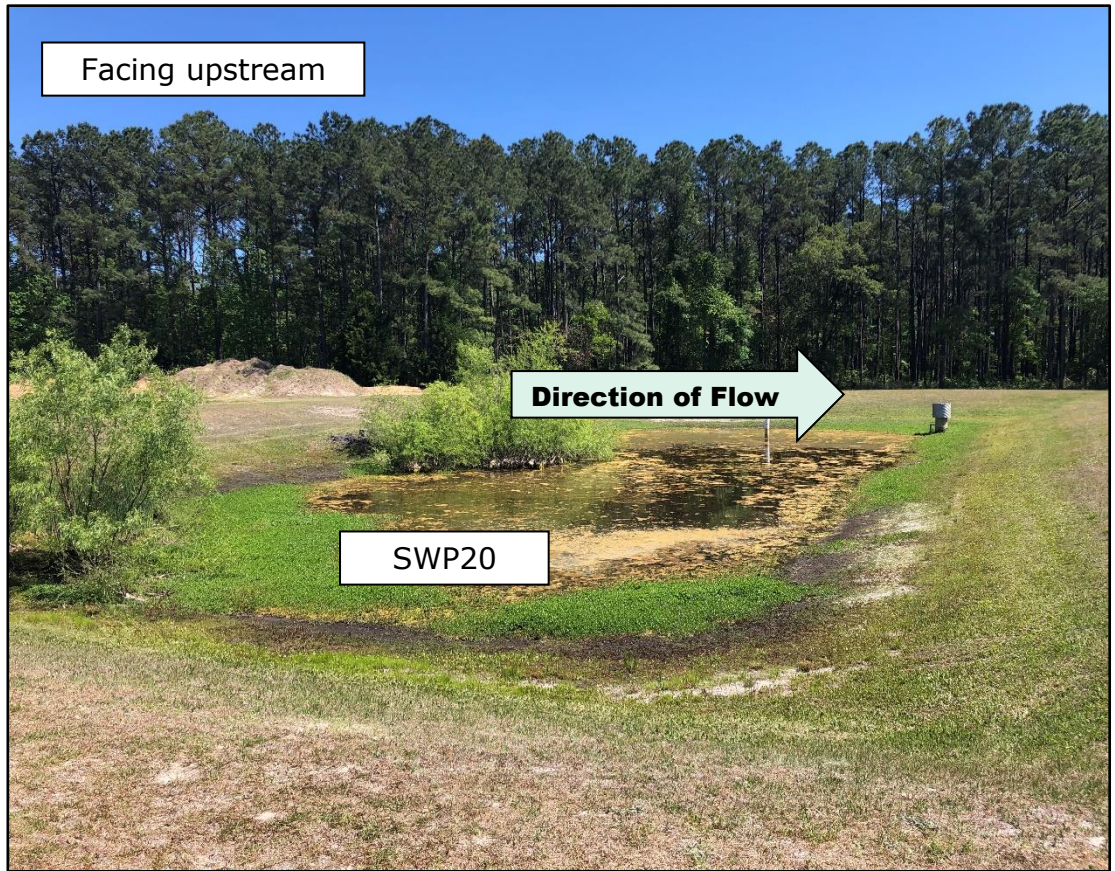
0 100 200 400
 Feet

Legend



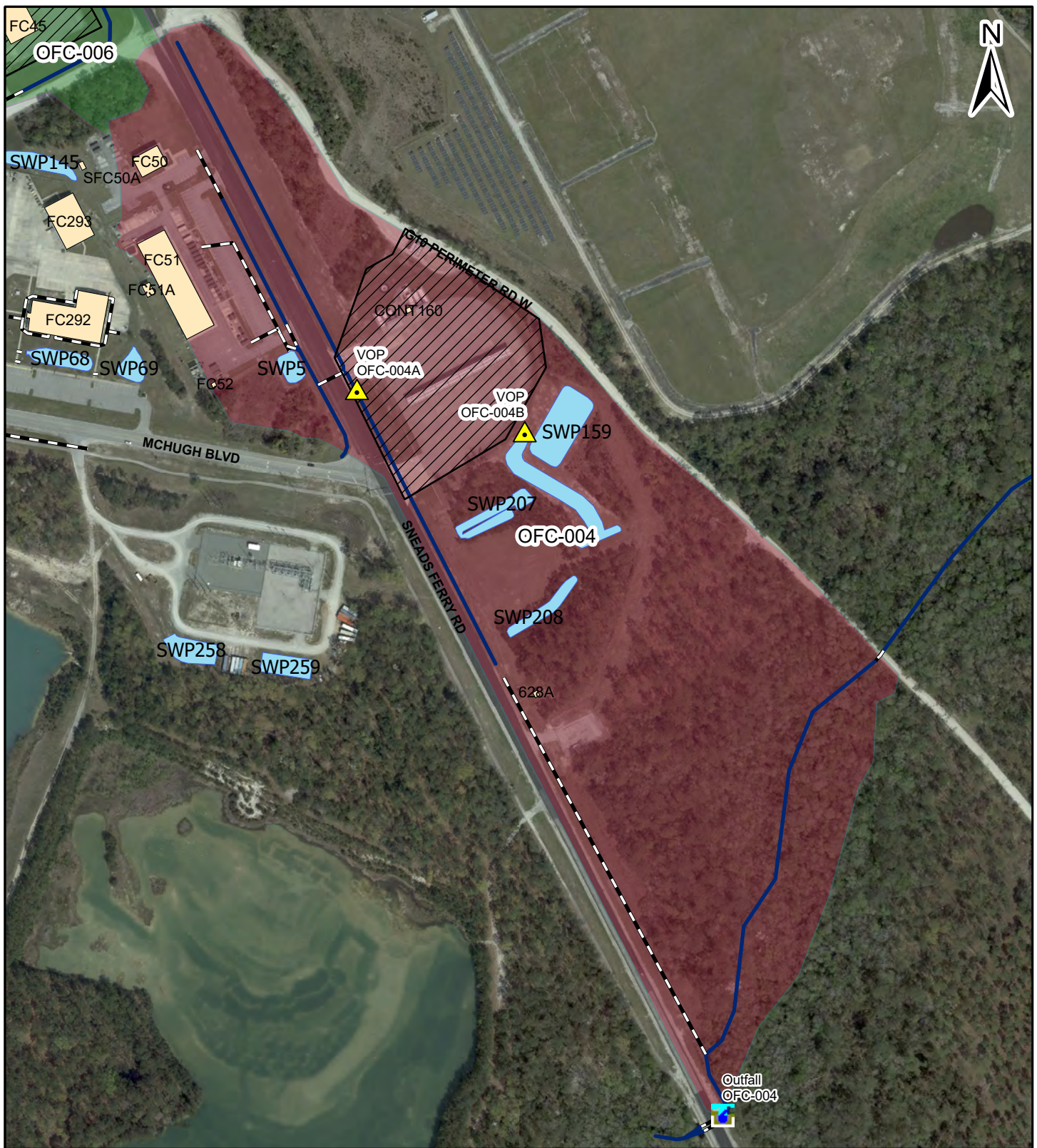
Visual Observation Points
Outfall No. OFC-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-54



**Visual Observation Points
Outfall No. OFC-002
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina**

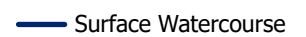
**Figure
5-55**



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend



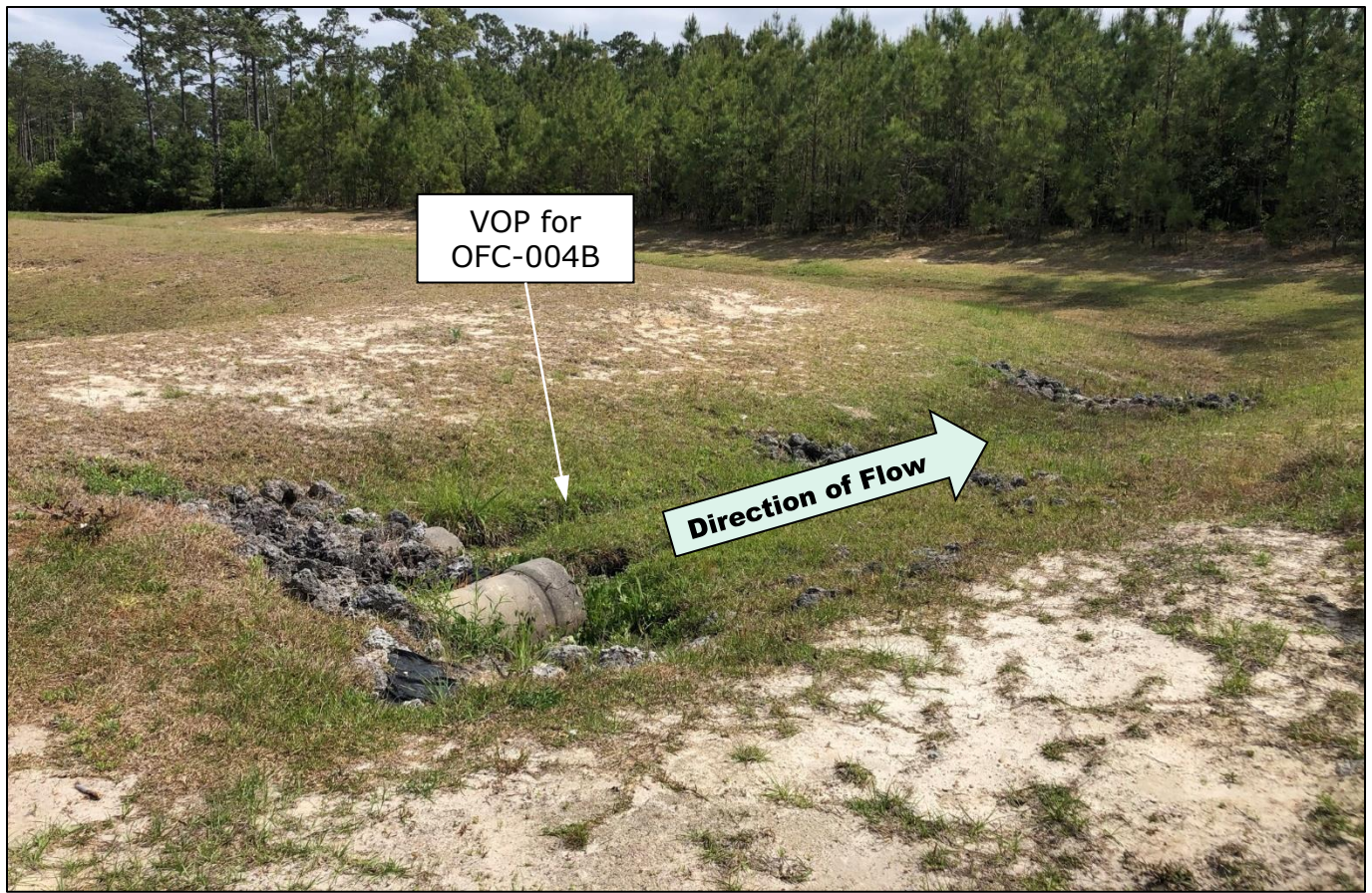
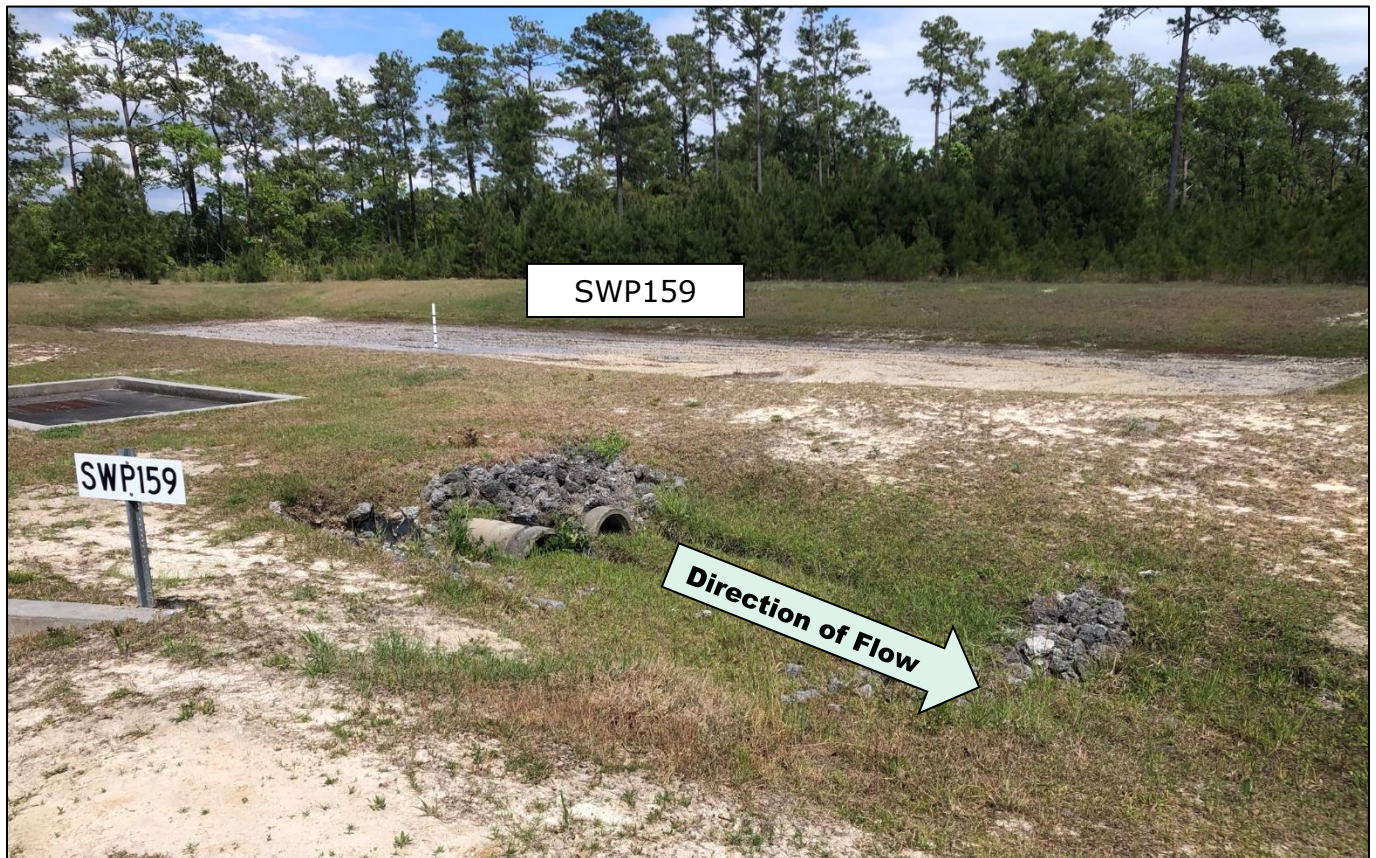
Visual Observation Points
Outfall No. OFC-004
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-56



Visual Observation Points
Outfall No. OFC-004A
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-57





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

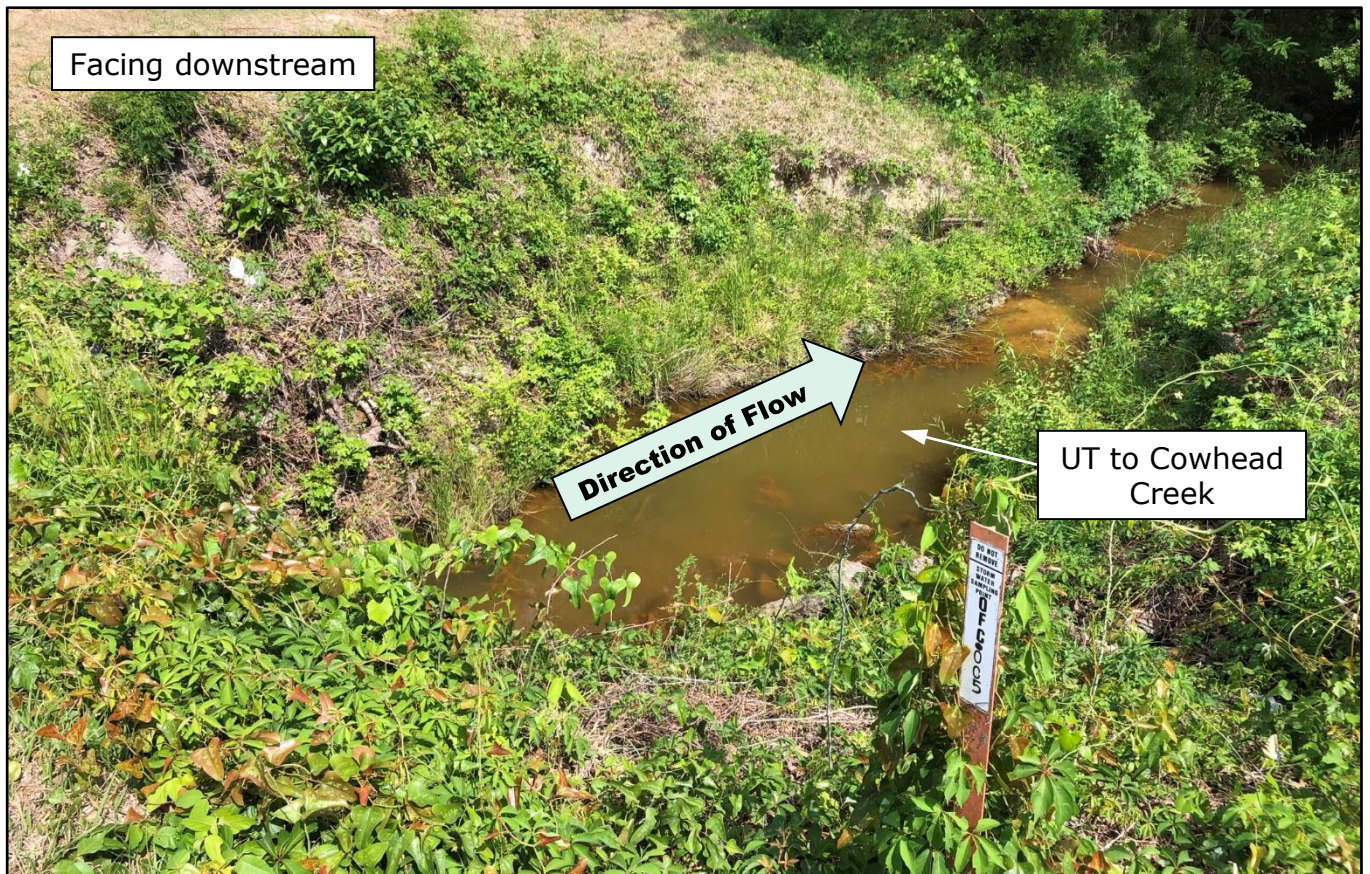
Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



Visual Observation Points
Outfall No. OFC-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-59



Visual Observation Points
Outfall No. OFC-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-60



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

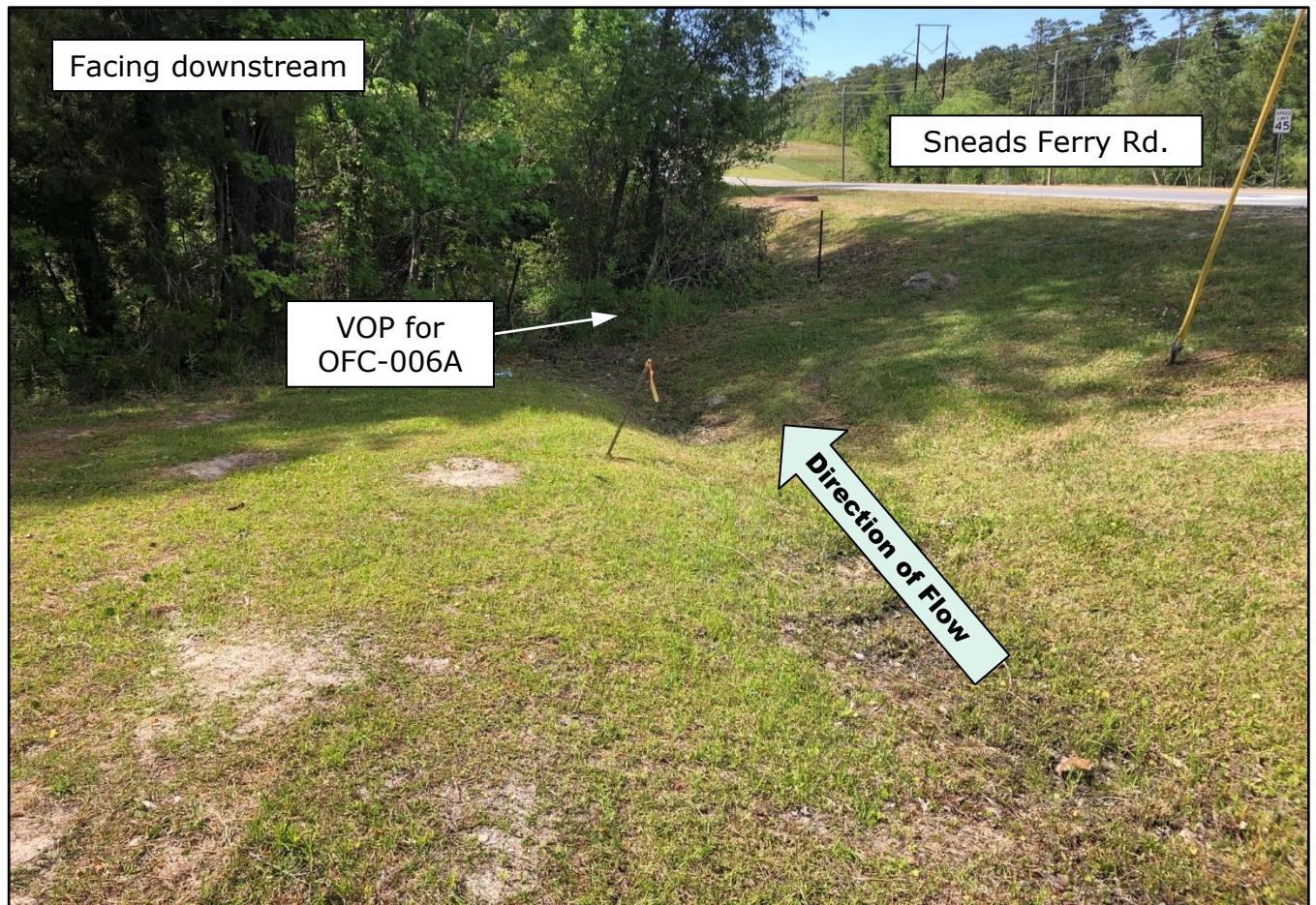
Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



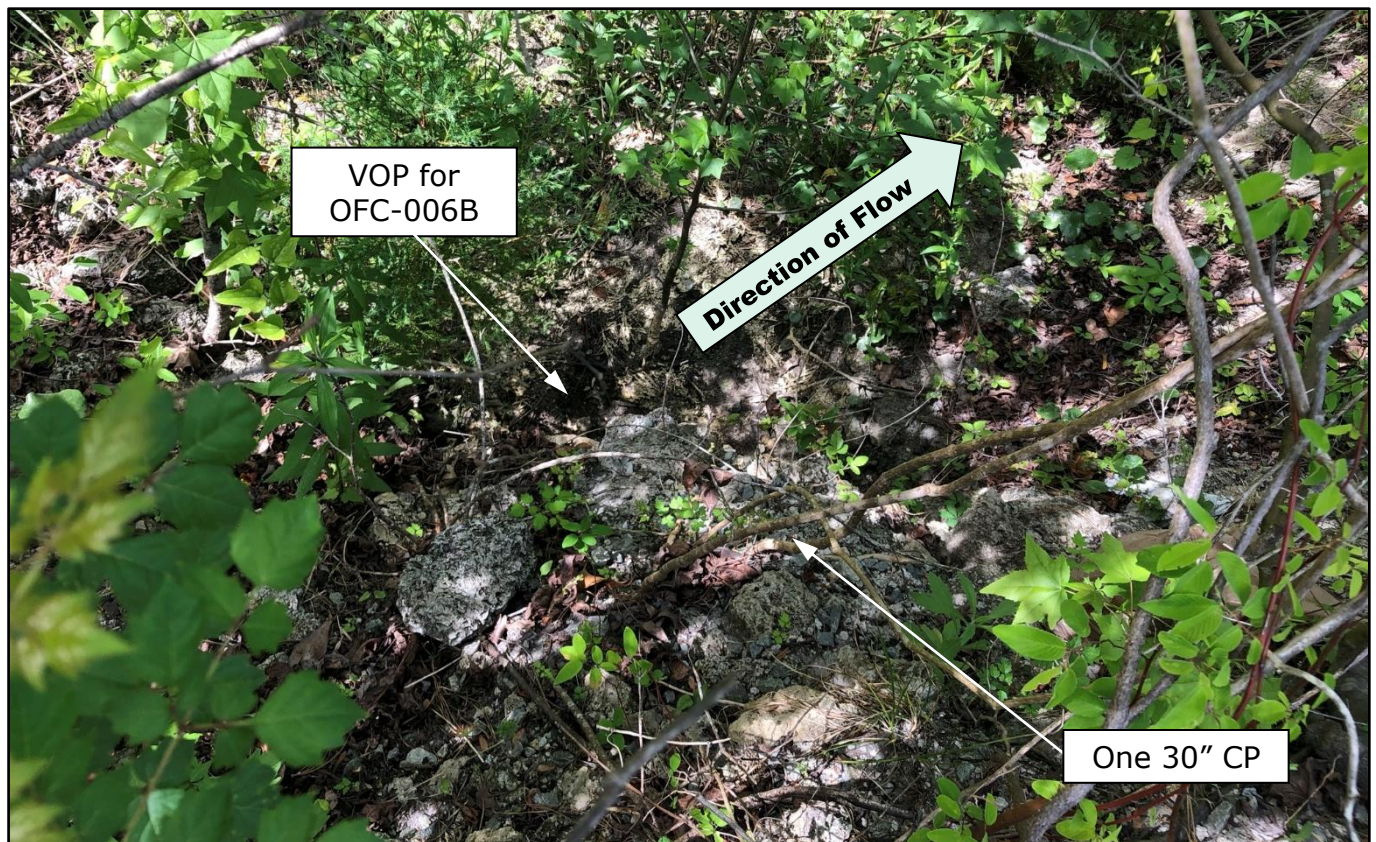
Visual Observation Points
Outfall No. OFC-006
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

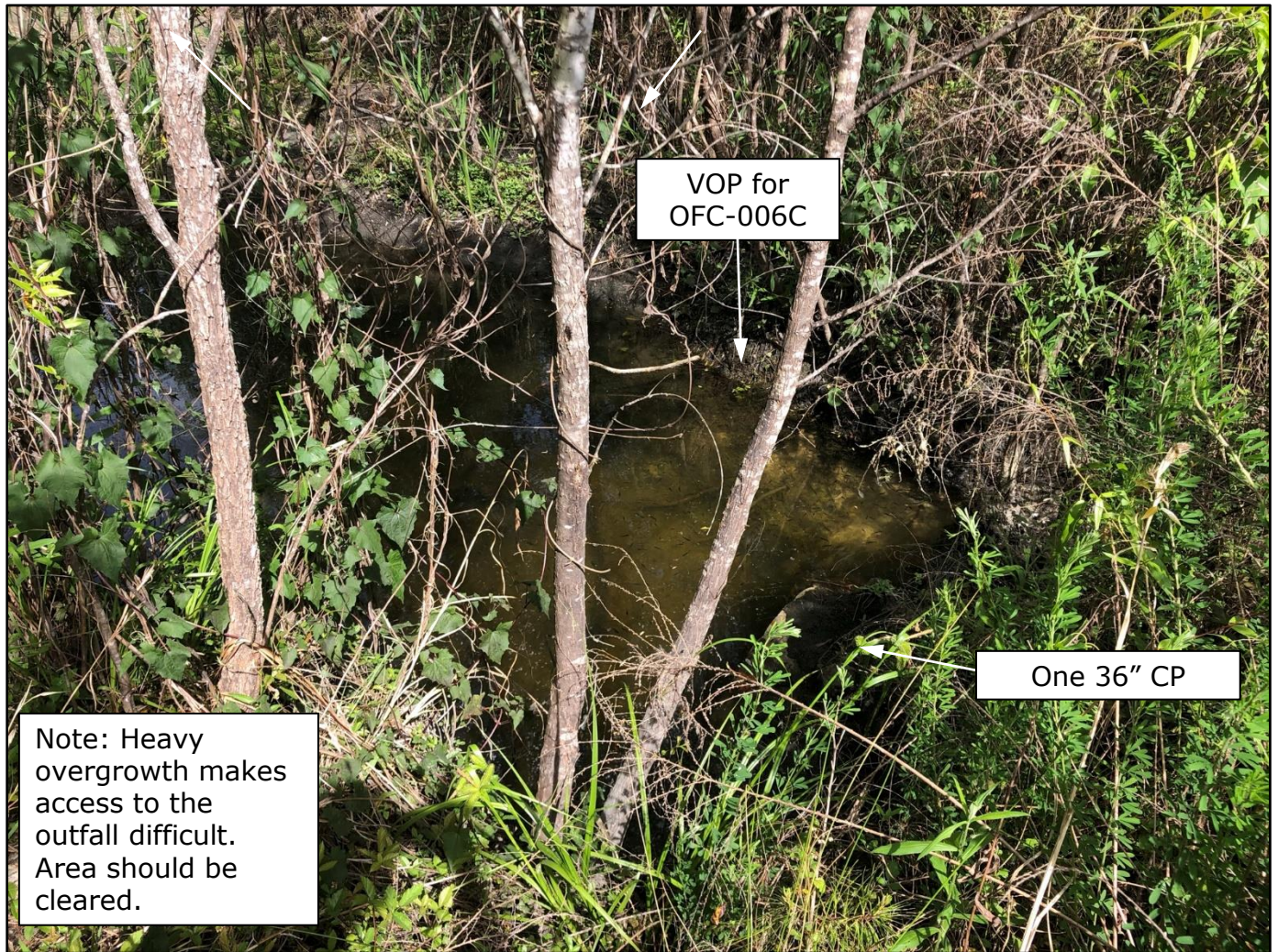
Figure
 5-61



Visual Observation Points
Outfall No. OFC-006A
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-62





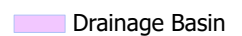
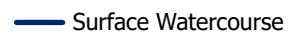
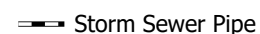
Note: Heavy overgrowth makes access to the outfall difficult. Area should be cleared.



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend



Visual Observation Points
Outfall No. OFC-008
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-65





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



Visual Observation Points
Outfall No. OFC-009
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-67



Visual Observation Points
Outfall No. OFC-009
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-68



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

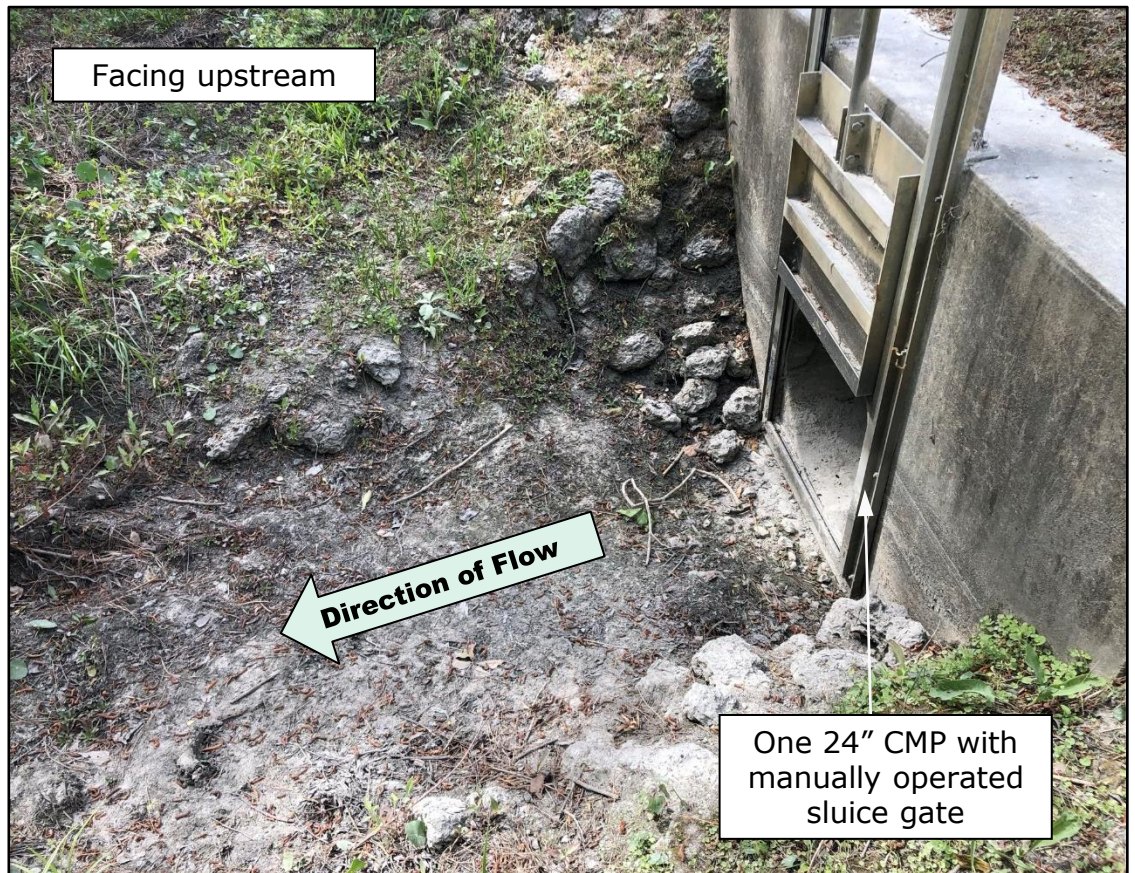
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OFC-012
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-69



**Visual Observation Points
Outfall No. OFC-012
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina**

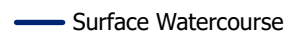
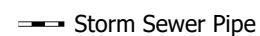
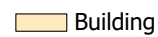
**Figure
5-70**



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

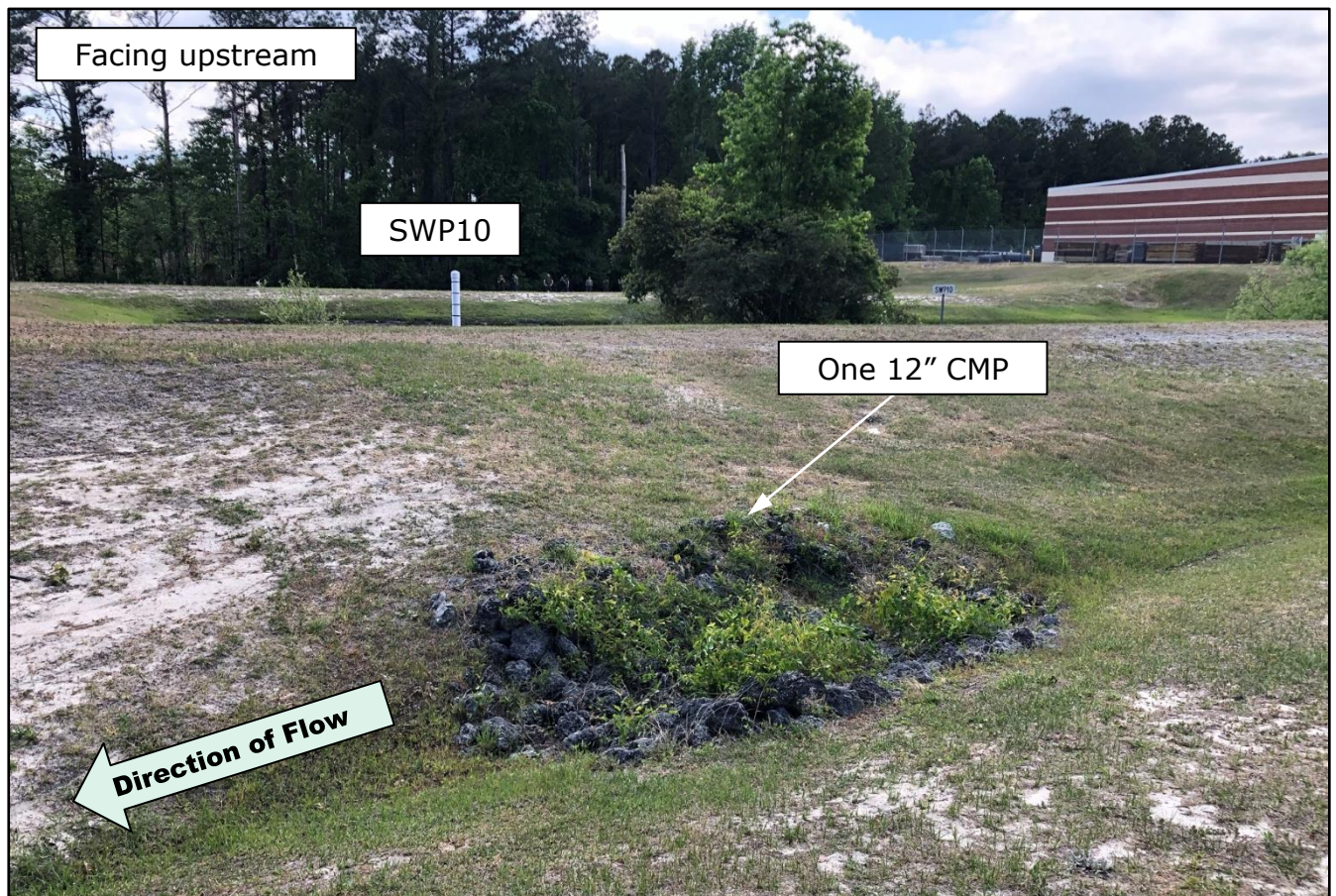
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OFC-013
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-71





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

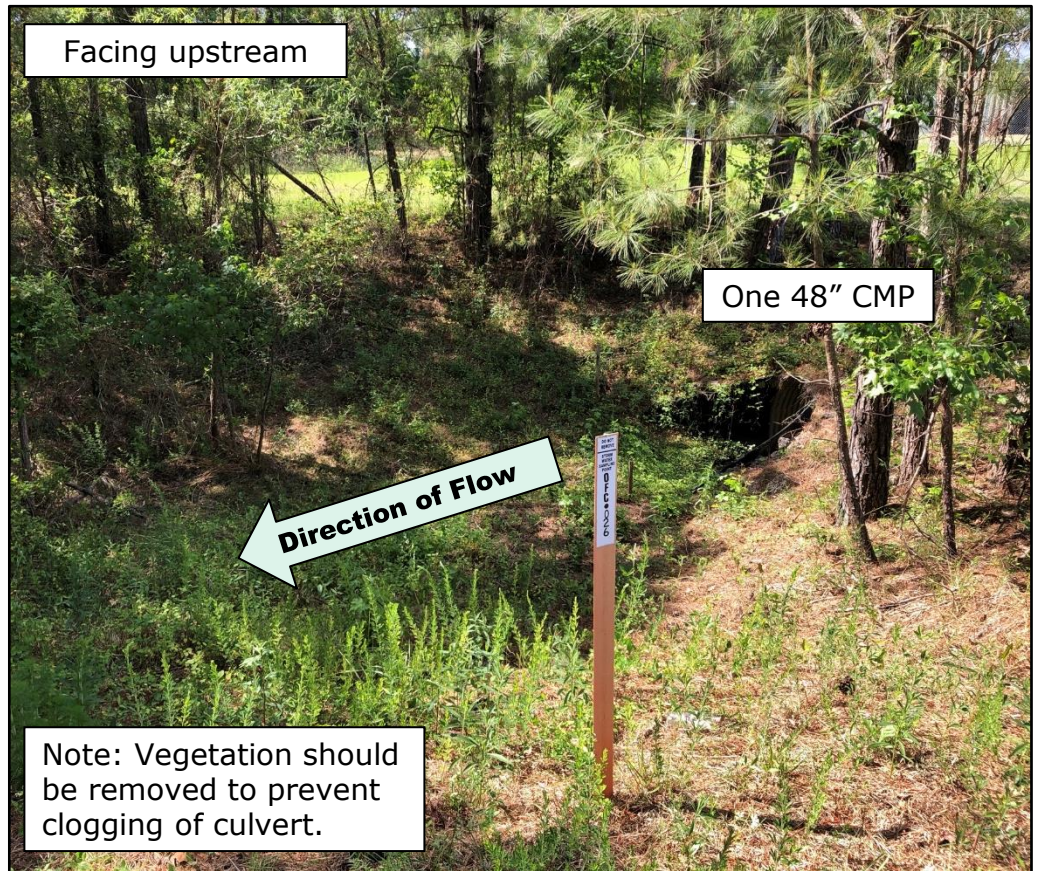
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OFC-026
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-73



Note: Vegetation should be removed to prevent clogging of culvert.



Visual Observation Points
Outfall No. OFC-026
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

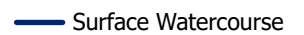
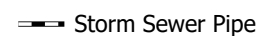
Figure
5-74



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

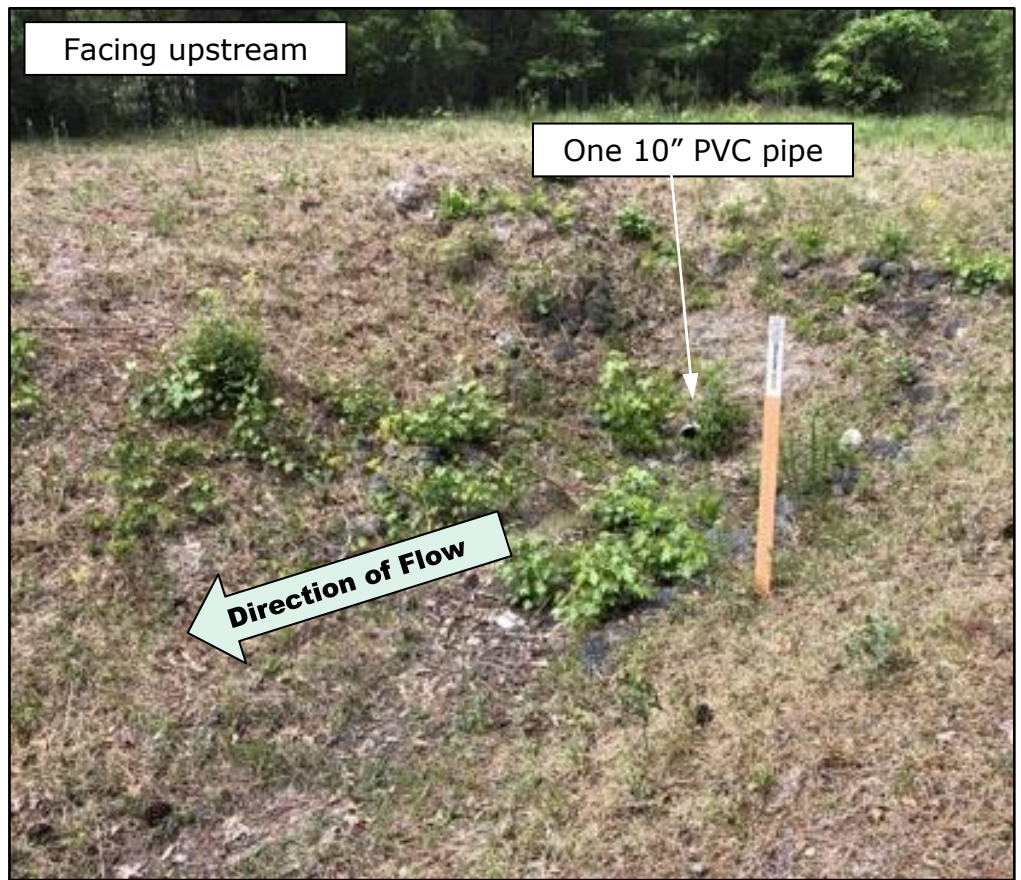
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OFC-027
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-75



Visual Observation Points
Outfall No. OFC-027
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-76



5.6 HADNOT POINT (HP)

This section provides mapping and photos of VOPs located in the Hadnot Point area. Table 5-7 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-7 Hadnot Point VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OHP-001	937975.17	12589629.59	-
OHP-002A	938705.00	12590928.30	Replace missing VOP marker.
OHP-002B	938492.77	12591079.31	Replace missing VOP marker.
OHP-003	938785.48	12590680.76	Replace missing VOP marker.
OHP-005	938681.35	12591186.60	-
OHP-006A	939015.38	12591929.95	Replace damaged VOP marker.
OHP-006B	938759.34	12592087.70	Replace missing VOP marker.
OHP-006C	938731.91	12592552.64	Install VOP marker (newly added VOP).
OHP-007	938444.10	12596460.72	Move VOP marker to side of creek closest to Holcomb Blvd.
OHP-010	937267.81	12595612.93	-
OHP-011	942158.76	12594925.96	Replace missing VOP marker.
OHP-012	940349.56	12598246.20	Install VOP marker (newly added VOP).
OHP-013A	941543.13	12596534.80	-
OHP-013B	941192.46	12597676.52	-
OHP-014	937168.18	12589907.85	-
OHP-015	934068.71	12589639.01	Replace missing VOP marker.
OHP-017	938487.40	12590020.35	Replace missing VOP marker.
OHP-018A	932179.54	12592110.37	Replace missing VOP marker.
OHP-018B	931988.71	12592562.93	Clear heavy overgrowth to make VOP more accessible.
OHP-019A	931874.36	12594110.21	-
OHP-019B	931909.10	12594339.91	-
OHP-019C	931876.96	12594474.88	-
OHP-019D	931764.40	12594736.68	Dry weather flow observed at time of inspection. Consider follow-up investigation to determine source.
OHP-021A	932041.43	12597093.71	-
OHP-021B	931297.12	12596879.20	Replace missing VOP marker.
OHP-022	940202.60	12600907.61	Replace missing VOP marker.
OHP-024	936331.19	12595303.88	Dry weather flow observed at time of inspection. Consider follow-up investigation to determine source.
OHP-027	932506.16	12598052.13	Install VOP marker (newly added VOP).
OHP-035	935882.93	12588828.08	Replace label on VOP marker; numbers have worn off.
OHP-038	938295.69	12589779.27	-
OHP-042	940605.16	12592449.66	Install VOP marker (newly added VOP).
OHP-043	941916.98	12592876.55	Install VOP marker (newly added VOP).
OHP-044	941027.02	12593245.96	Install VOP marker (newly added VOP).
OHP-045	940958.25	12600188.32	Install VOP marker (newly added VOP).

1) UTM geographic coordinate system, NAD83.



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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OHP-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-77



Visual Observation Points
Outfall No. OHP-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

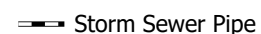
Figure
5-78



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OHP-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-79

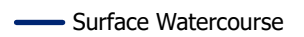
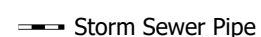
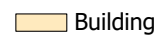






Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend

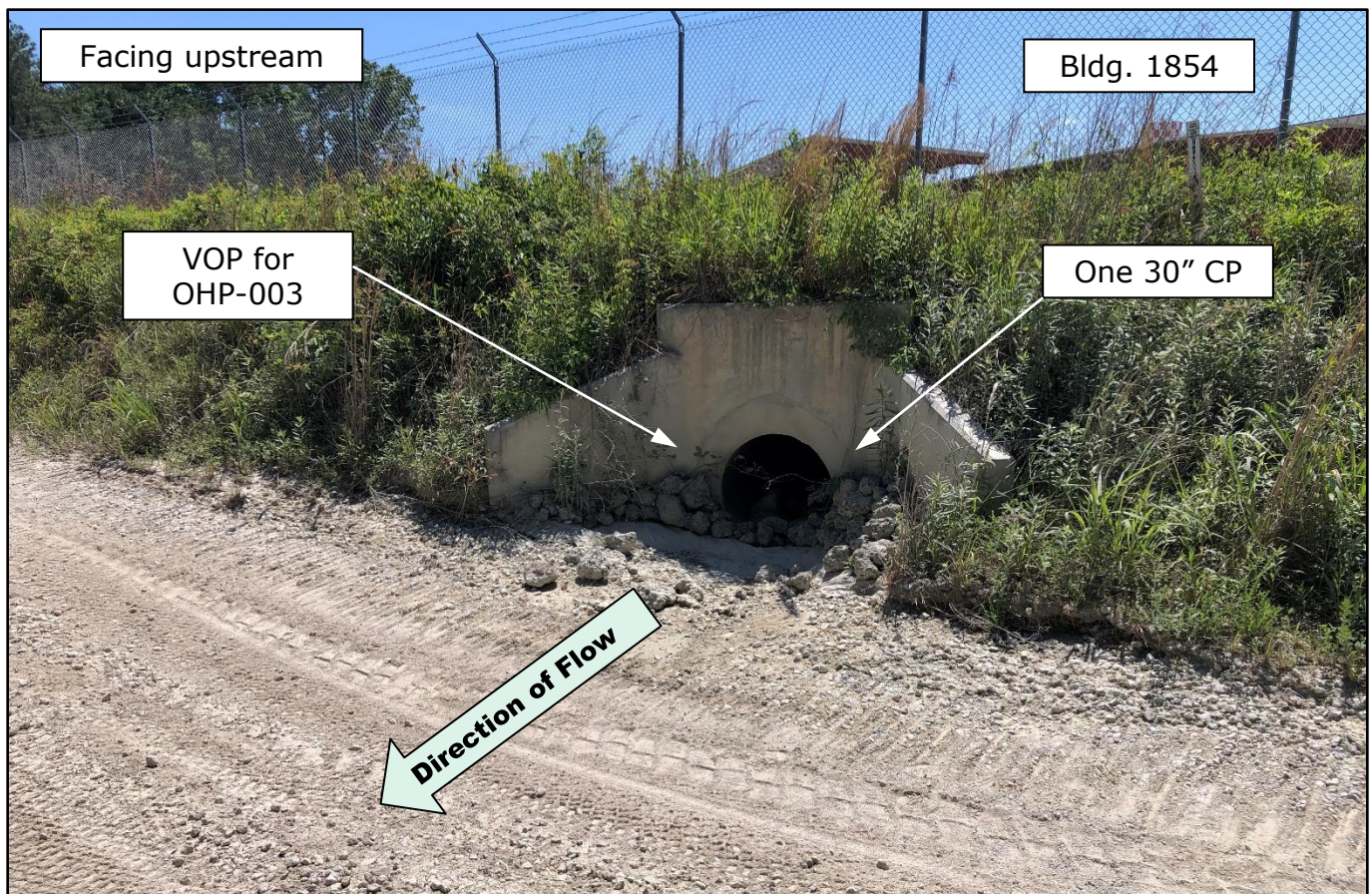


0 100 200
 Feet



Visual Observation Points
Outfall No. OHP-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-82



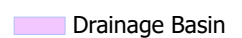
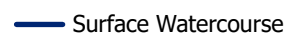
**Visual Observation Points
Outfall No. OHP-003
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina**

**Figure
5-83**



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend

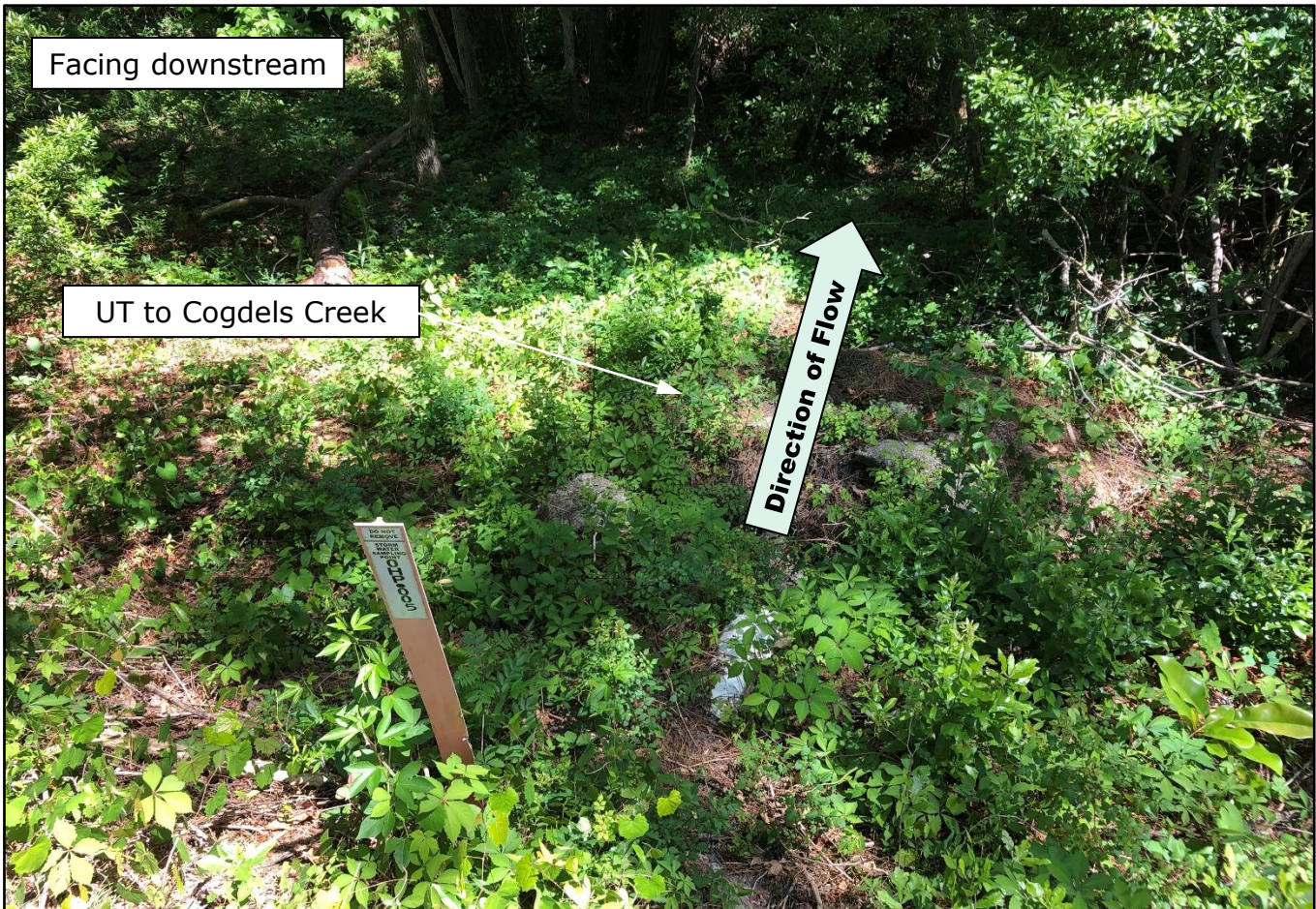
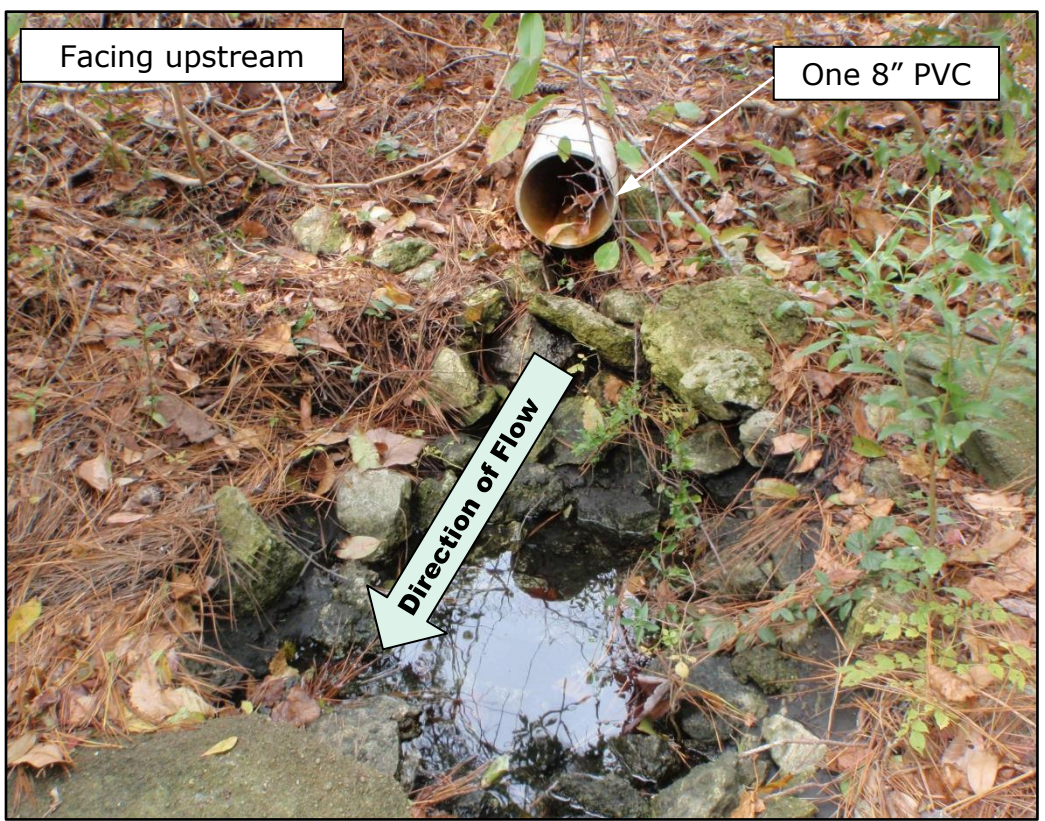


0 100 200
 Feet



Visual Observation Points
Outfall No. OHP-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

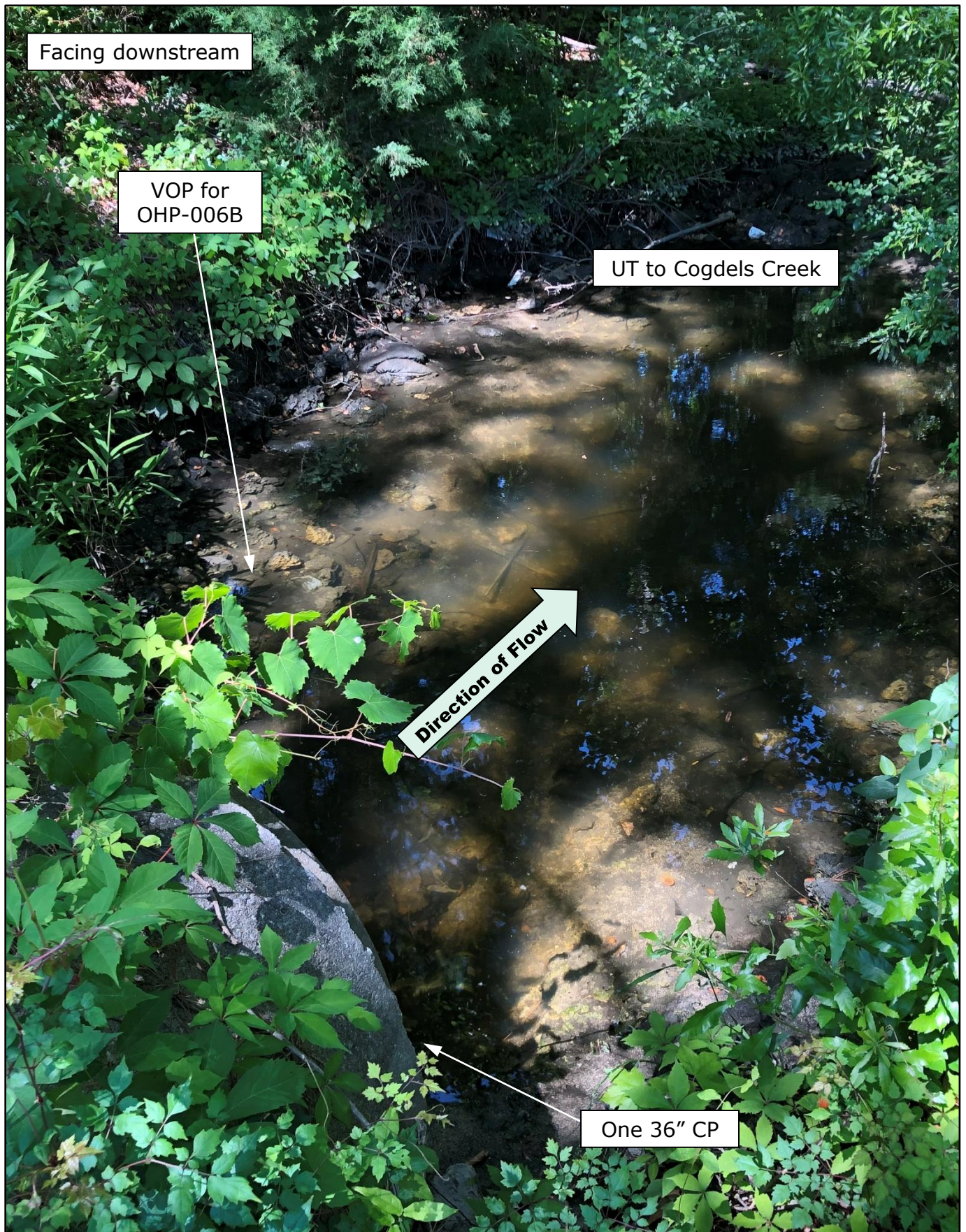
Figure
 5-84



Visual Observation Points
Outfall No. OHP-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-85





Visual Observation Points
Outfall No. OHP-006B
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

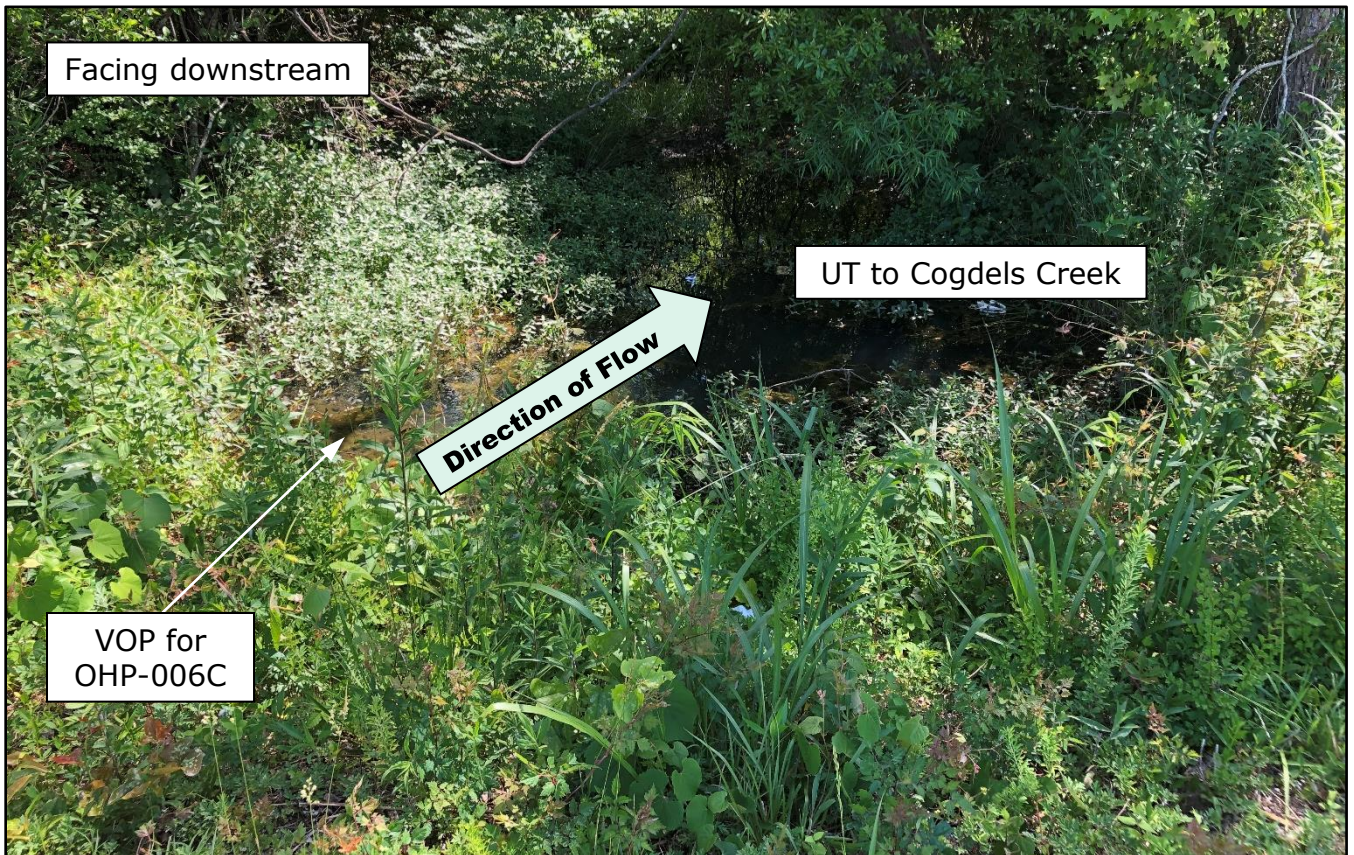
Figure
5-88

Facing upstream



Outlet structure
for SWP17

Facing downstream



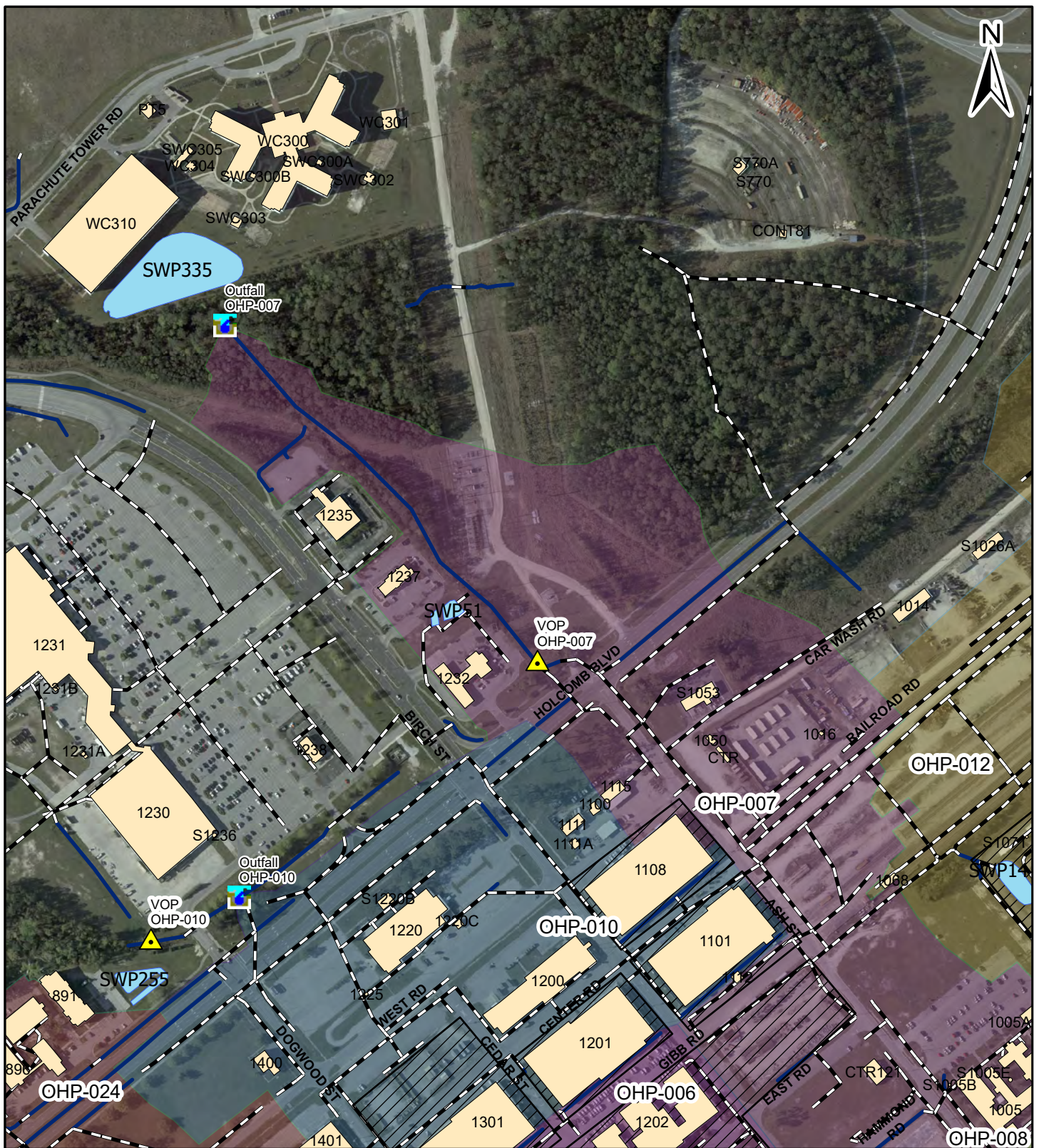
UT to Cogdels Creek

VOP for
OHP-006C



Visual Observation Points
Outfall No. OHP-006C
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-89



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

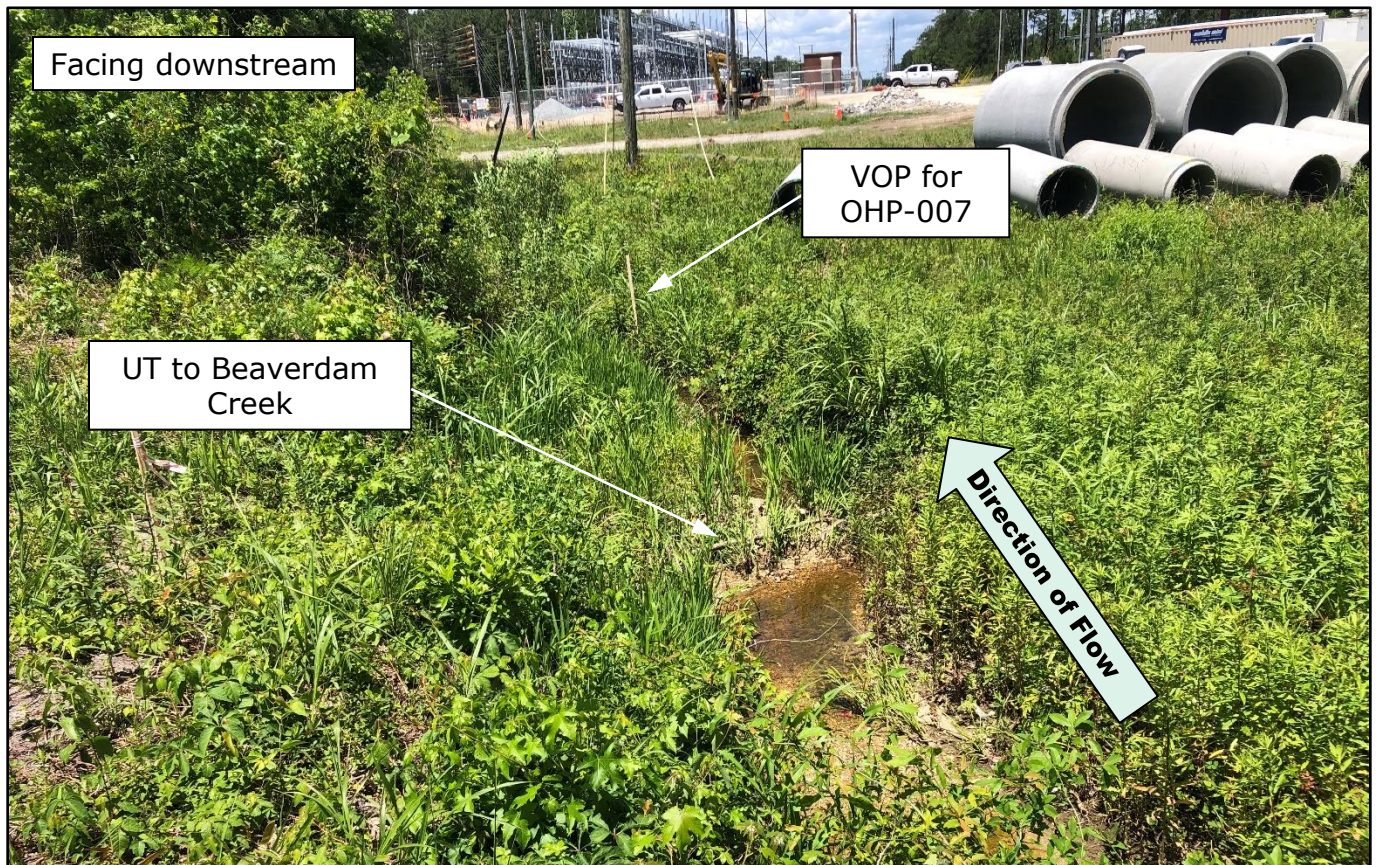
Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



Visual Observation Points
Outfall No. OHP-007
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-90



Visual Observation Points
Outfall No. OHP-007
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina



Visual Observation Points
Outfall No. OHP-010
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-93



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

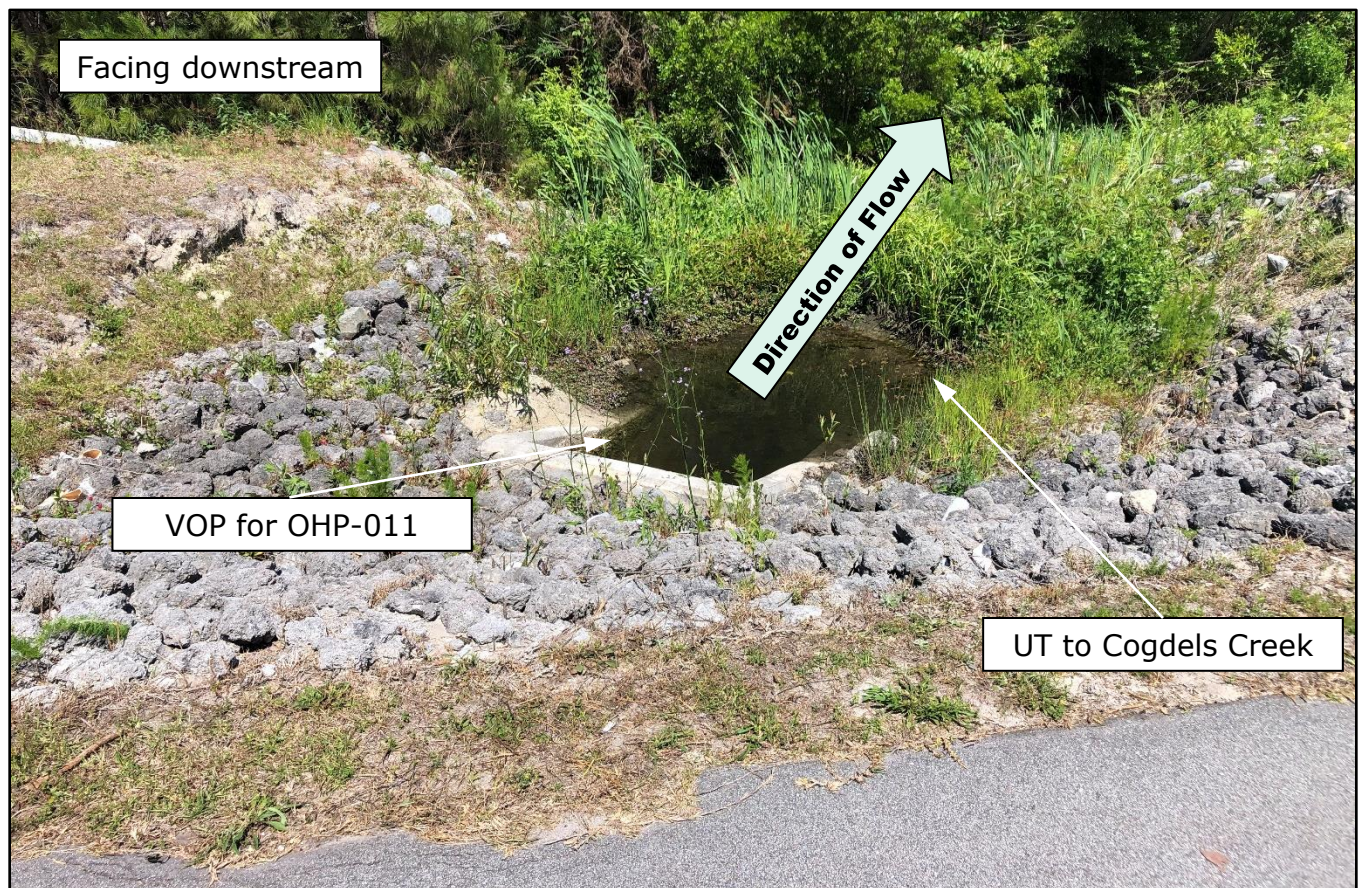
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OHP-011
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-94

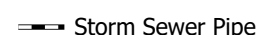




Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400 600
 Feet

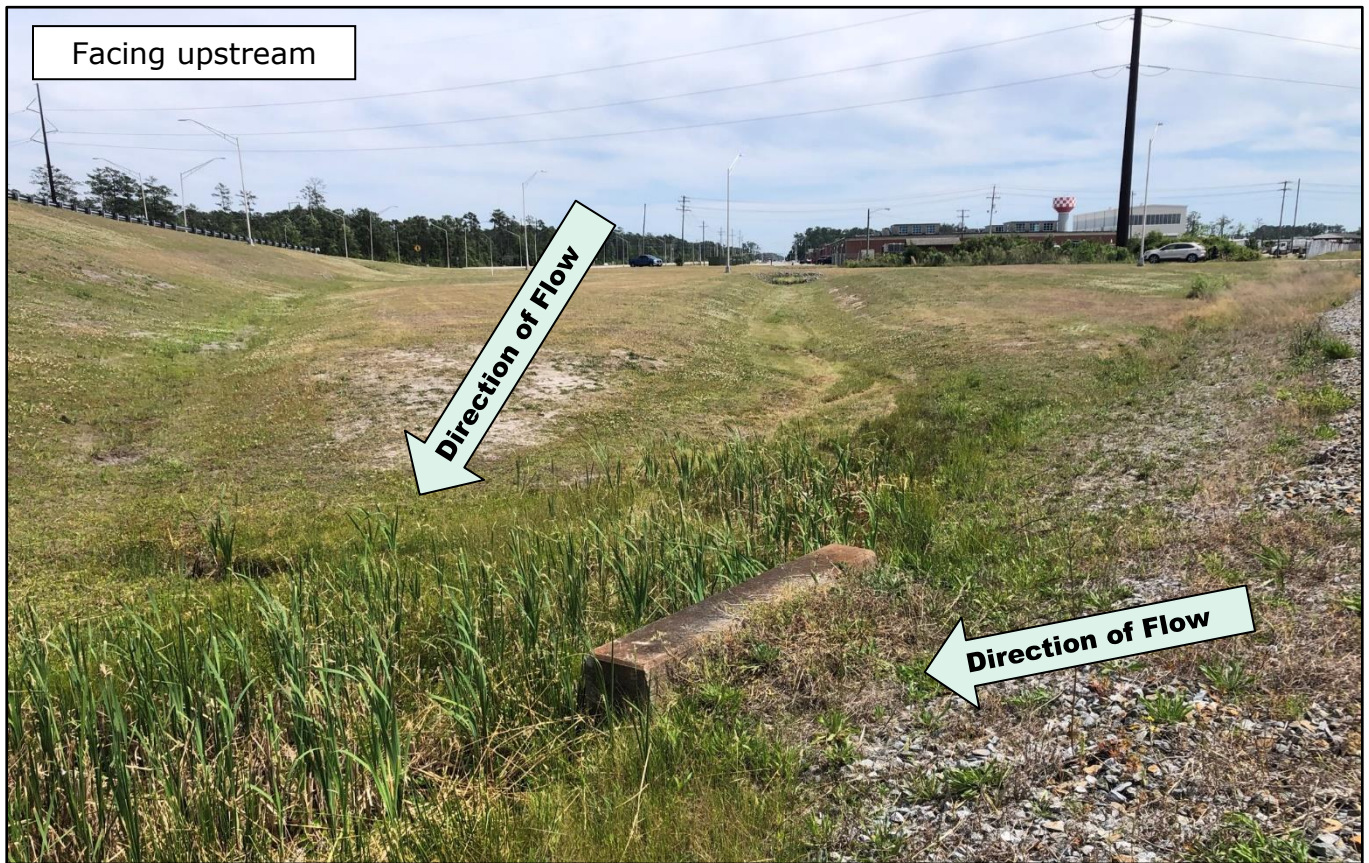
Legend



Visual Observation Points
Outfall No. OHP-012
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-96

Facing upstream

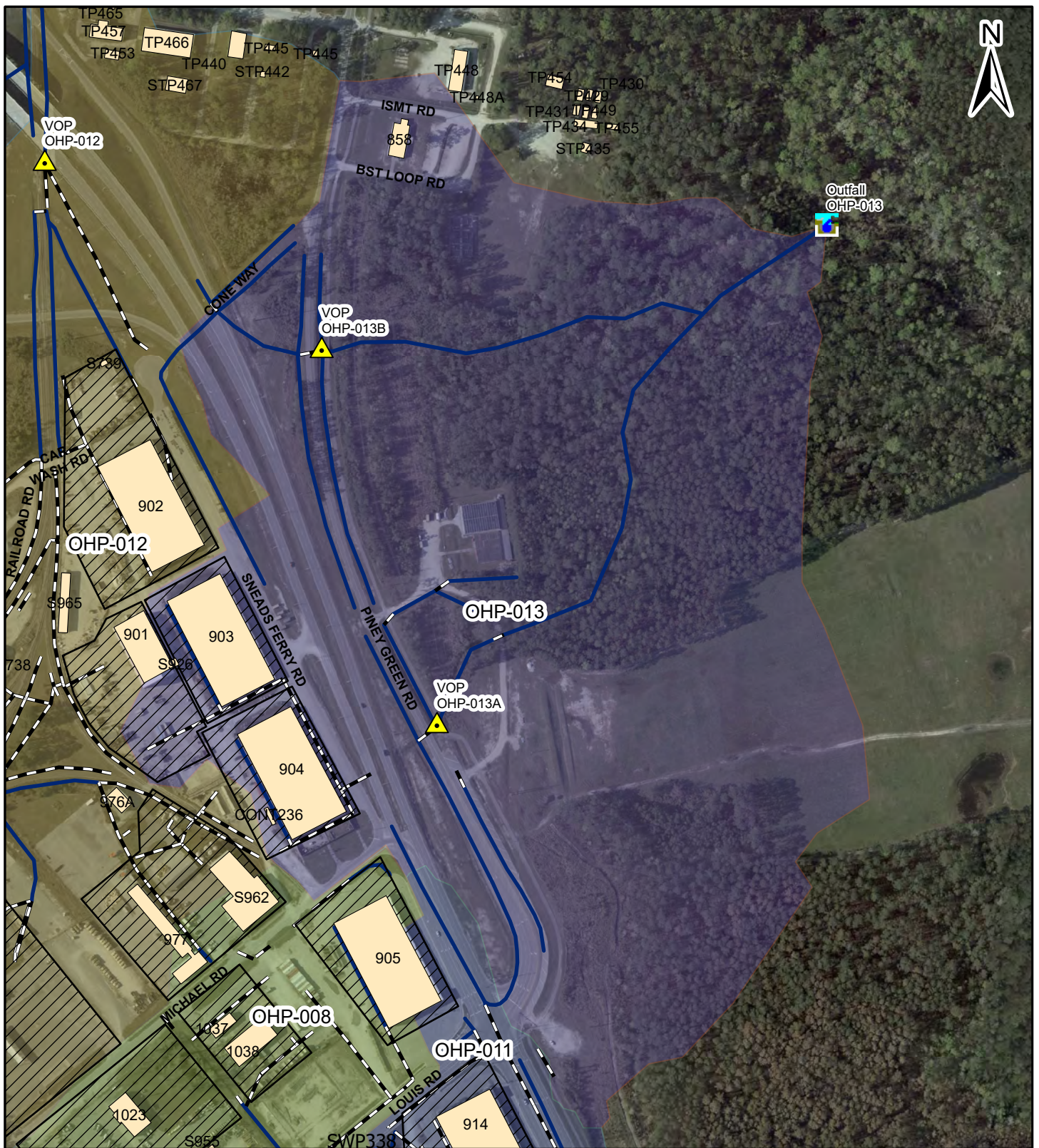


Facing downstream



Visual Observation Points
Outfall No. OHP-012
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-97



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



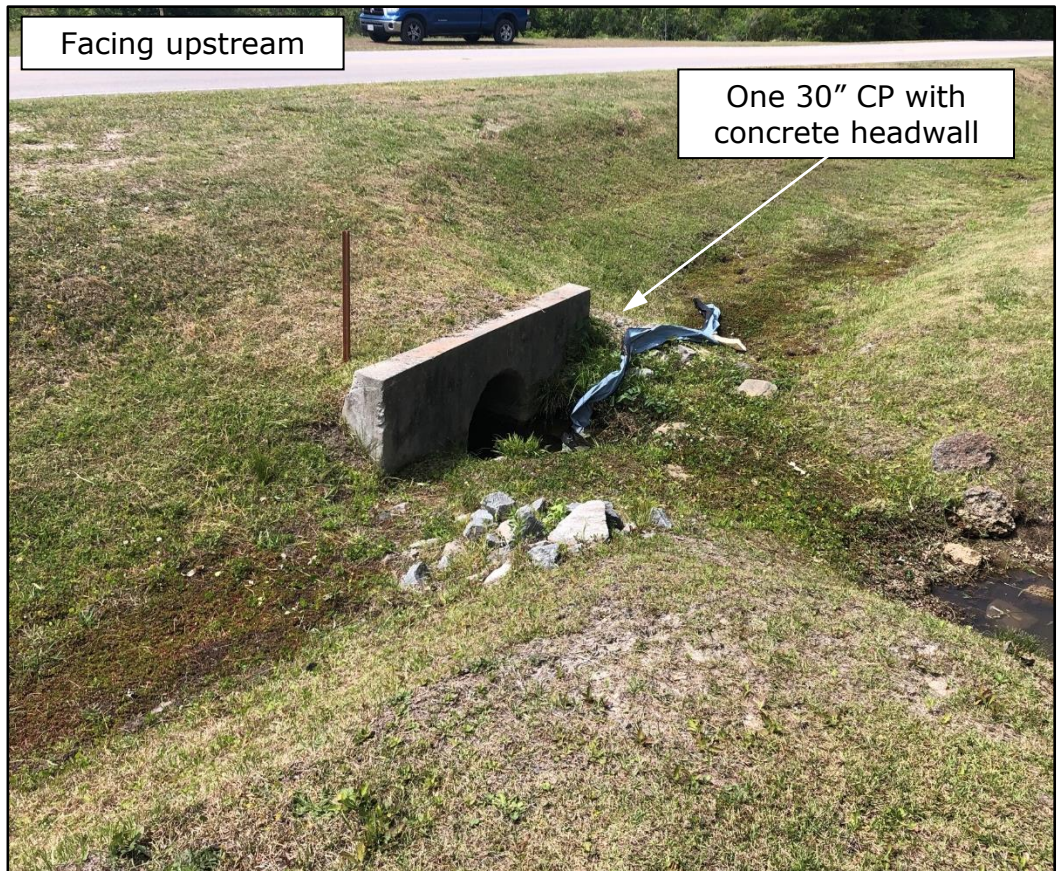
Visual Observation Points
Outfall No. OHP-013
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-98



Visual Observation Points
Outfall No. OHP-013A
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-99



Visual Observation Points
Outfall No. OHP-013B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-100



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



Building



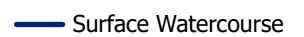
Facility Boundary



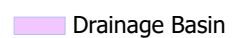
Catch Basin



Storm Sewer Pipe



Surface Watercourse



Drainage Basin



Visual Observation Points
Outfall No. OHP-014
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-101



Visual Observation Points
Outfall No. OHP-014
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-102



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400 600
 Feet

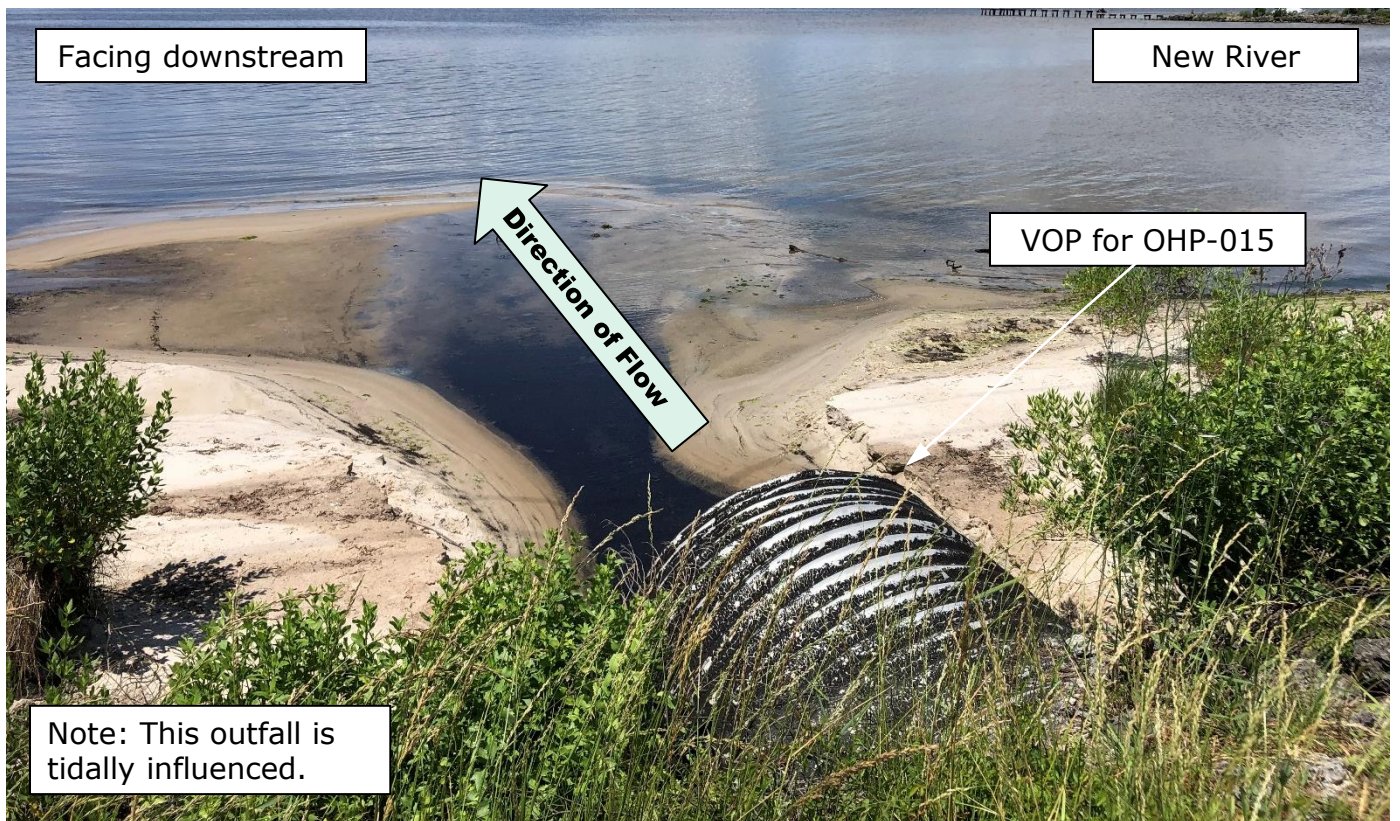
Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



Visual Observation Points
Outfall No. OHP-015
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-103





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

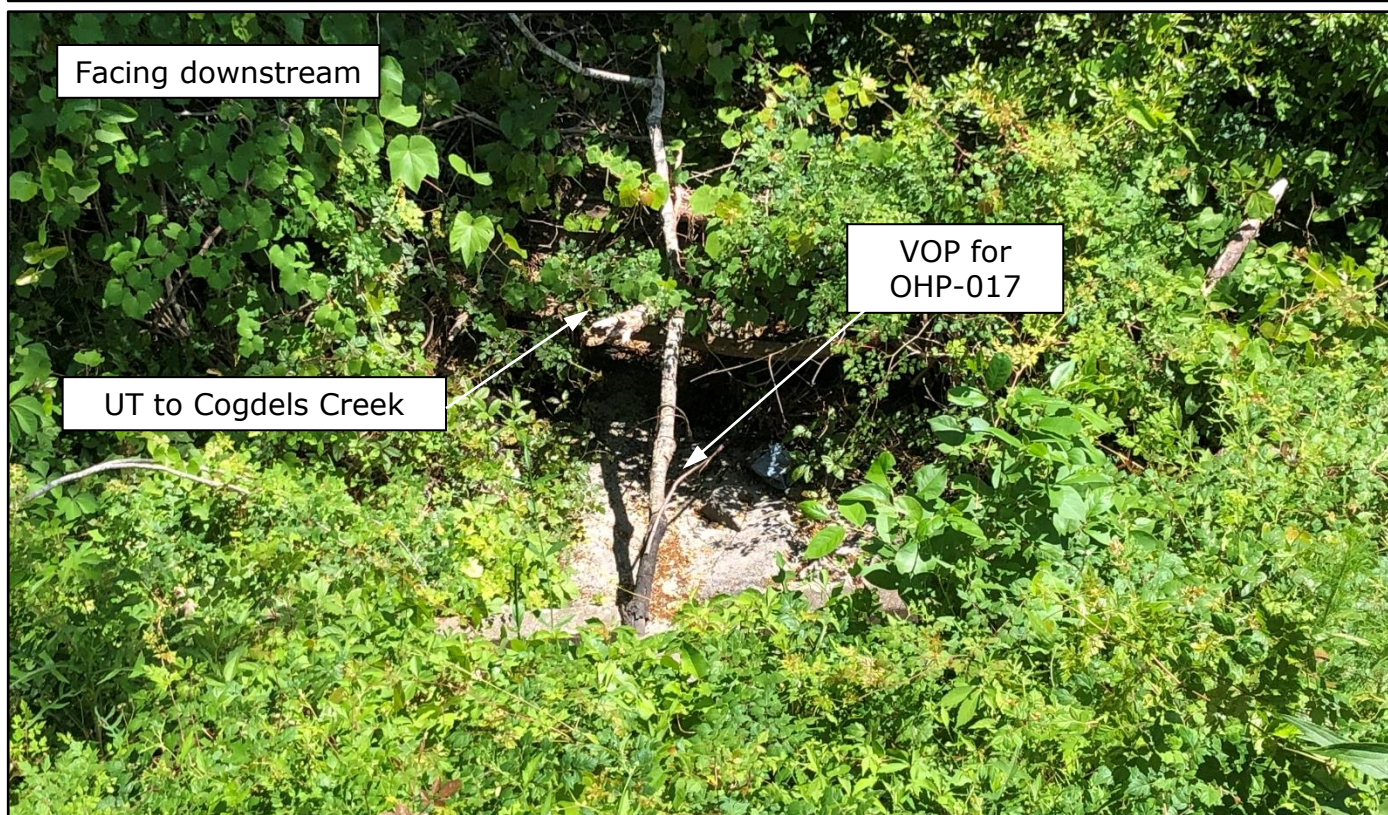
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OHP-017
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-105





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400 600
 Feet

Legend

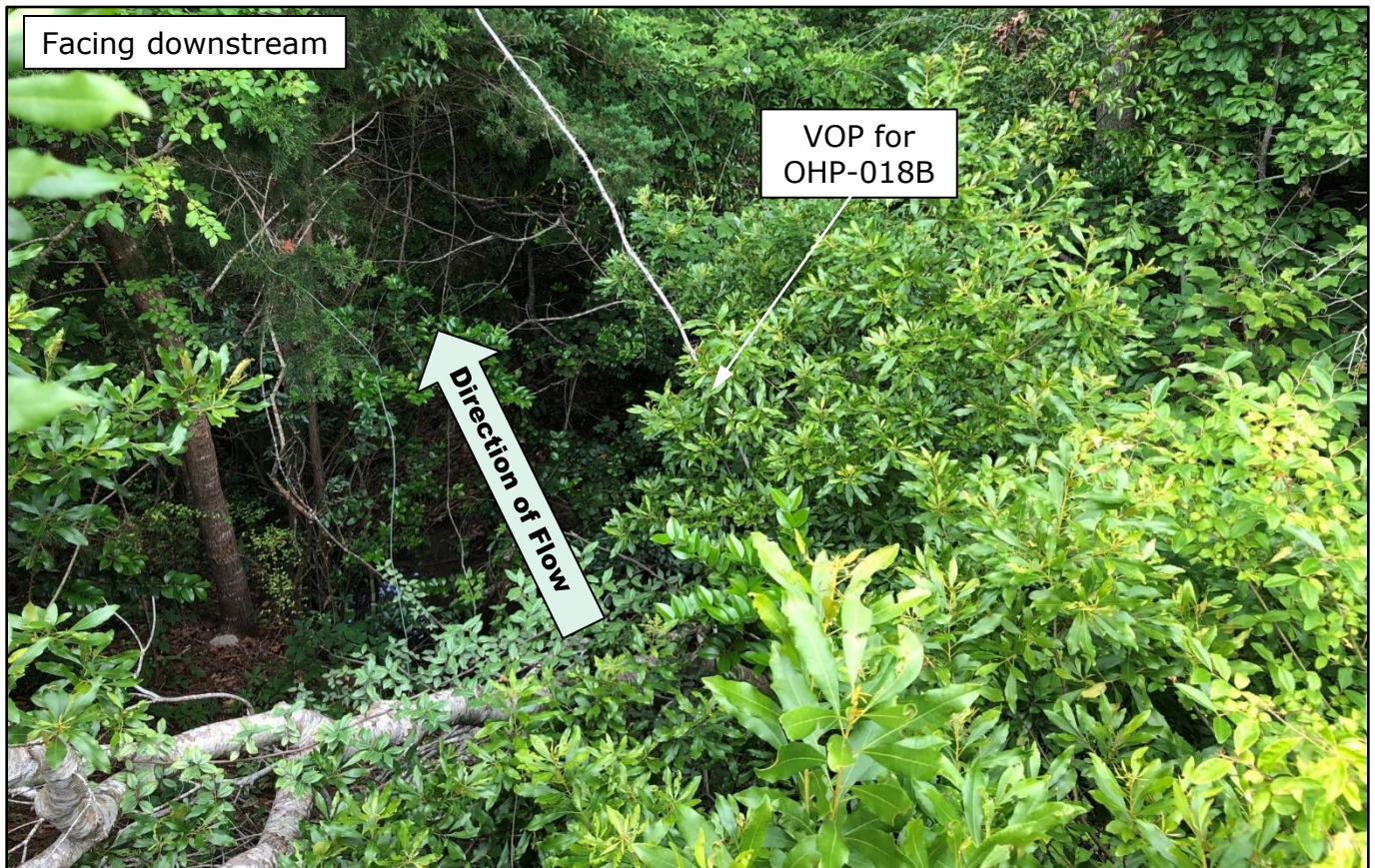
- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



Visual Observation Points
Outfall No. OHP-018
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-107







Visual Observation Points
Outfall No. OHP-019A
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

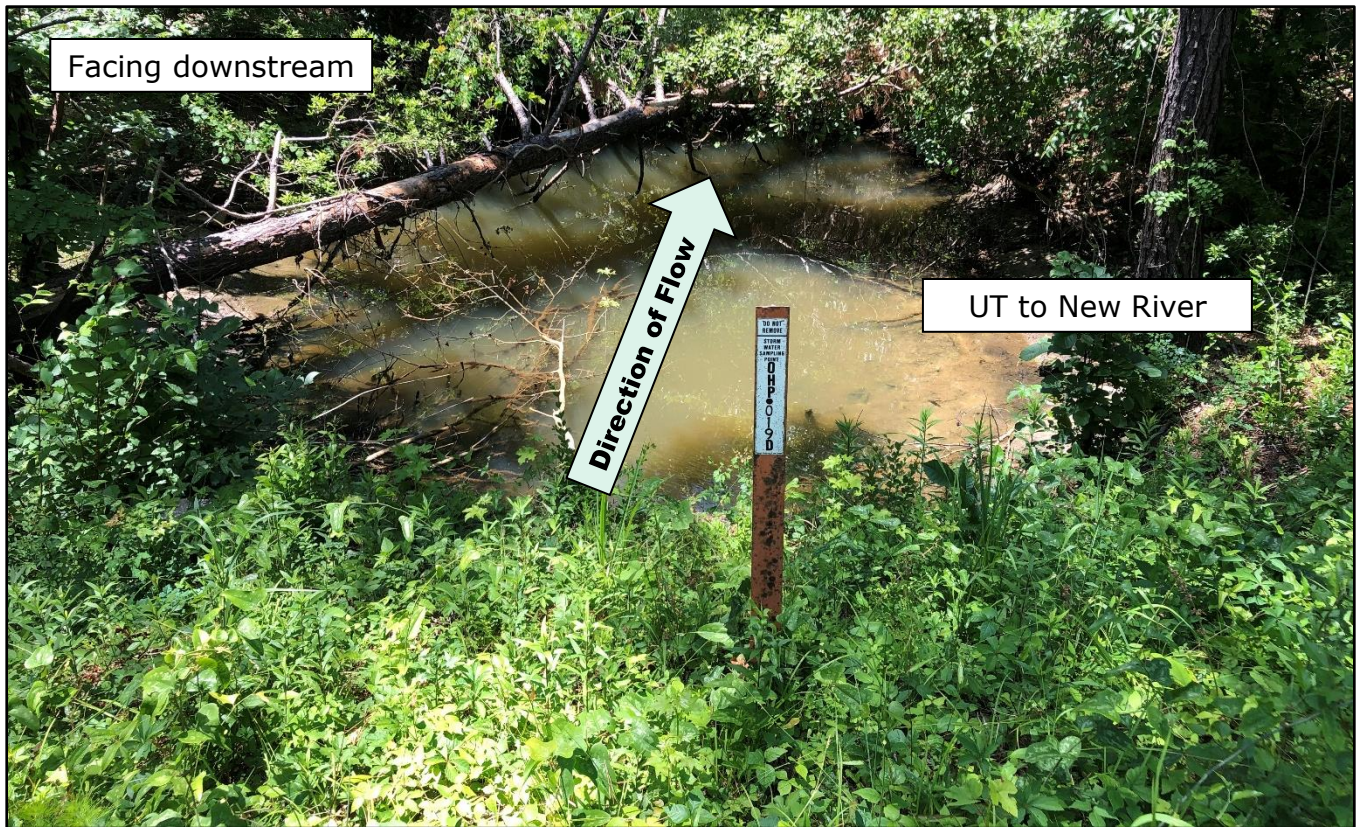
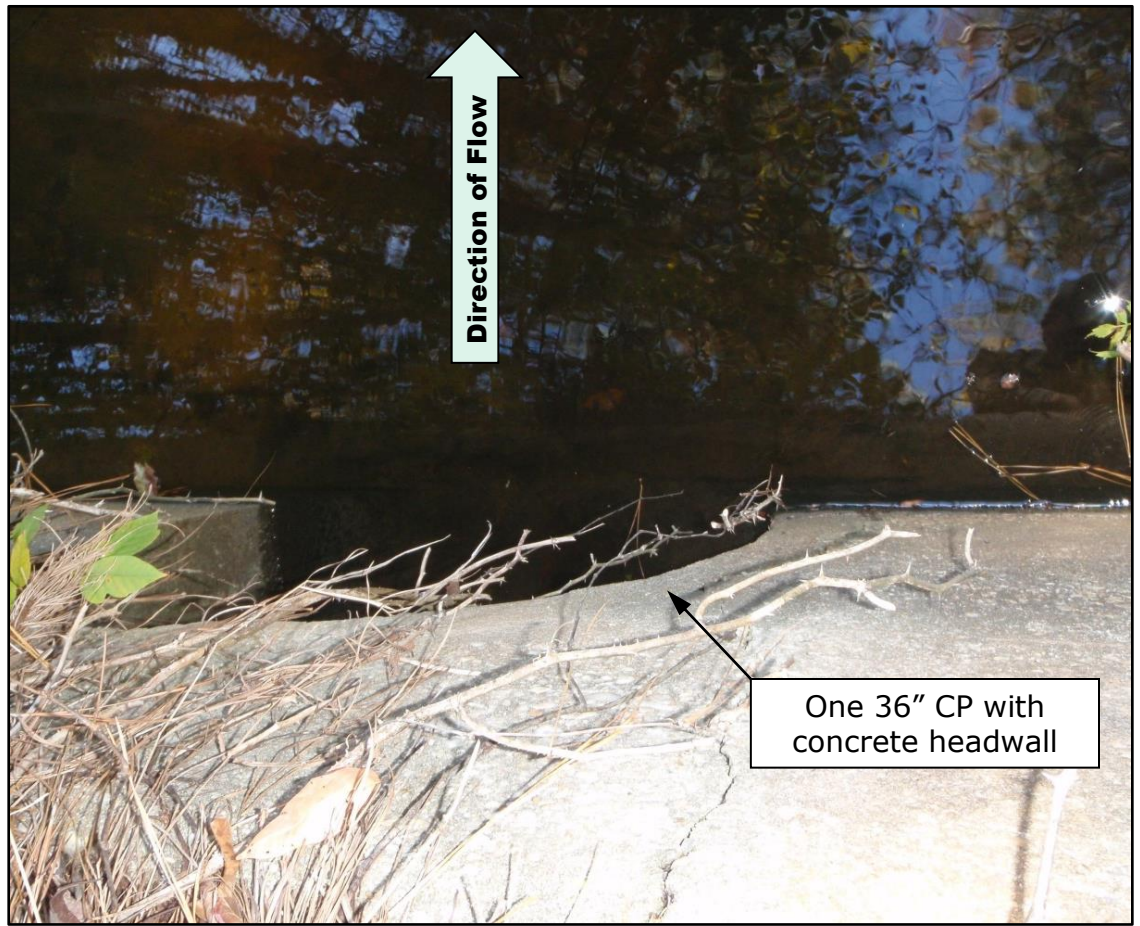
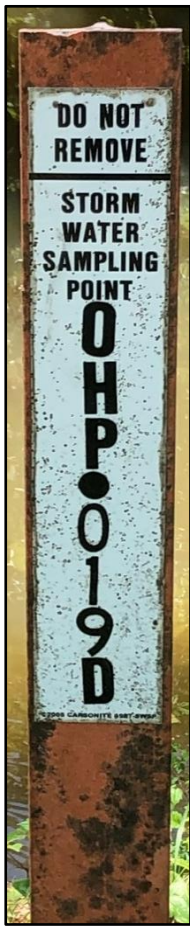
Figure
 5-111



Visual Observation Points
Outfall No. OHP-019B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-112





Visual Observation Points
Outfall No. OHP-019D
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
5-114



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |



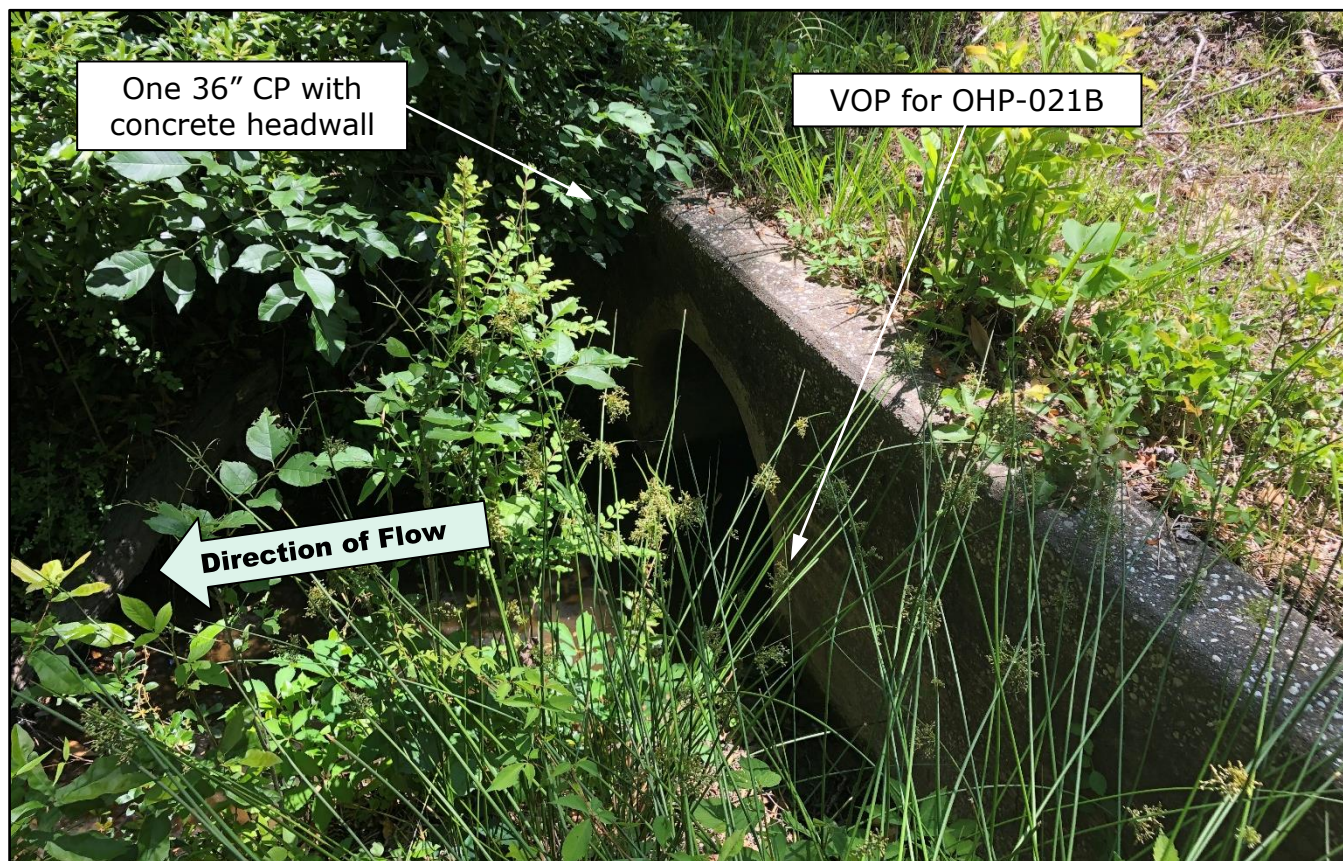
Visual Observation Points
Outfall No. OHP-021
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-115



Visual Observation Points
Outfall No. OHP-021A
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-116



**Visual Observation Points
Outfall No. OHP-021B
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina**

**Figure
5-117**



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

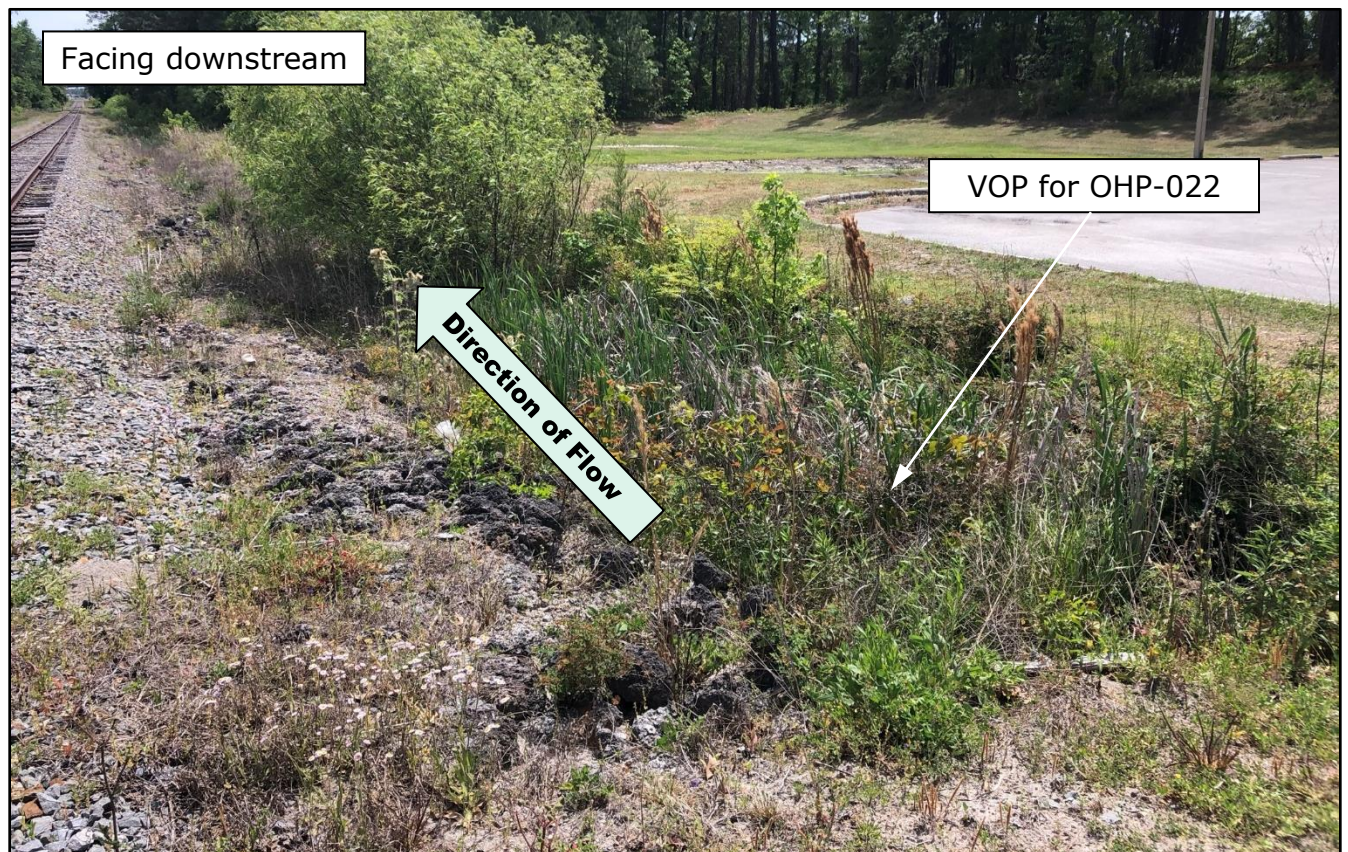
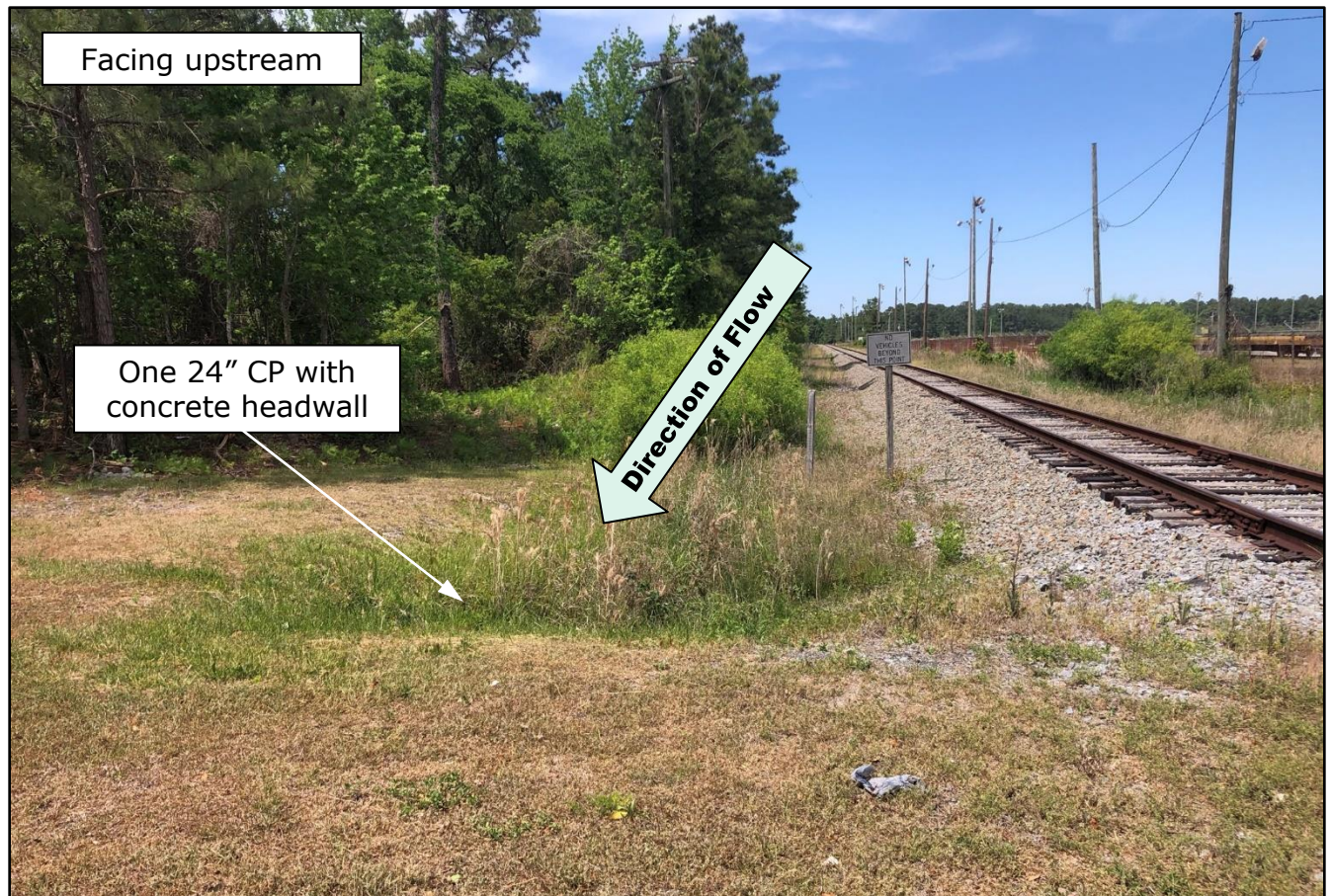
0 100 200 400 600
 Feet

Legend



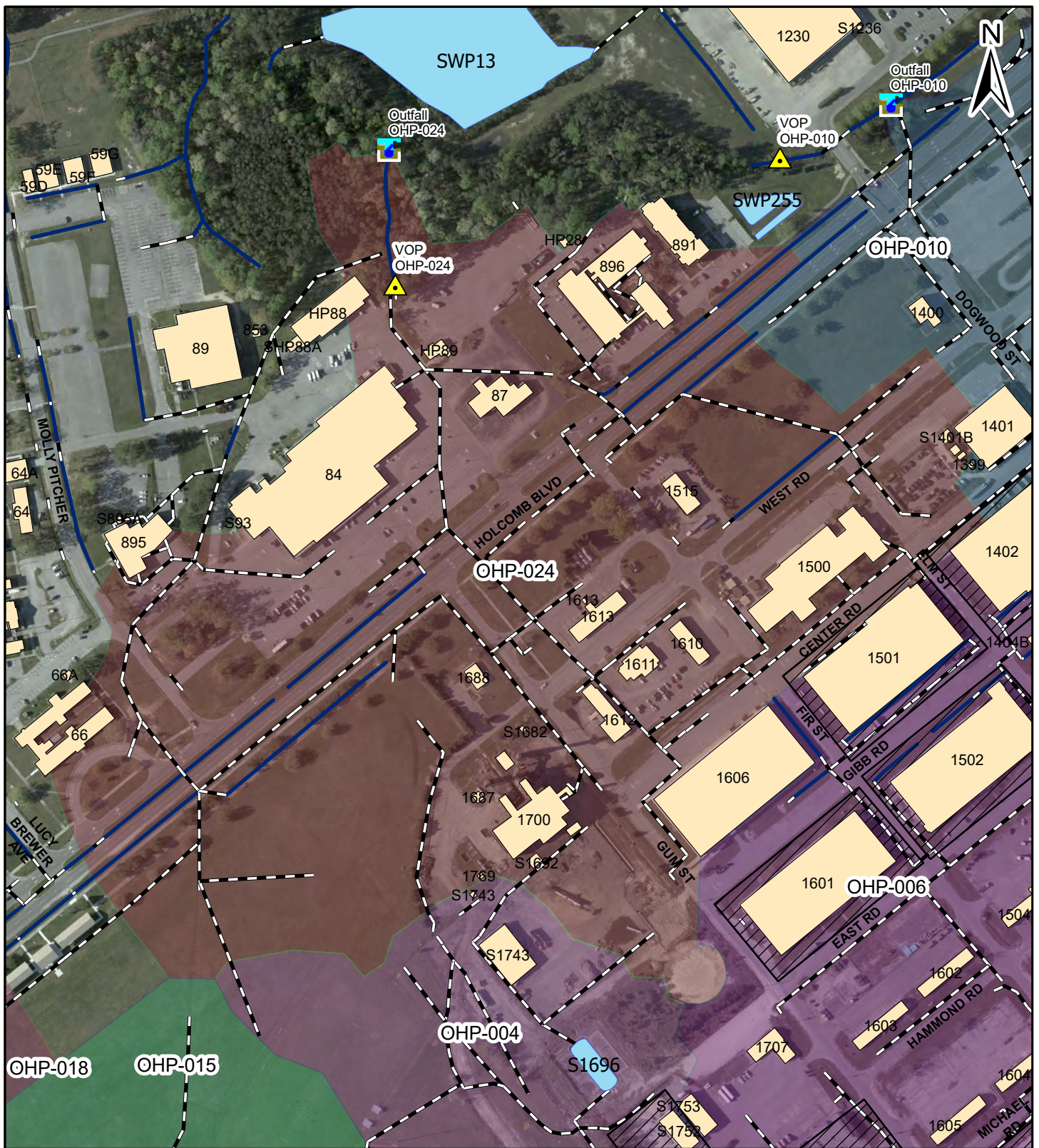
Visual Observation Points
Outfall No. OHP-022
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-118



Visual Observation Points
Outfall No. OHP-022
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

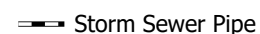
Figure
5-119



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend



Visual Observation Points
Outfall No. OHP-024
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-120





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OHP-027
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-122

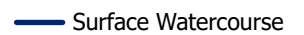
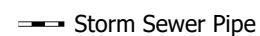




Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

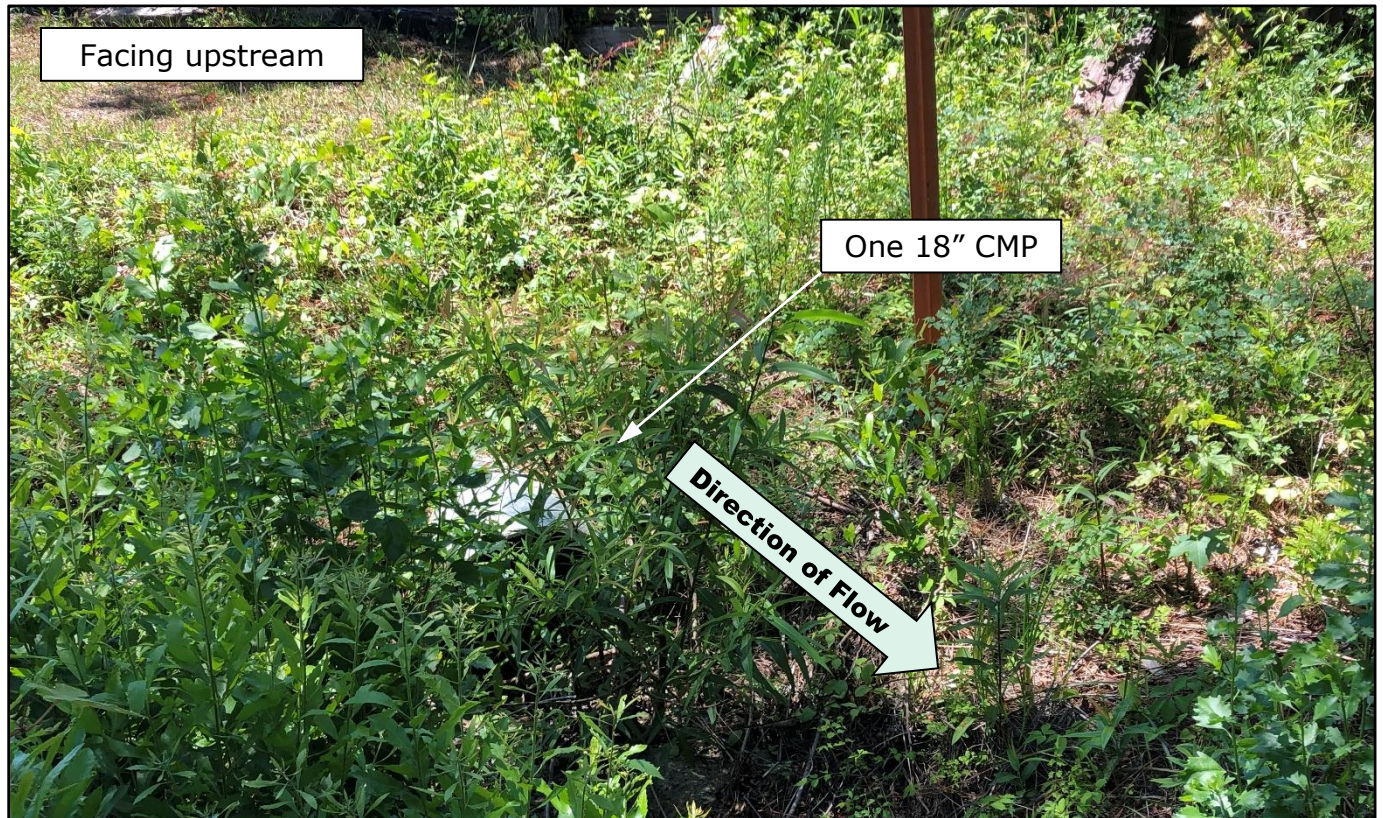
0 100 200
 Feet

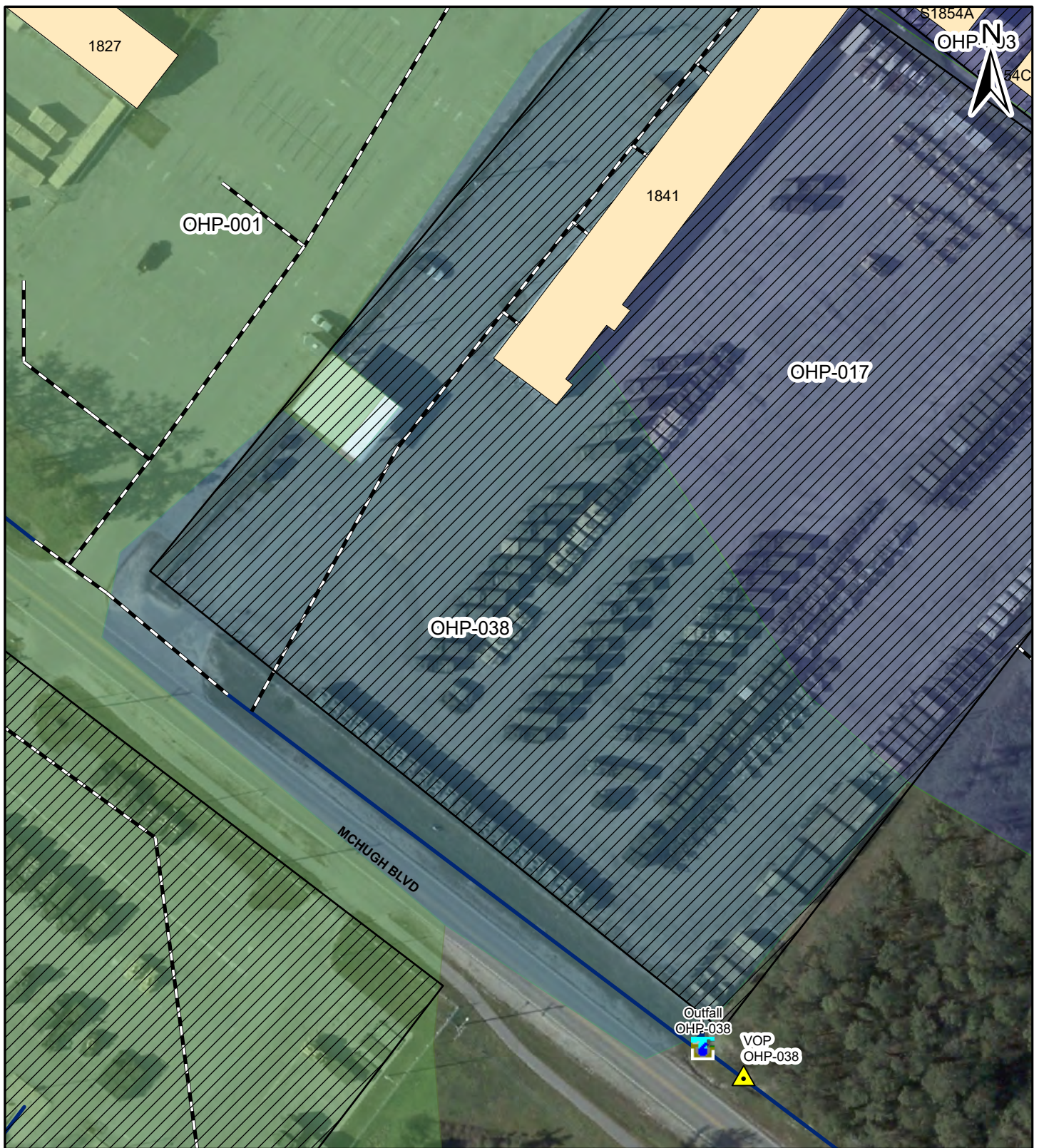
Legend



Visual Observation Points
Outfall No. OHP-035
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

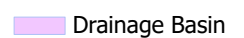
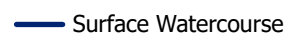
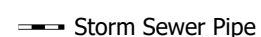
Figure
 5-124





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend



0 100 200
 Feet



Visual Observation Points
Outfall No. OHP-038
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-126



Visual Observation Points
Outfall No. OHP-038
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-127



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



Building



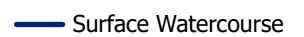
Facility Boundary



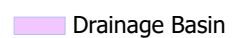
Catch Basin



Storm Sewer Pipe



Surface Watercourse

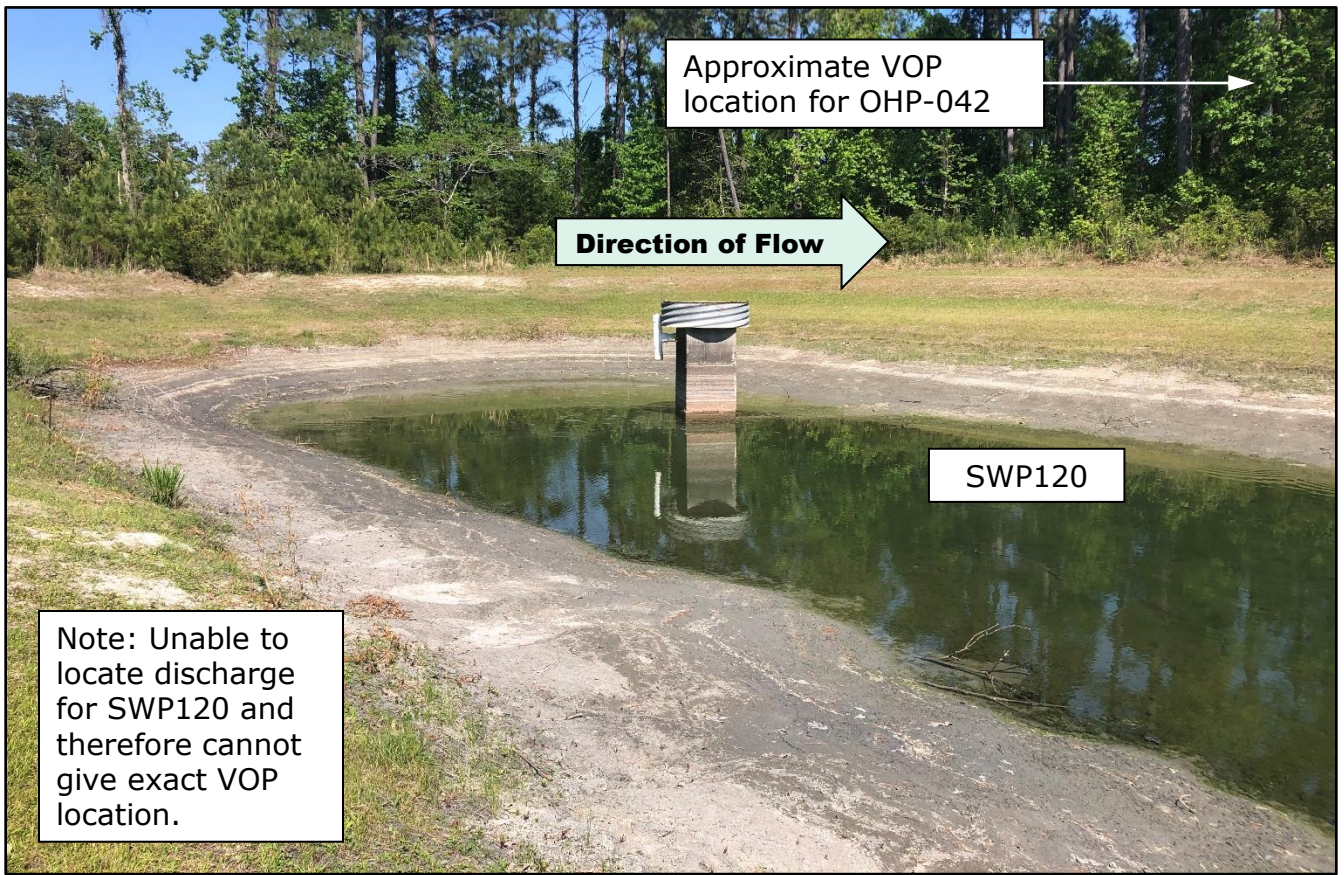


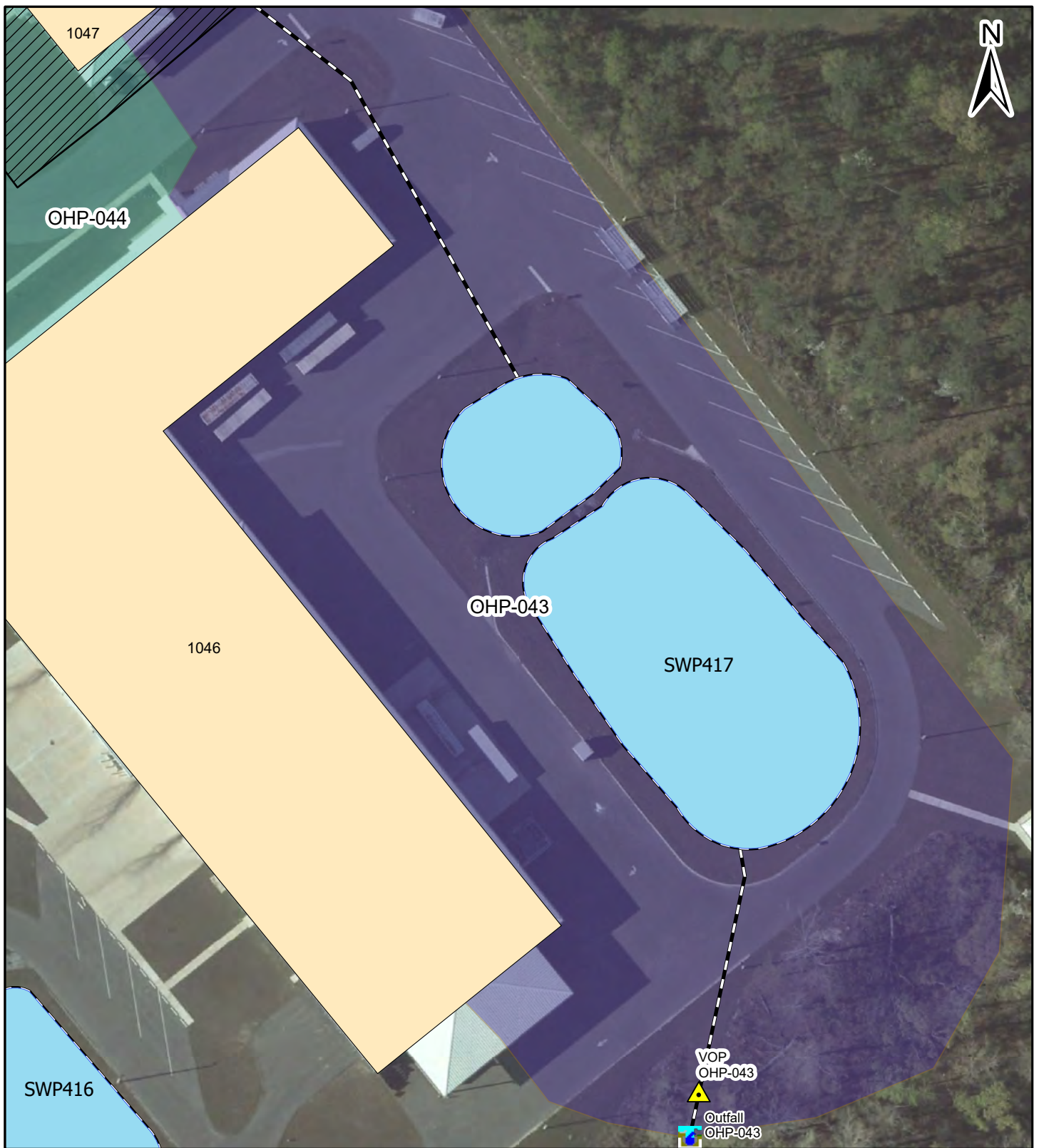
Drainage Basin



Visual Observation Points
Outfall No. OHP-042
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

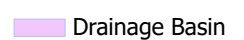
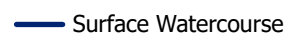
Figure
 5-128





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend

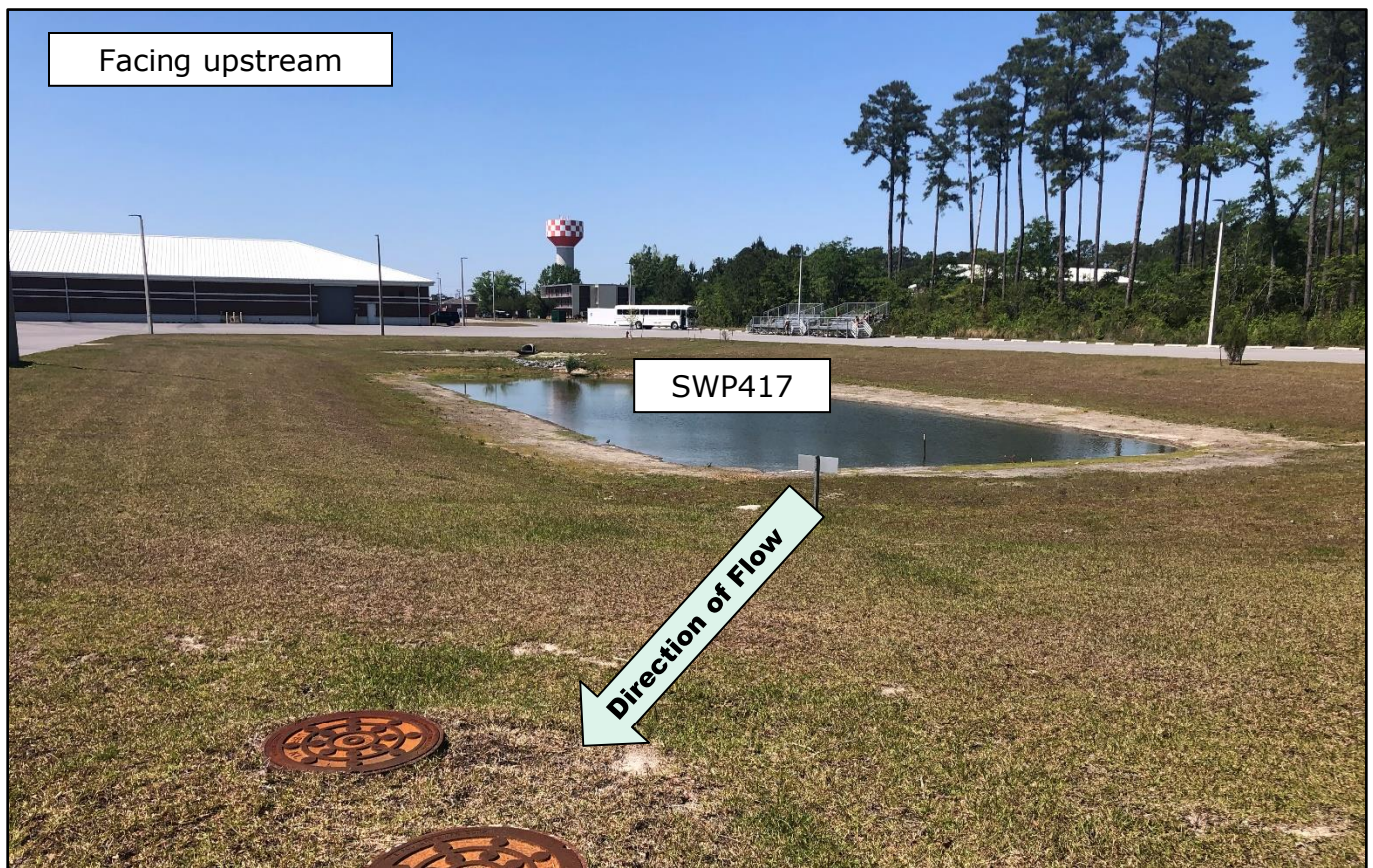


0 100 200
 Feet



Visual Observation Points
Outfall No. OHP-043
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-130





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend



VOP



Analytical/VOP



Stormwater Outfall



Catch Basin



Drainage Basin



Facility Boundary

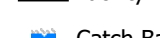
Surface Watercourse

Stormwater BMP

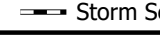
Storm Sewer Pipe



Building



Facility Boundary



Surface Watercourse



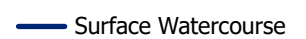
Stormwater BMP



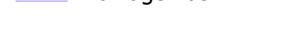
Storm Sewer Pipe



Surface Watercourse



Surface Watercourse



Stormwater BMP



Storm Sewer Pipe



Surface Watercourse



Stormwater BMP



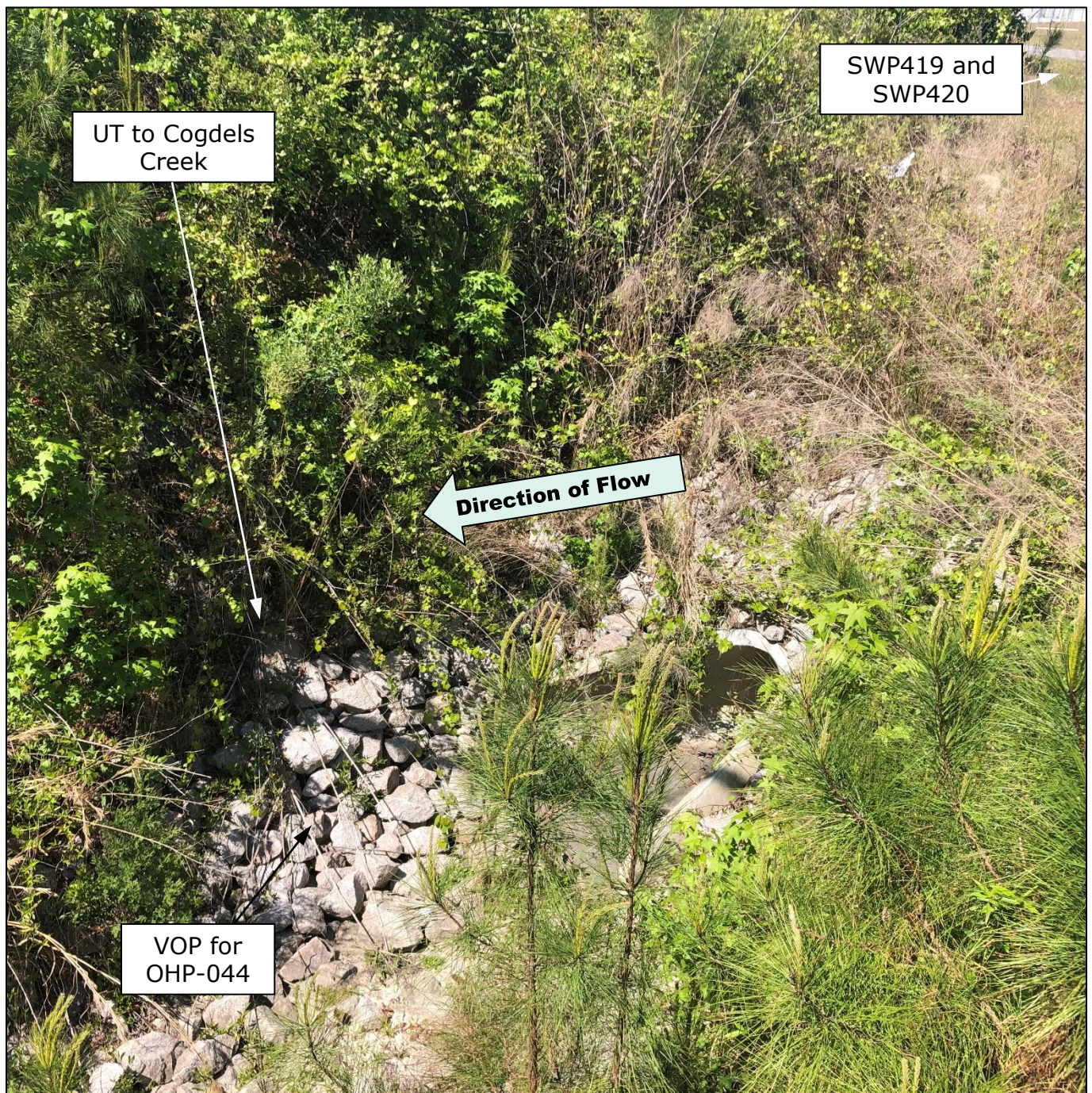
Storm Sewer Pipe

0 100 200 Feet



Visual Observation Points
Outfall No. OHP-044
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-132





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



Building



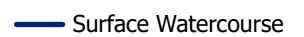
Facility Boundary



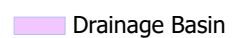
Catch Basin



Storm Sewer Pipe



Surface Watercourse

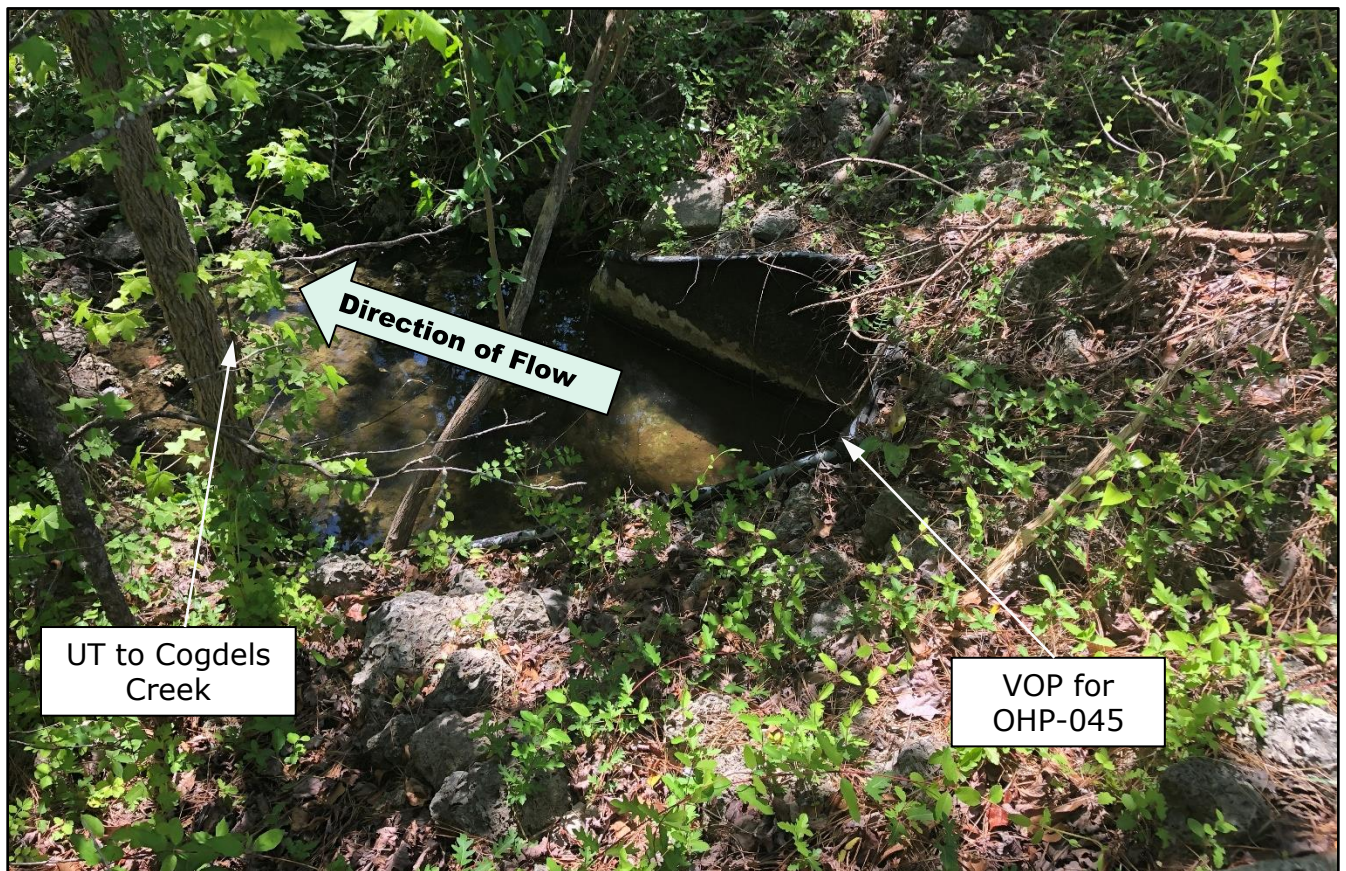


Drainage Basin



Visual Observation Points
Outfall No. OHP-045
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-134





5.7 LANDFILL (LF)

This section provides mapping and photos of VOPs located in the Landfill area. Table 5-8 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-8 Landfill VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OLF-001	941525.98	12600132.40	-
OLF-002	944586.66	12602535.01	Replace missing VOP marker.

1) UTM geographic coordinate system, NAD83.



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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



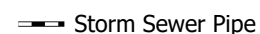
Building



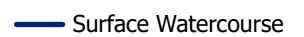
Facility Boundary



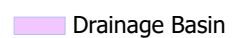
Catch Basin



Storm Sewer Pipe



Surface Watercourse

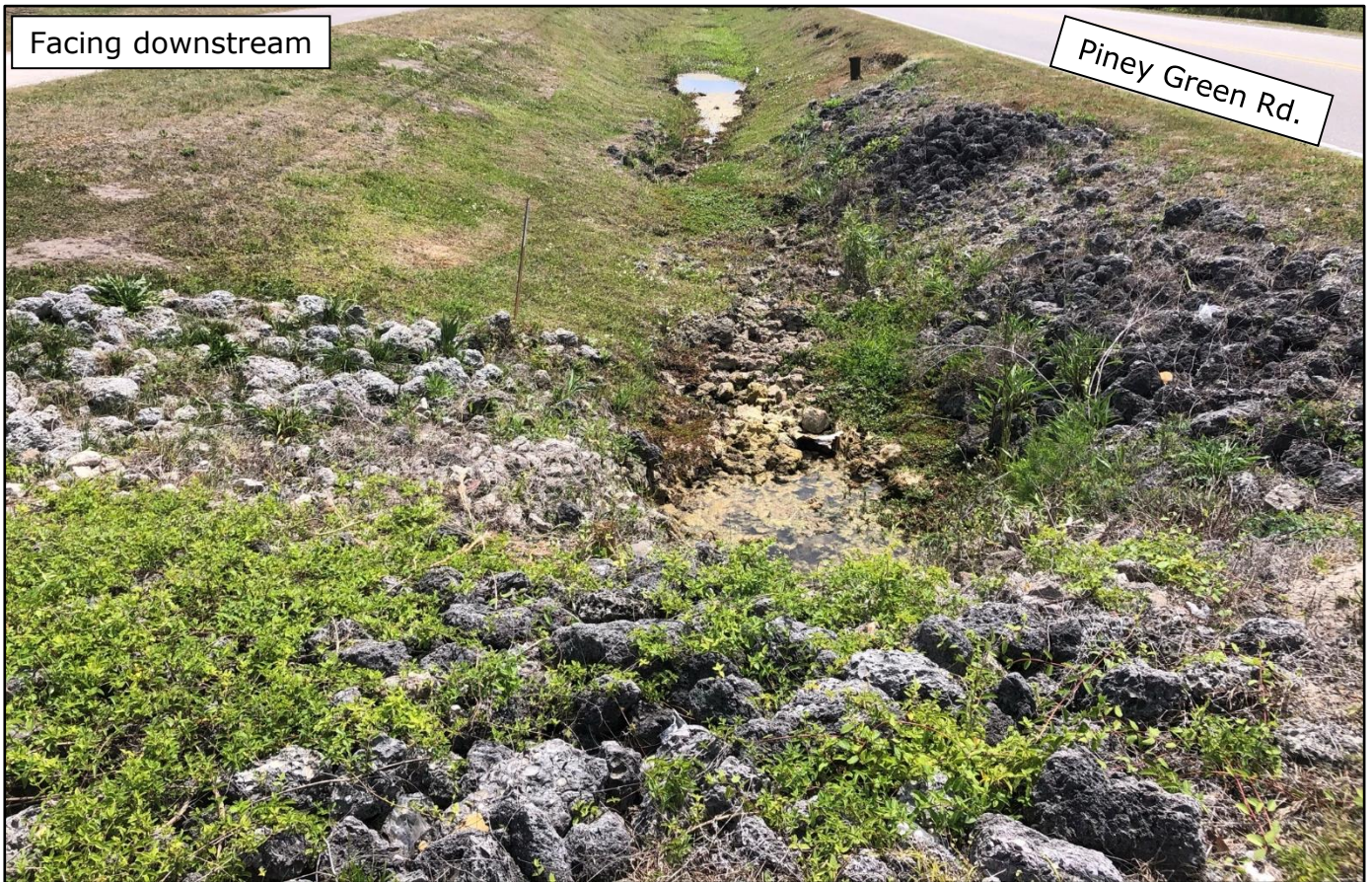


Drainage Basin

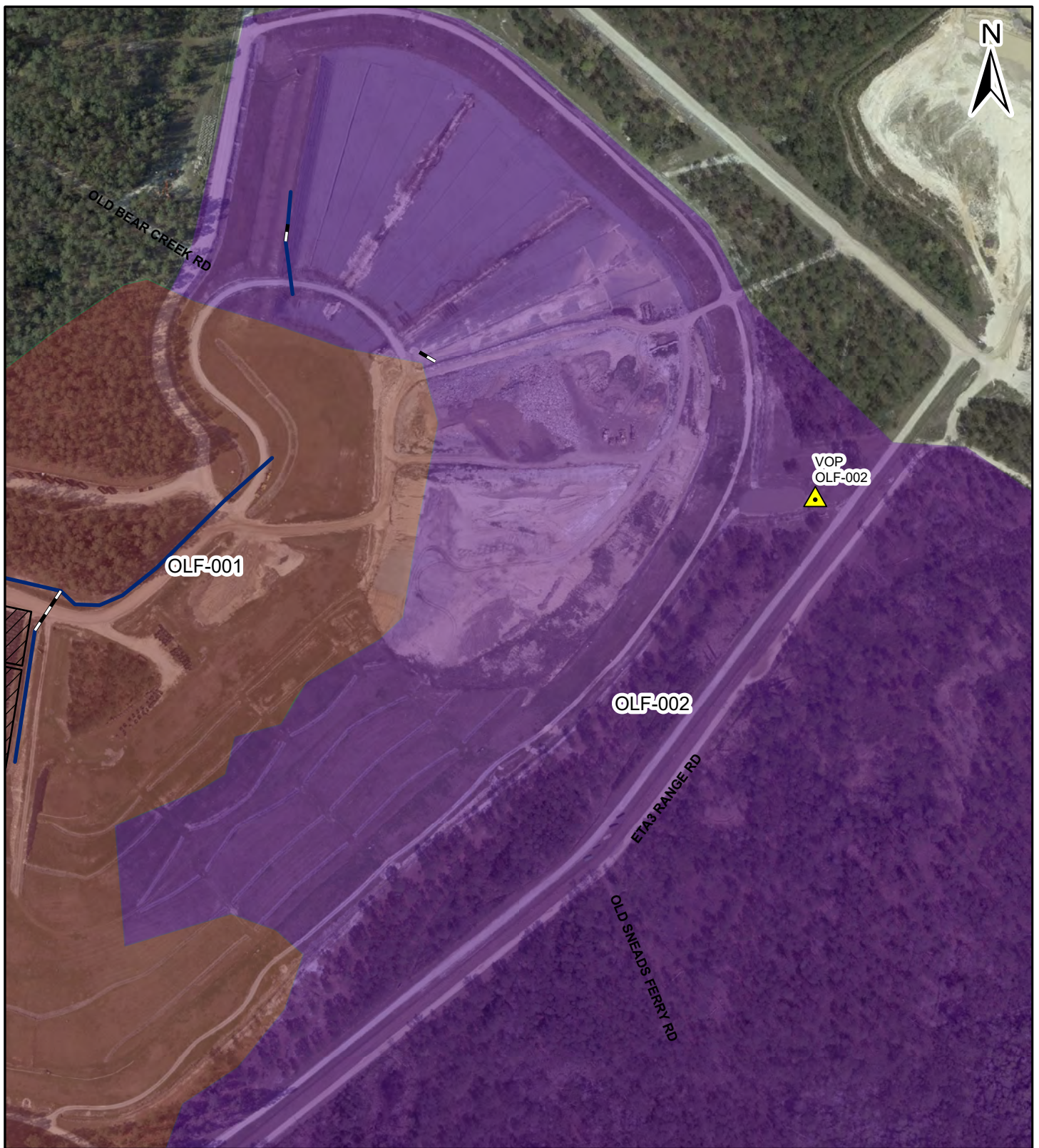


Visual Observation Points
Outfall No. OLF-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-136



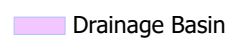
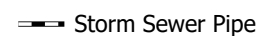
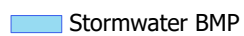
Visual Observation Points
Outfall No. OLF-001
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

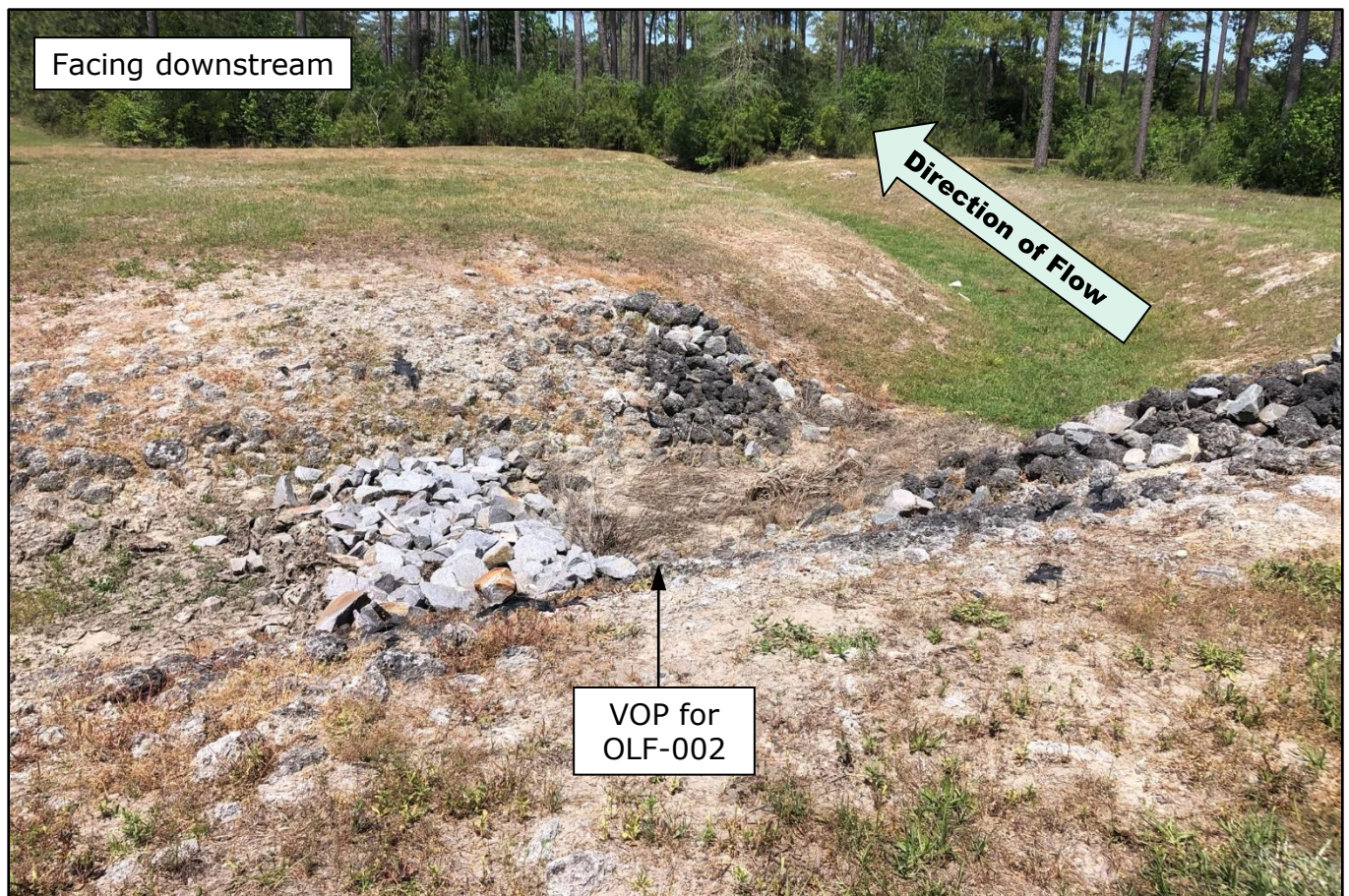
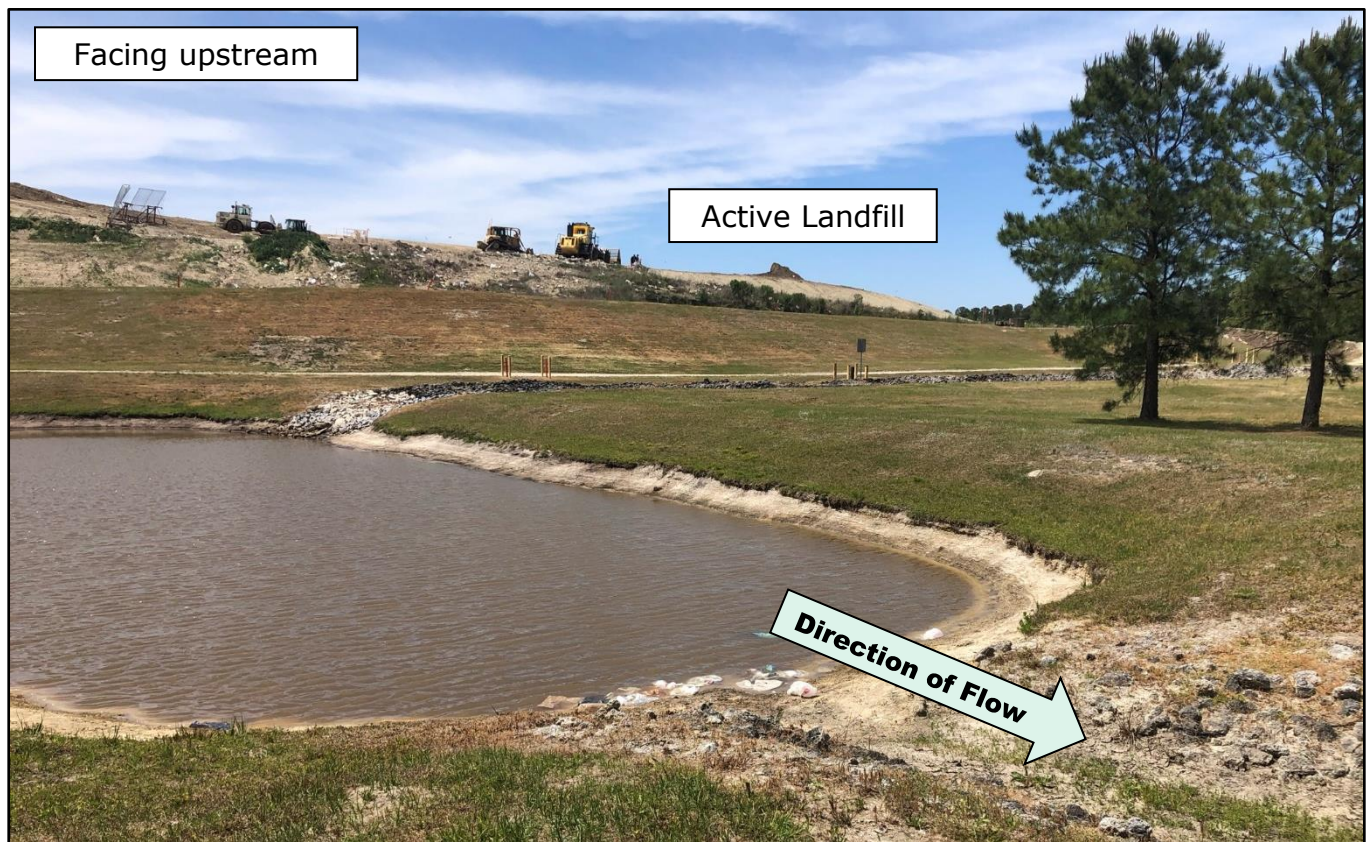
0 100 200 400
 Feet

Legend



Visual Observation Points
Outfall No. OLF-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-138





5.8 NAVAL HOSPITAL (NH)

This section provides mapping and photos of VOPs located in the Naval Hospital area. Table 5-9 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

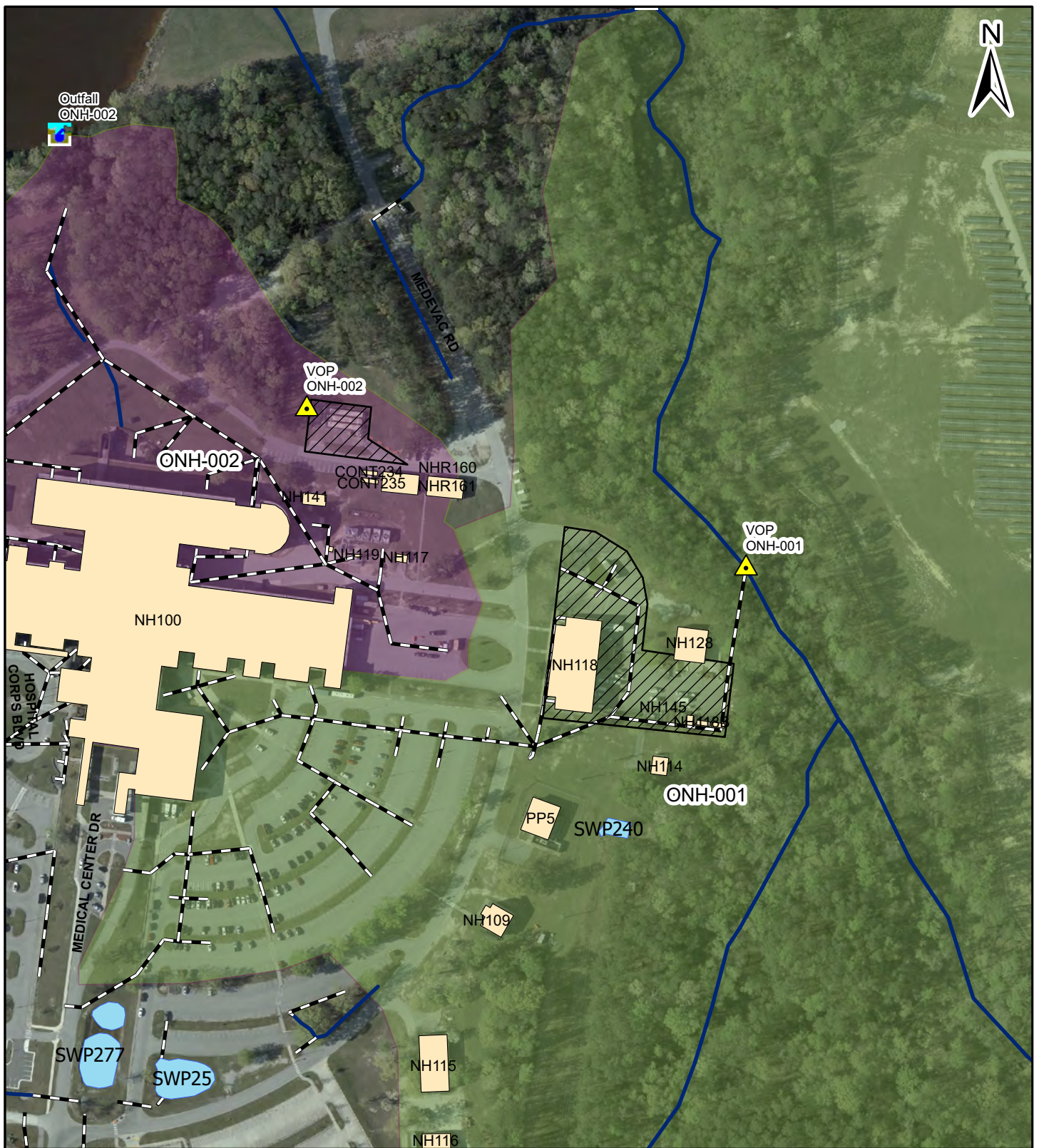
Table 5-9 Naval Hospital VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
ONH-001	933148.88	12614426.34	-
ONH-002	932346.96	12614717.13	Replace missing VOP marker.

1) UTM geographic coordinate system, NAD83.



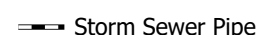
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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. ONH-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

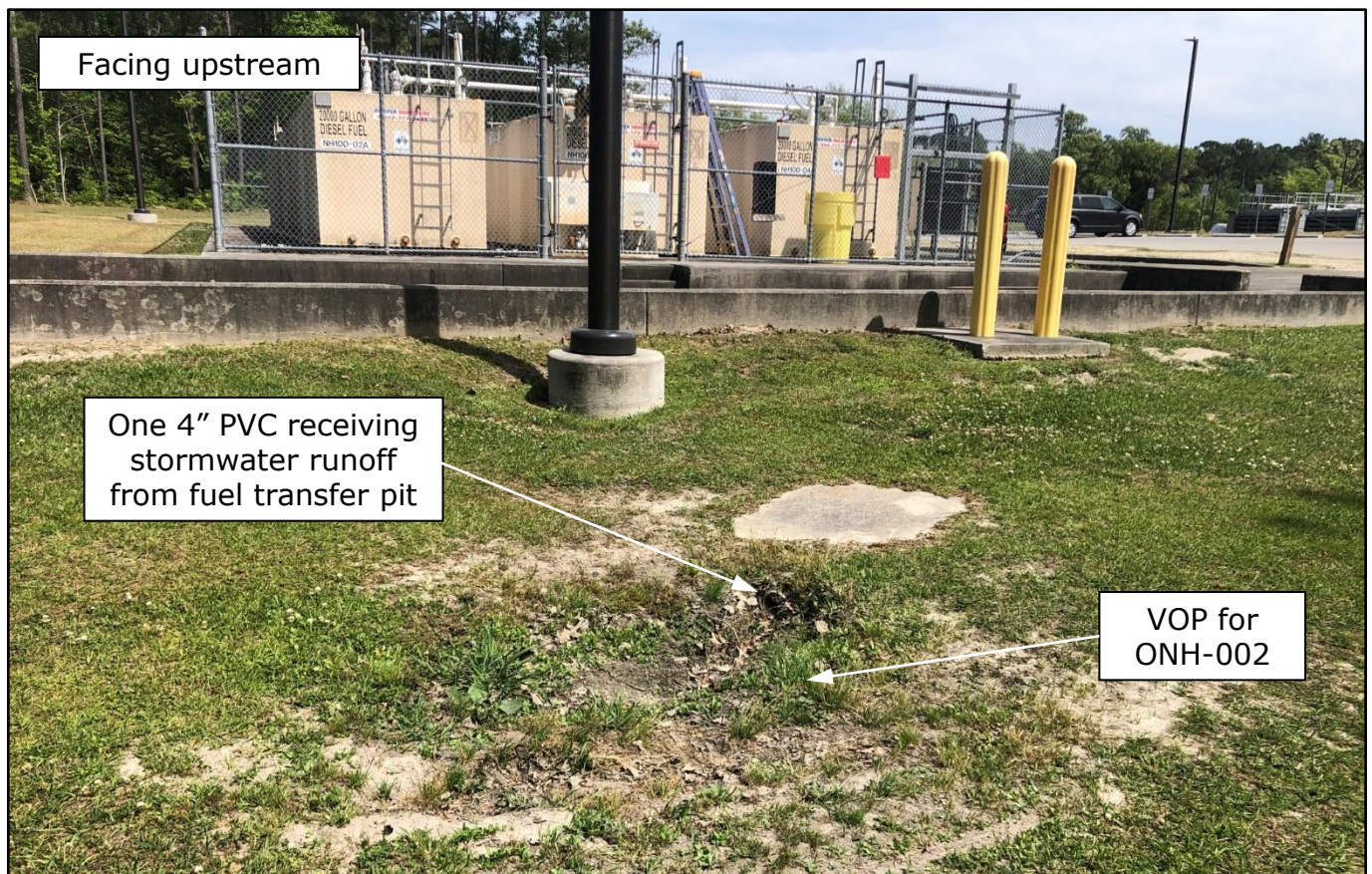
Figure
 5-140



Visual Observation Points
Outfall No. ONH-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-141







5.9 OLD HOSPITAL (OH)

This section provides mapping and photos of the VOP located in the Old Hospital area. Table 5-10 gives the x- and y-coordinates of this VOP along with comments and recommendations made during field observation.

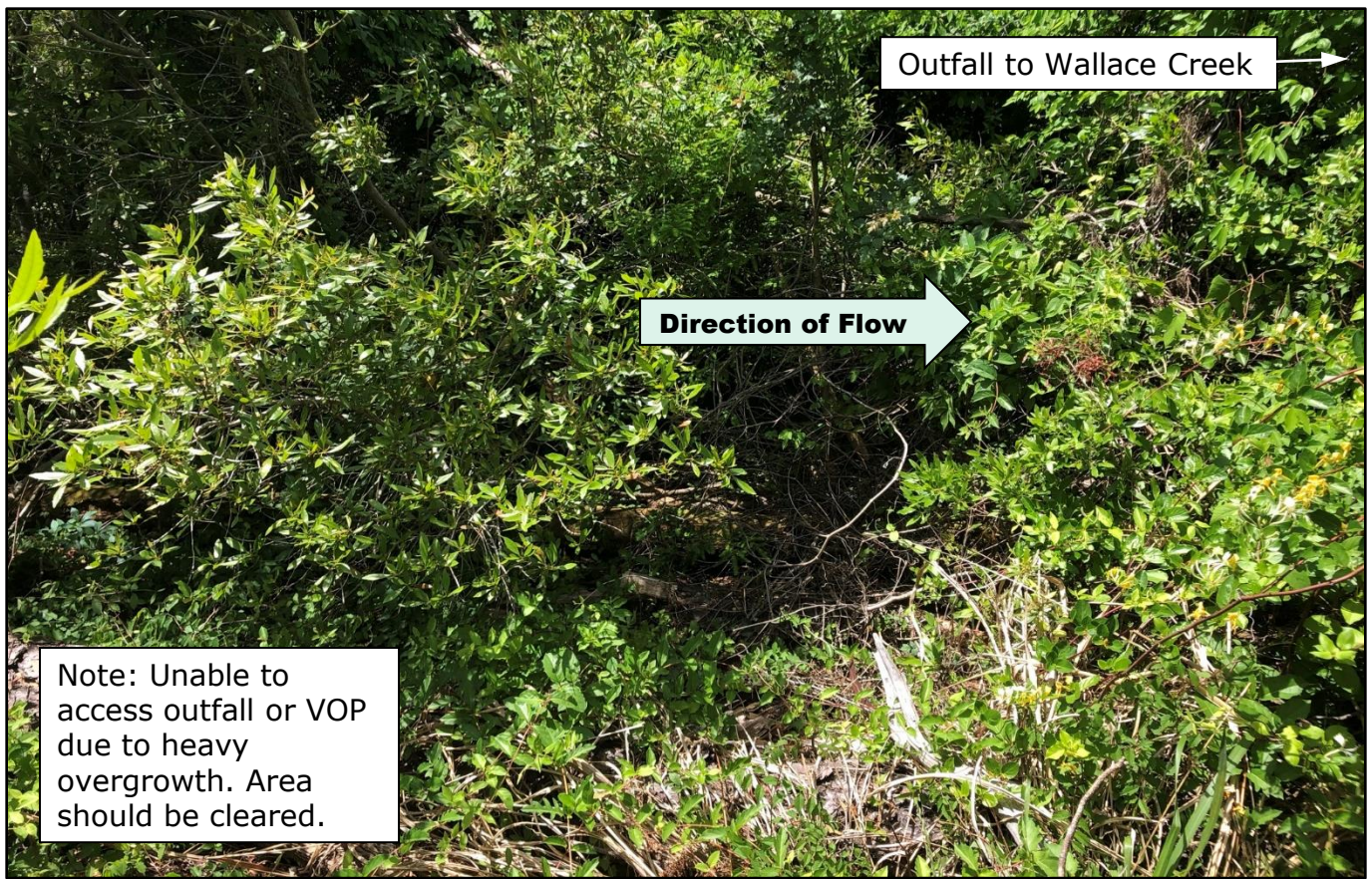
Table 5-10 Old Hospital VOP

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OOH-008	930275.97	12597567.05	Install VOP marker (newly added VOP) and clear area of heavy overgrowth.

1) UTM geographic coordinate system, NAD83.



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5.10 RIFLE RANGE (RR)

This section provides mapping and photos of VOPs located in the Rifle Range area. Table 5-11 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-11 Rifle Range VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
ORR-001	902992.07	12567125.49	Replace missing VOP marker.
ORR-003	905964.93	12567892.76	-
ORR-012	903756.42	12562575.28	-
ORR-013	902786.53	12566108.30	Install VOP marker in new location at SWP93 (stormwater treatment facility).
ORR-014	902532.10	12567632.22	Replace missing VOP marker.

1) UTM geographic coordinate system, NAD83.

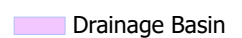
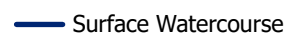


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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend



0 100 200
 Feet



Visual Observation Points
Outfall No. ORR-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-146





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

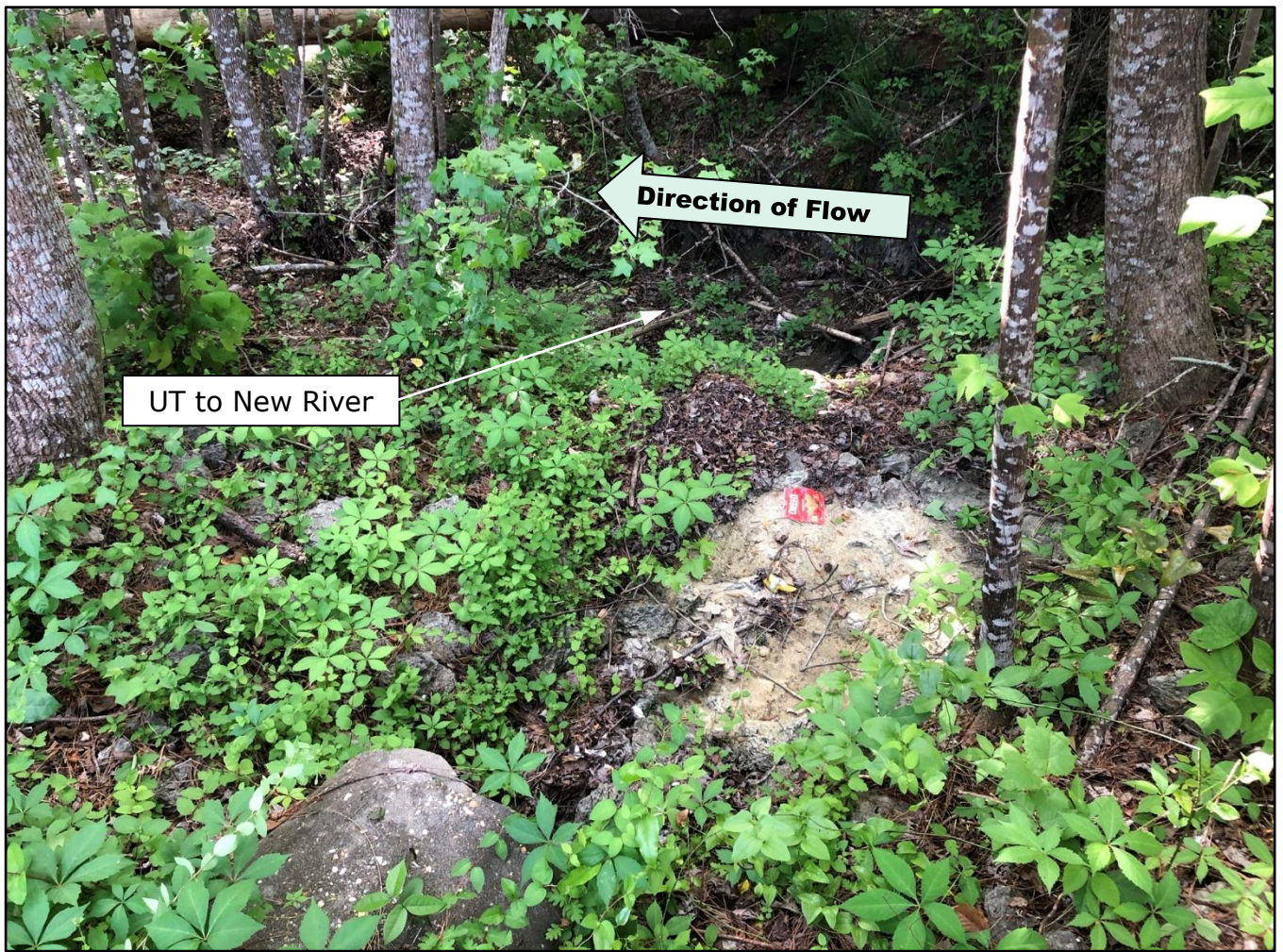
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. ORR-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-148



Visual Observation Points
Outfall No. ORR-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-149



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

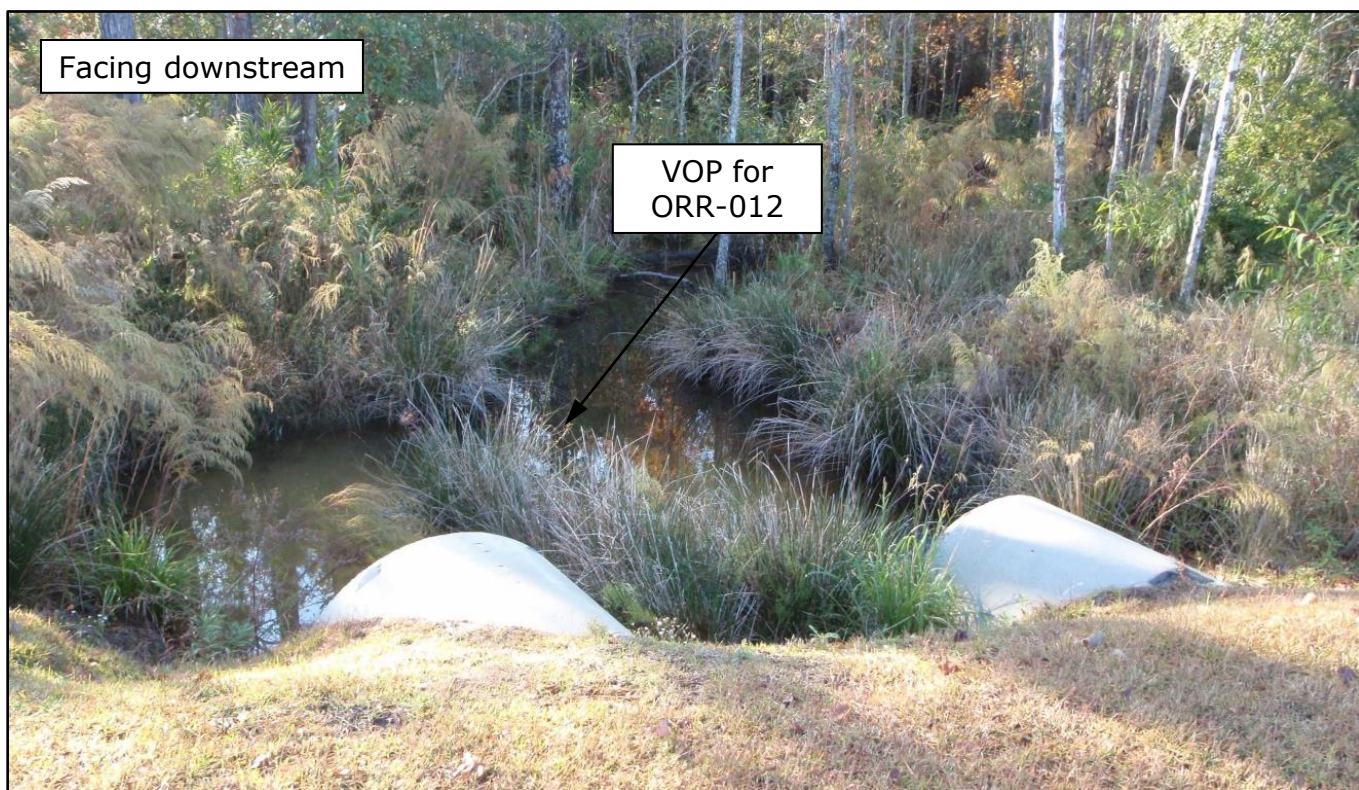
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 Feet

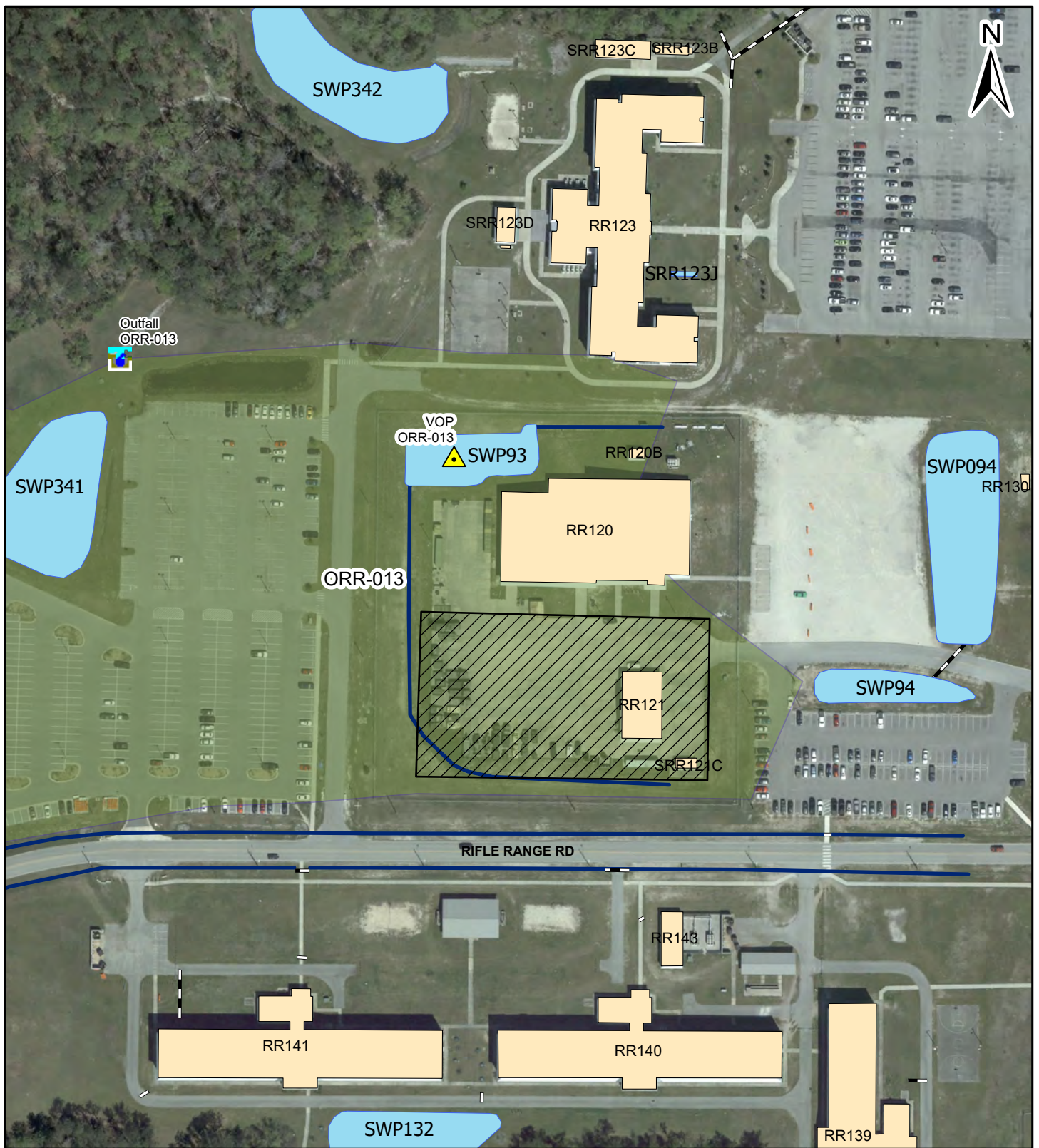
Legend



Visual Observation Points
Outfall No. ORR-012
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-150





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

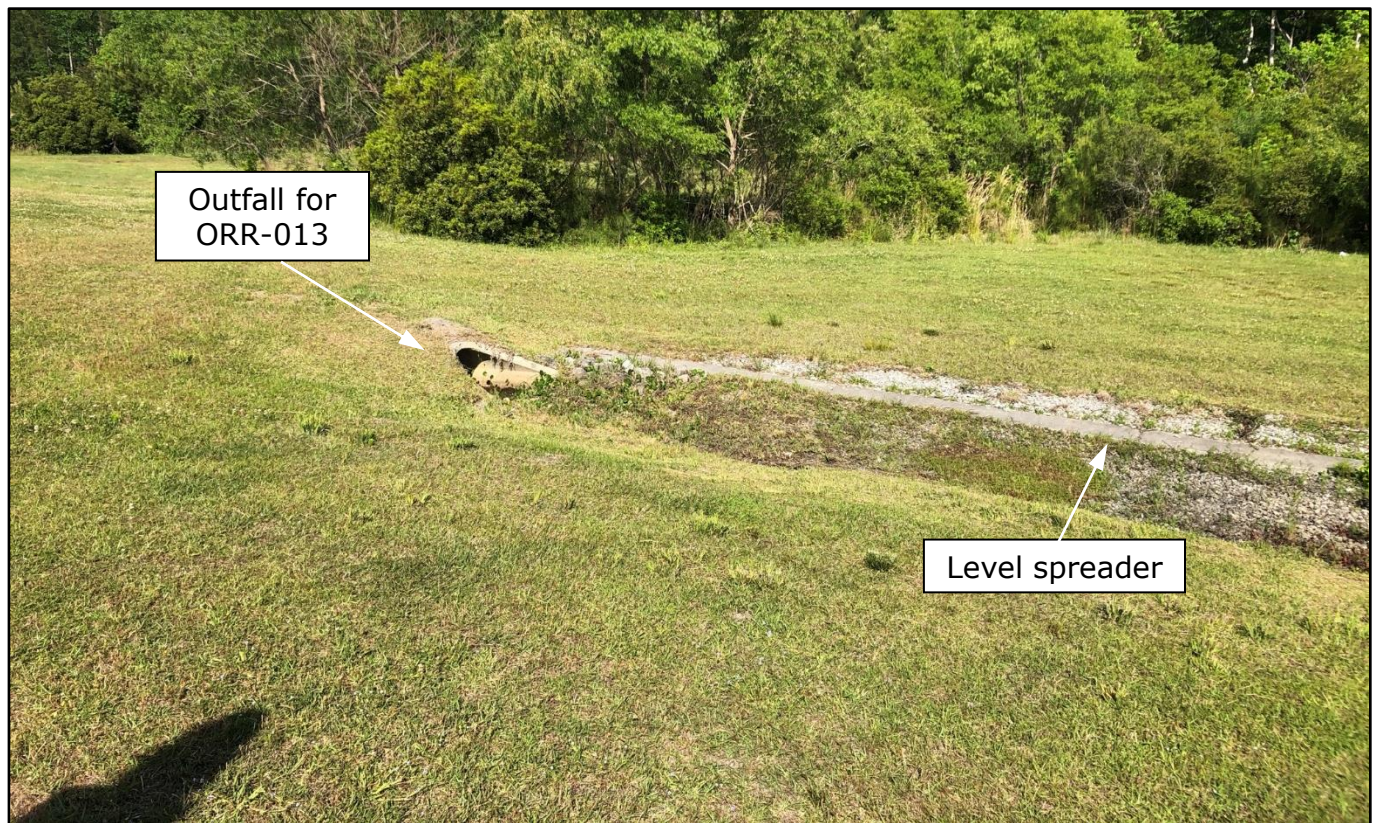
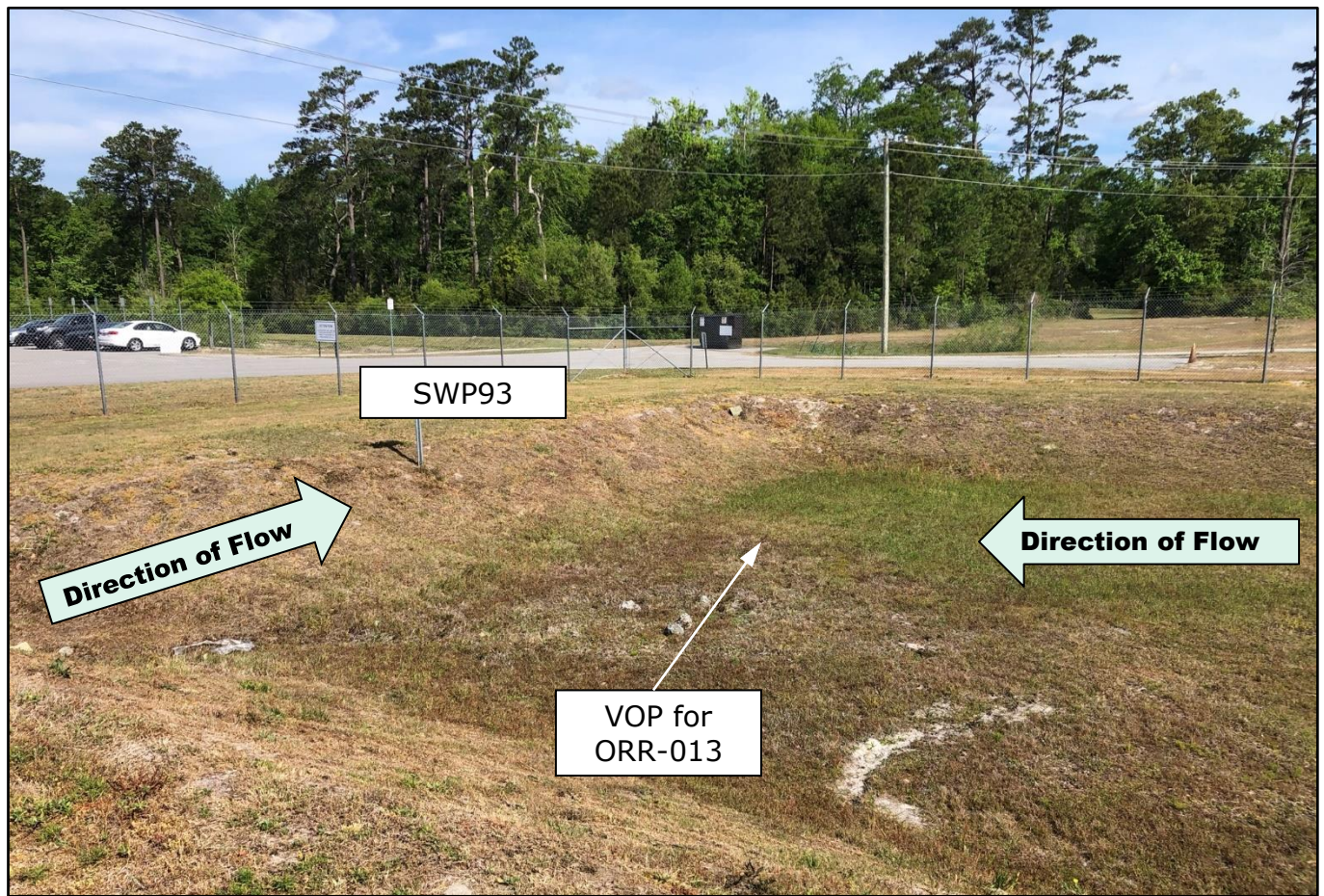
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. ORR-013
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

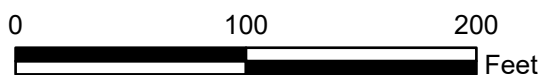
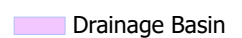
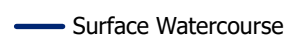
Figure
 5-152





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

Legend



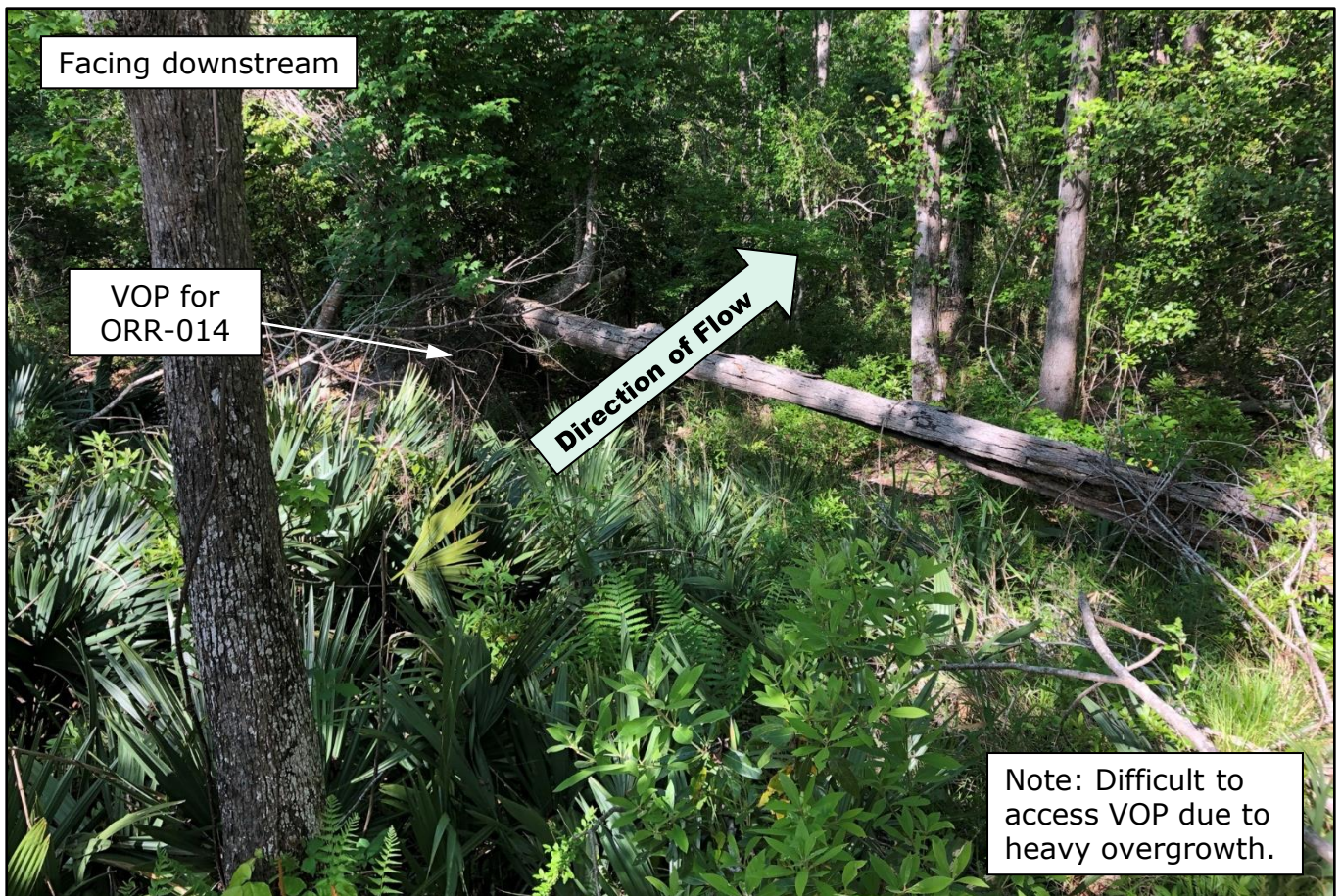
Visual Observation Points
Outfall No. ORR-014
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-154

Facing upstream



Facing downstream



Visual Observation Points
Outfall No. ORR-014
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-155



5.11 SANDY RUN (SR)

This section provides mapping and photos of the VOP located in the Sandy Run area. Table 5-12 gives the x- and y-coordinates of this VOP along with comments and recommendations made during field observation.

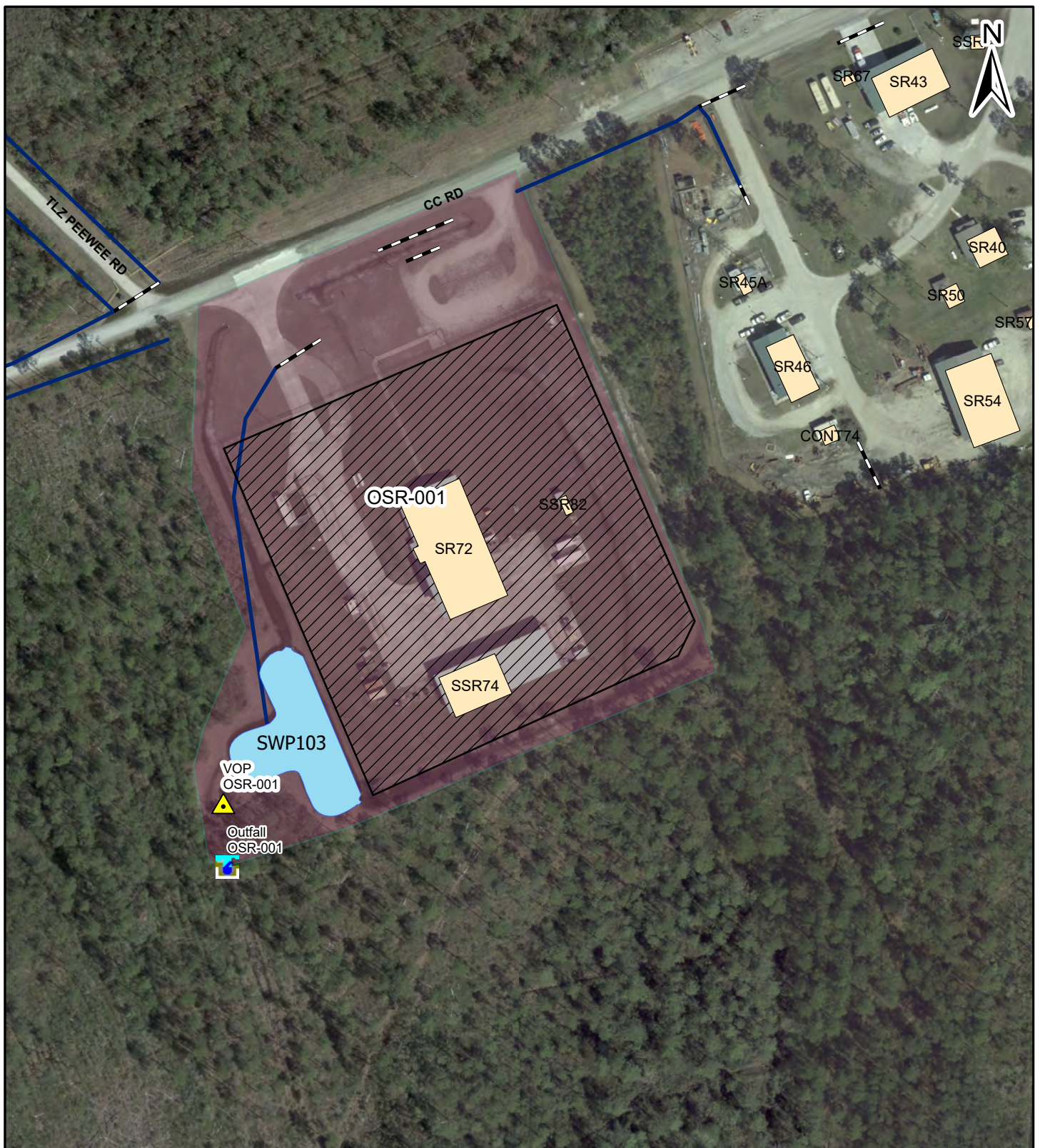
Table 5-12 Sandy Run VOP

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OSR-001	891151.33	12574254.30	-

1) UTM geographic coordinate system, NAD83.



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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



VOP



Analytical/VOP



Stormwater Outfall



Stormwater BMP



Building



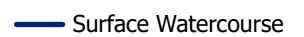
Facility Boundary



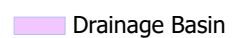
Catch Basin



Storm Sewer Pipe



Surface Watercourse



Drainage Basin



Visual Observation Points
Outfall No. OSR-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-156



Visual Observation Points
Outfall No. OSR-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-157



5.12 CAMP GEIGER (TC)

This section provides mapping and photos of VOPs located in the Camp Geiger area. Table 5-13 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

Table 5-13 Camp Geiger VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OTC-002	903382.97	12621300.14	Install VOP marker (newly added VOP).
OTC-002B	902261.80	12621285.83	Install VOP marker (newly added VOP).
OTC-004A	904922.73	12618970.49	Install VOP marker (newly added VOP).
OTC-004B	904915.72	12618467.94	Install VOP marker (newly added VOP).
OTC-005	903921.51	12618303.66	-

1) UTM geographic coordinate system, NAD83.



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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend

▲ VOP

▲ Analytical/VOP

■ Stormwater Outfall

■ Stormwater BMP

■ Building

■ Facility Boundary

■ Catch Basin

■ Storm Sewer Pipe

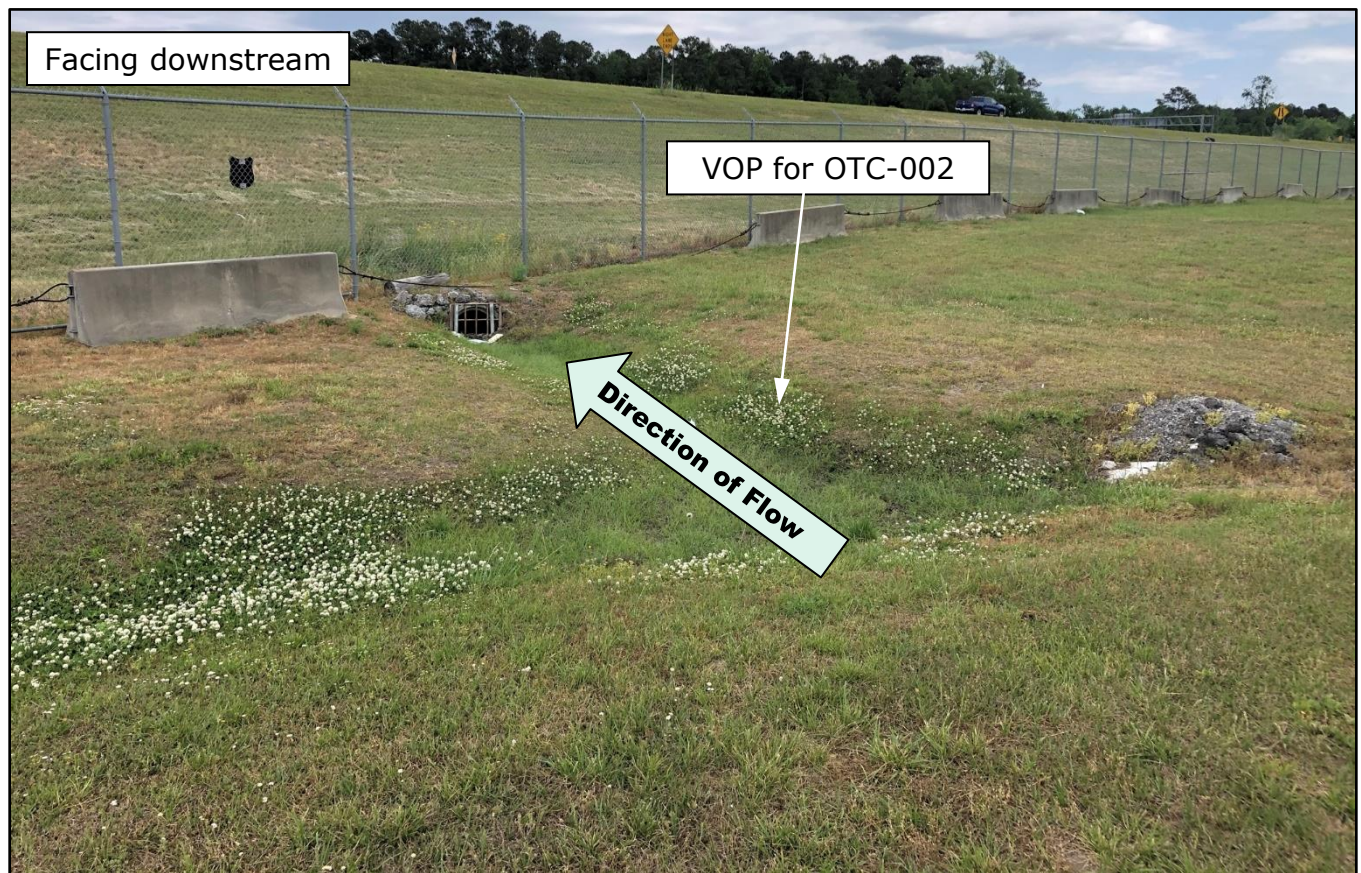
— Surface Watercourse

■ Drainage Basin



Visual Observation Points
Outfall No. OTC-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-158





Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

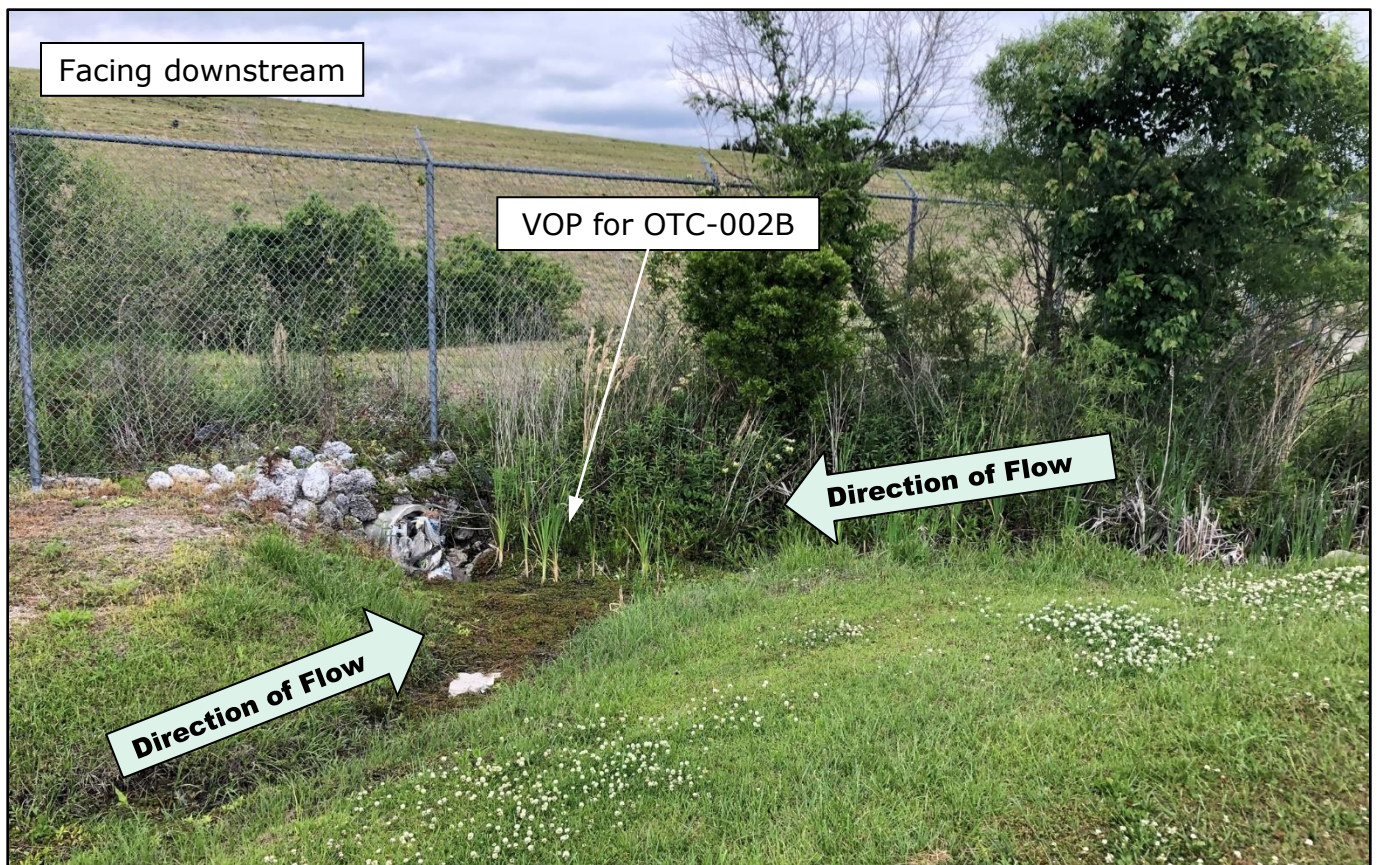
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OTC-002B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-160



Visual Observation Points
Outfall No. OTC-002B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend

- | | | |
|--------------------|-------------------|---------------------|
| VOP | Building | Surface Watercourse |
| Analytical/VOP | Facility Boundary | Drainage Basin |
| Stormwater Outfall | Catch Basin | |
| Stormwater BMP | Storm Sewer Pipe | |

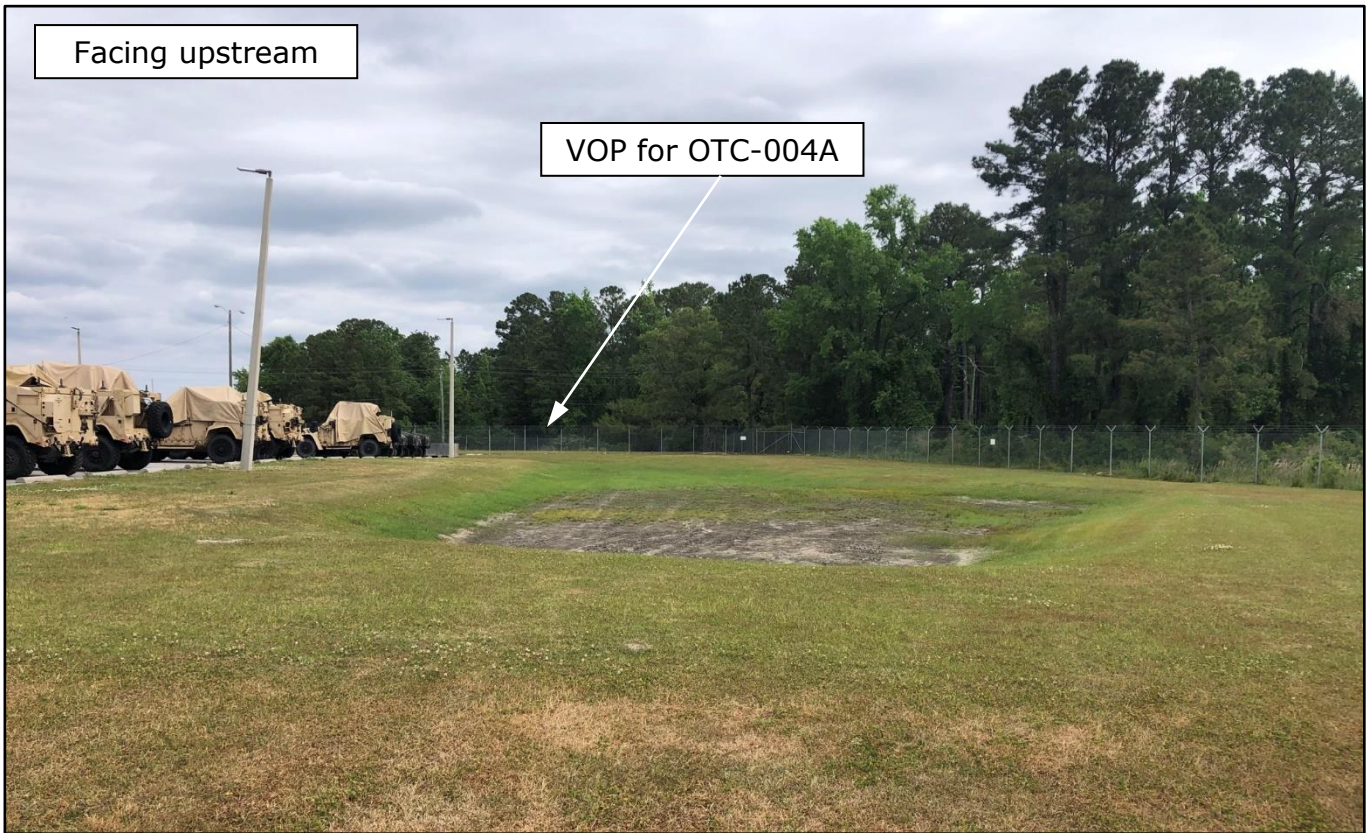


Visual Observation Points
Outfall No. OTC-004
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-162

Facing upstream

VOP for OTC-004A



Facing downstream

VOP for OTC-004A

Direction of Flow



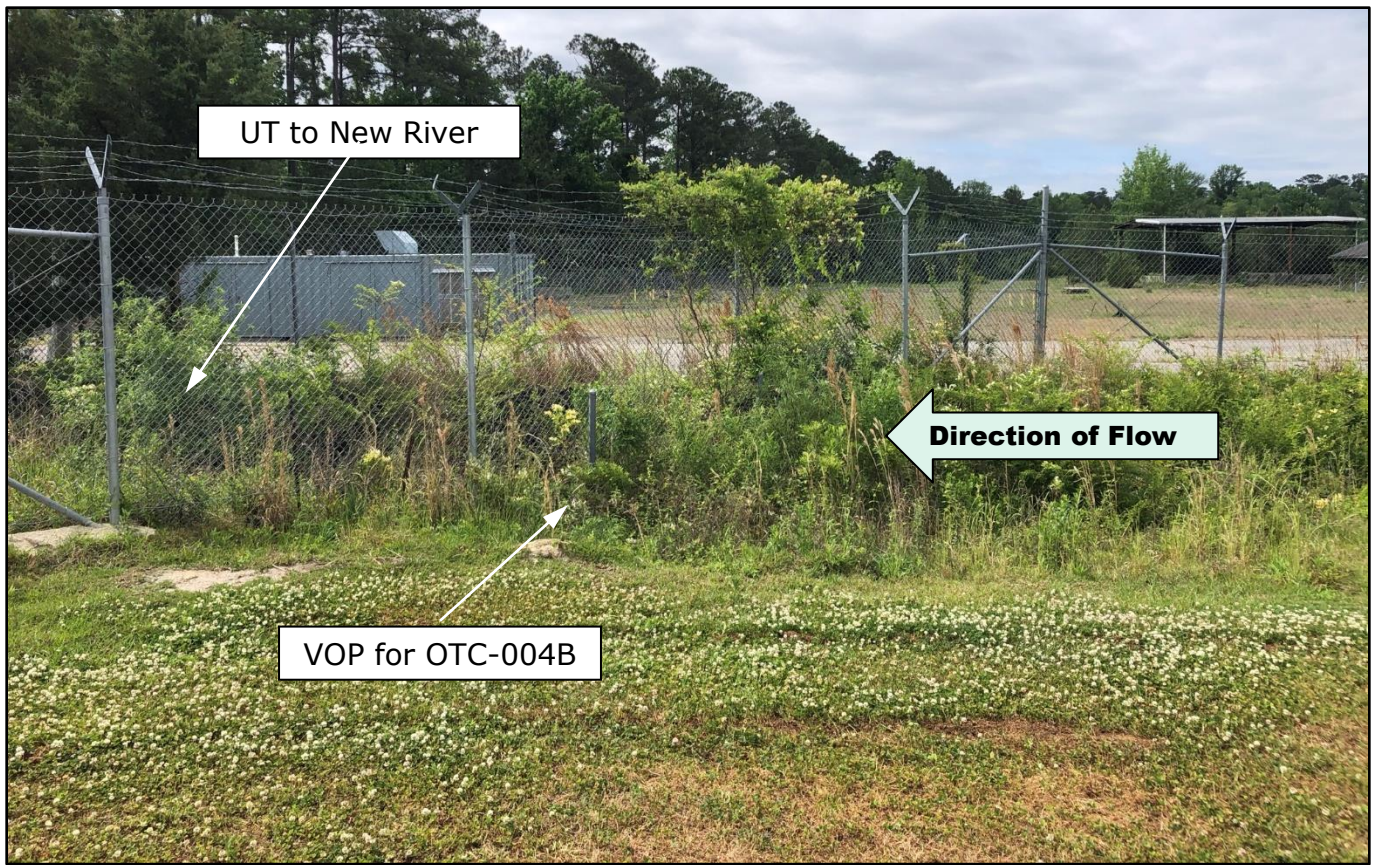
Visual Observation Points
Outfall No. OTC-004A
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-163

Facing upstream

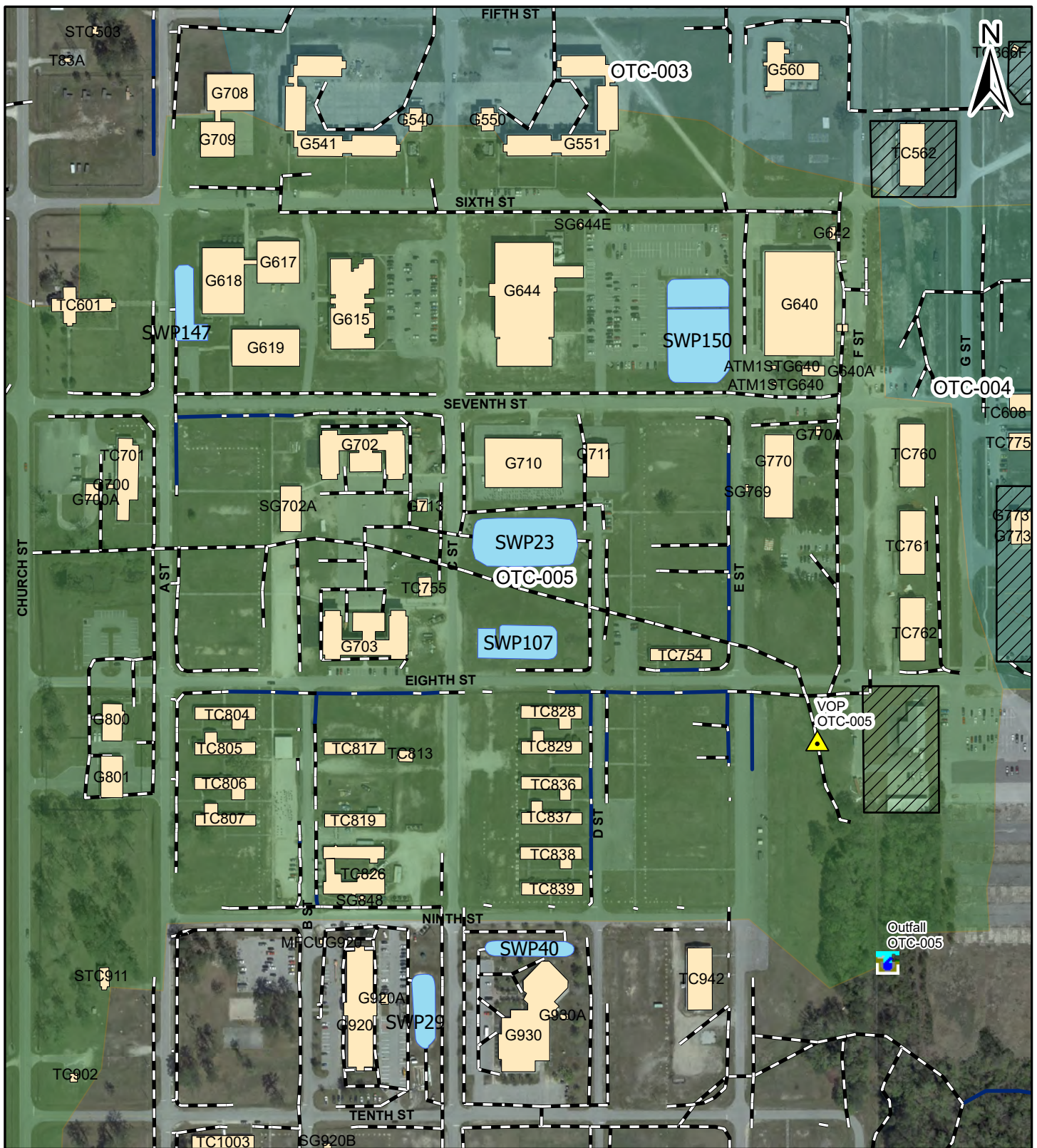


UT to New River



Visual Observation Points
Outfall No. OTC-004B
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

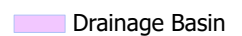
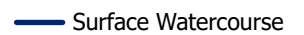
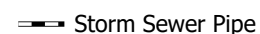
Figure
5-164



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200 400
 Feet

Legend



Visual Observation Points
Outfall No. OTC-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-165



Visual Observation Points
Outfall No. OTC-005
Stormwater Outfall Monitoring Plan
Marine Corps Base Camp Lejeune, North Carolina

Figure
5-166



5.13 WALLACE CREEK (WC)

This section provides mapping and photos of VOPs located in the Wallace Creek area. Table 5-14 gives the x- and y-coordinates of these VOPs along with comments and recommendations made during field observation.

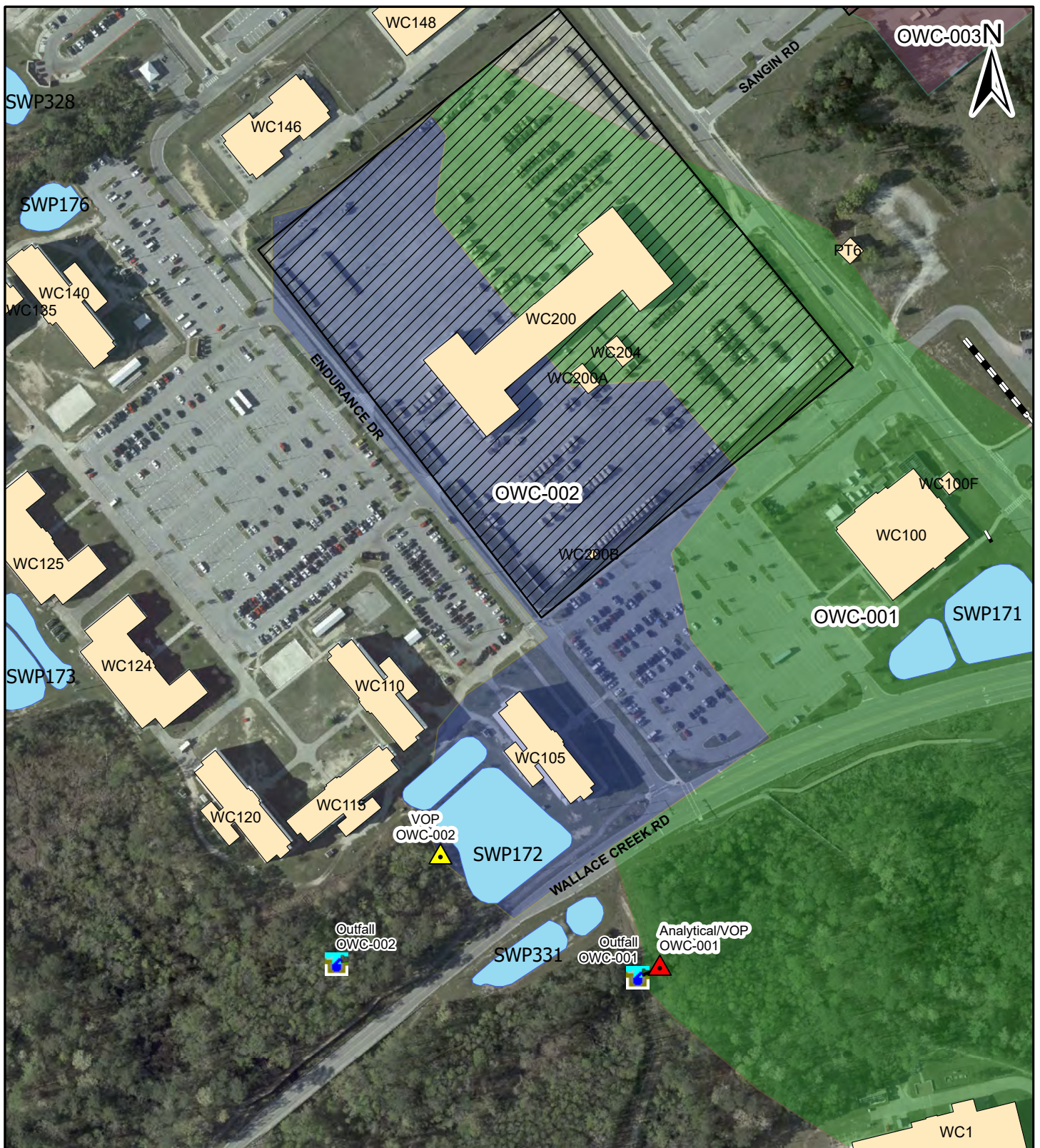
Table 5-14 Wallace Creek VOPs

VOP	X-coordinate ¹ (feet)	Y-coordinate ¹ (feet)	Comments/Recommendations
OWC-002	934554.25	12598527.31	-
OWC-003	935990.61	12600358.81	-
OWC-004	937309.49	12603306.42	Install VOP marker (newly added VOP).
OWC-005A	938315.91	12602847.54	Install VOP marker (newly added VOP).
OWC-005B	938318.15	12602702.73	Install VOP marker (newly added VOP).
OWF-001	939898.16	12606532.34	

1) UTM geographic coordinate system, NAD83.



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Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

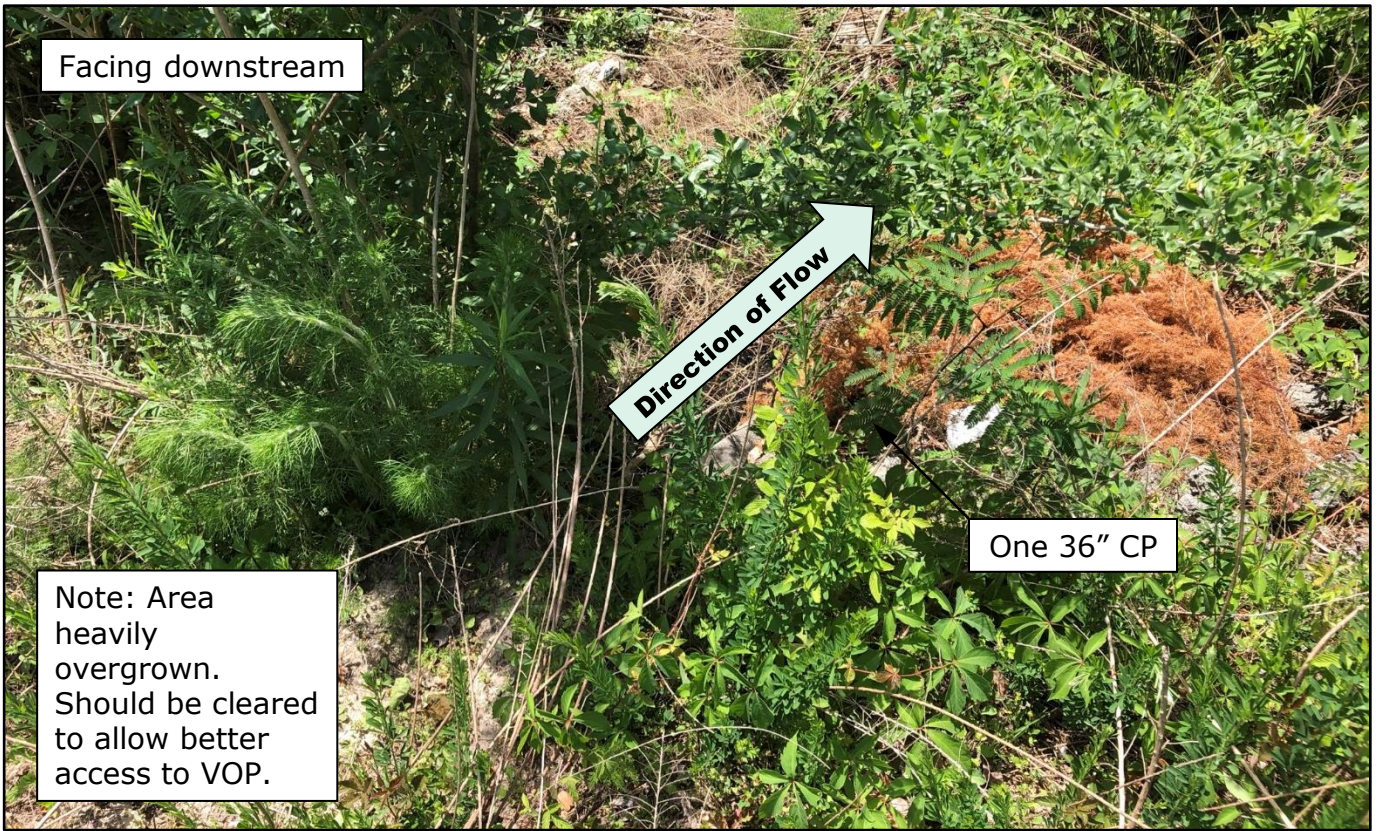
0 100 200
 Feet

Legend



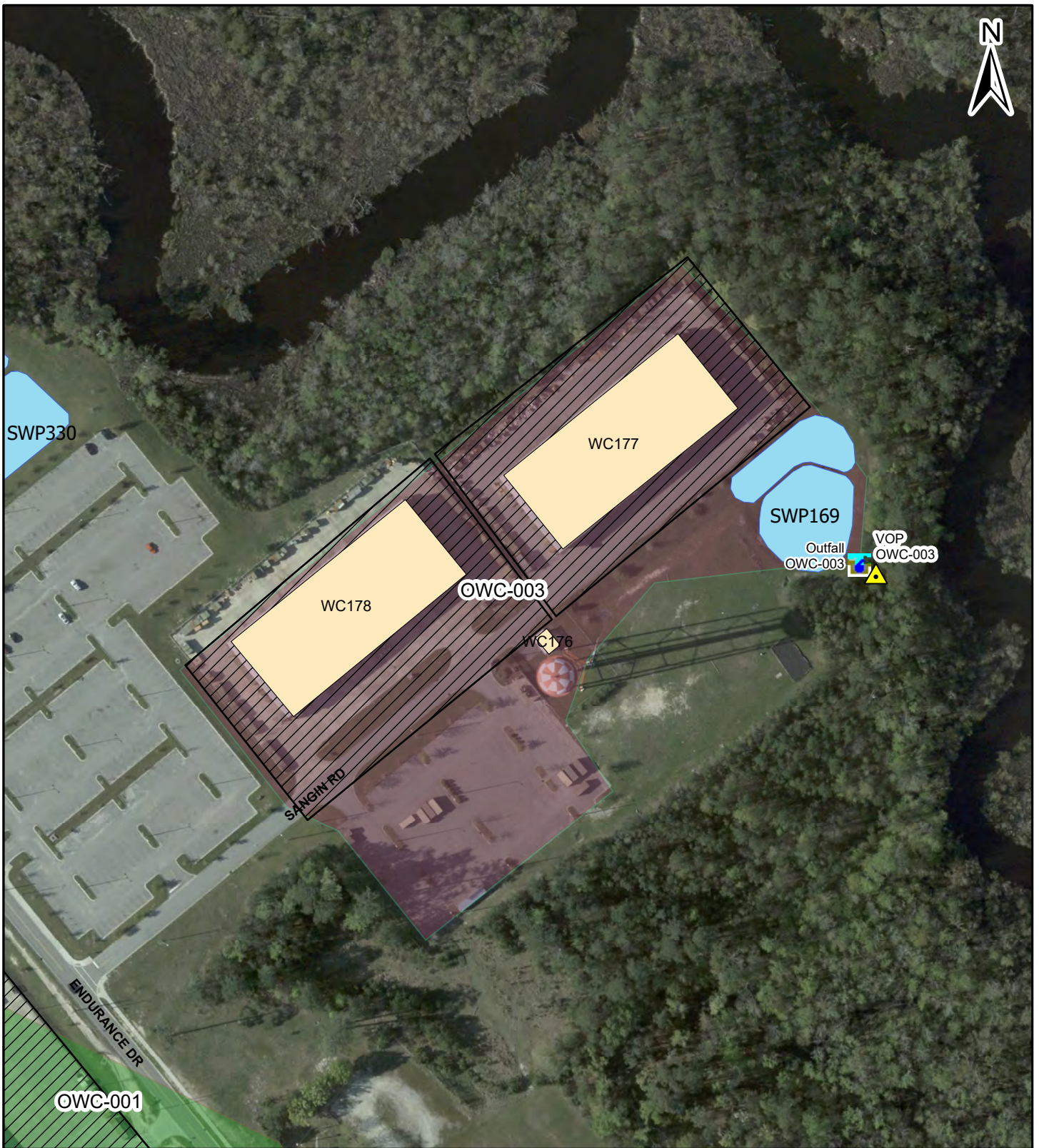
Visual Observation Points
Outfall No. OWC-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-167



Visual Observation Points
Outfall No. OWC-002
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

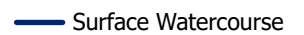
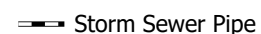
Figure
5-168



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

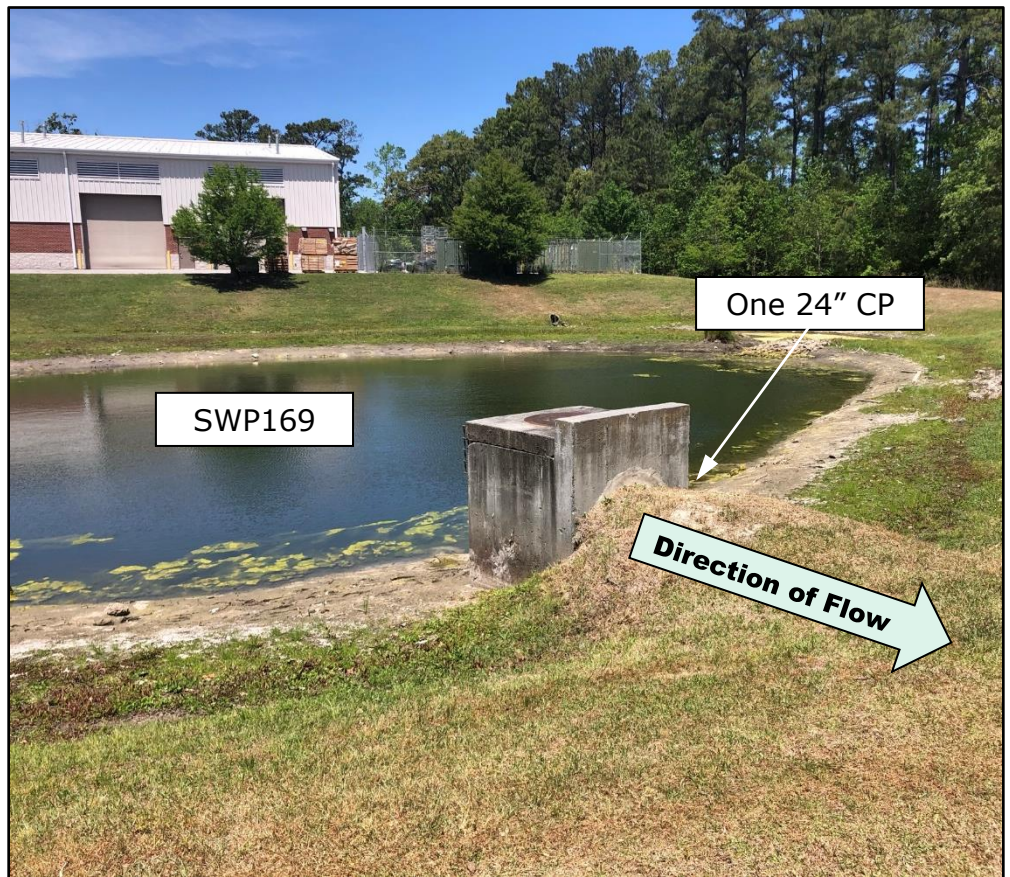
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OWC-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-169



Visual Observation Points
Outfall No. OWC-003
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

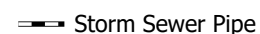
Figure
 5-170



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

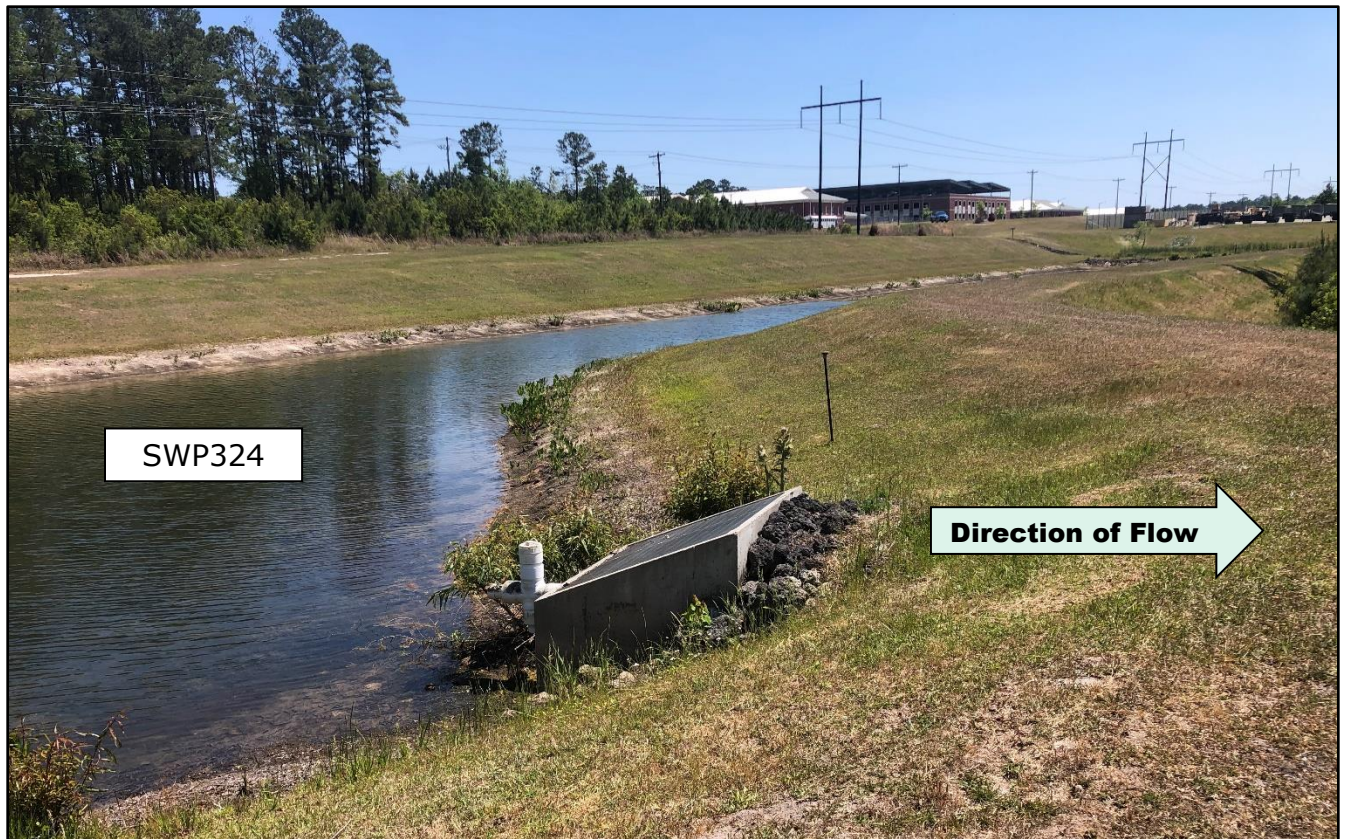
0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OWC-004
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-171

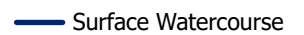




Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

0 100 200
 Feet

Legend



Visual Observation Points
Outfall No. OWC-005
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

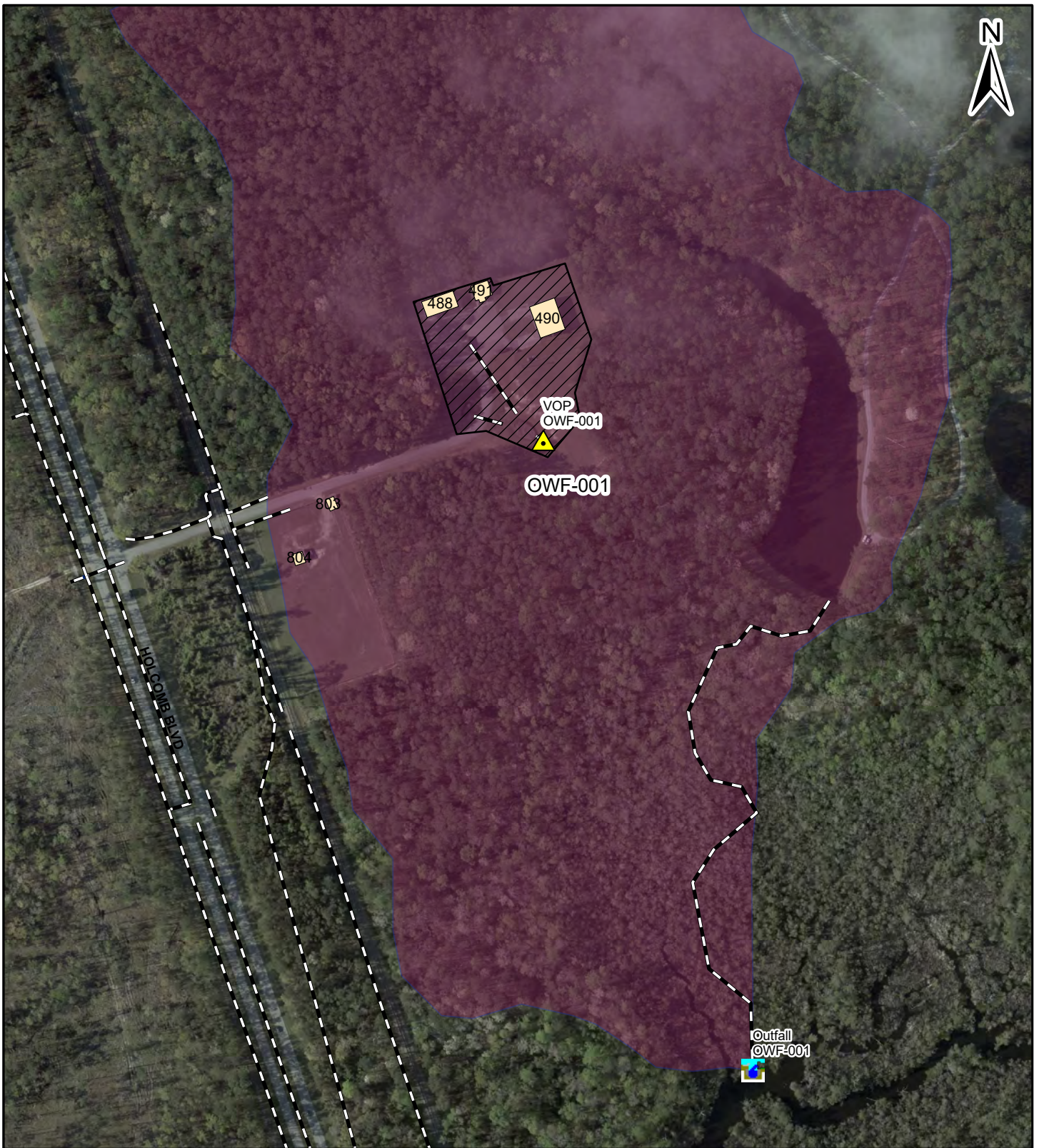
Figure
 5-173





Visual Observation Points
Outfall No. OWC-005B
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

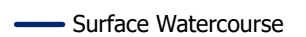
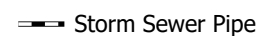
Figure
5-175



Source: AH, MCBCL, Esri
 AH Project Number: 134-031
 Contract Number: N62470-19-D-4001
 Date: 6/7/2021
 By: CJM

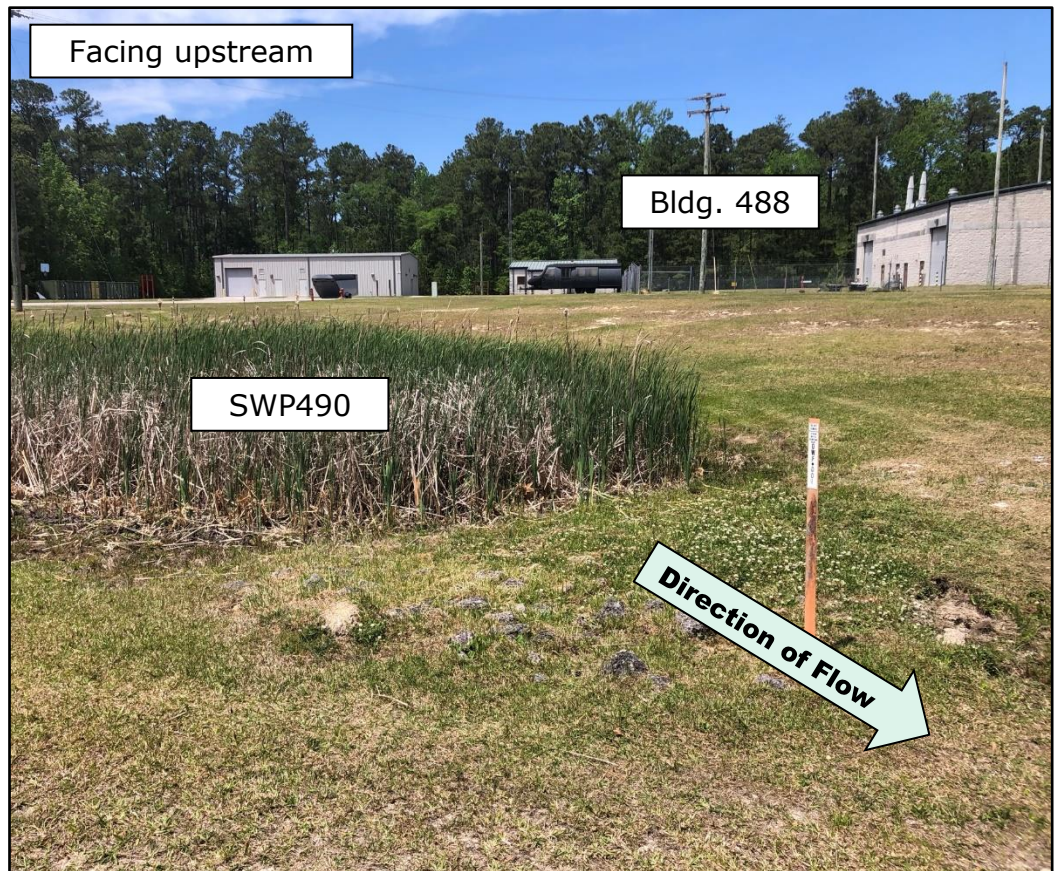
0 100 200 400
 Feet

Legend



Visual Observation Points
Outfall No. OWF-001
Stormwater Outfall Monitoring Plan
 Marine Corps Base Camp Lejeune, North Carolina

Figure
 5-176





6. REFERENCES AND WORKS CONSULTED

AH Environmental Consultants, Inc., *Stormwater Pollution Prevention Plan for MCIEAST-MCB CAMLEJ*, June 2021.

AH Environmental Consultants, Inc., *Stormwater Outfall Monitoring Plan for MCIEAST-MCIEAST-MCB CAMLEJ*, June 2013.

"EPA Administered Permit Programs: The National Pollutant Discharge Elimination System." *Code of Federal Regulations* Title 40, Pt. 122.26(b)(14).

North Carolina Department of Environmental Quality., *National Pollutant Discharge Elimination System Permit Number NCS000290*, April 2021.

Schueler, Thomas R., *Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs*, published by the Metropolitan Washington Council of Governments, 1987.

United States Environmental Protection Agency, Office of Management Information and Support Services, *Health and Safety Requirements for Employees Engaged in Field Activities (EPA Order 1440.2)*, July 1981.

United States Environmental Protection Agency, Office of Water, *NPDES Stormwater Sampling Guidance Document (EPA Document 833-8-92-001)*, July 1992.



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APPENDIX A

NPDES Permit Number NCS000290

**STATE of NORTH CAROLINA
DEPARTMENT of ENVIRONMENT QUALITY
DIVISION of ENERGY, MINERAL, and LAND RESOURCES**

**PERMIT NO. NCS000290
TO DISCHARGE STORMWATER UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with applicable law, including the regulations promulgated and adopted by the North Carolina Environmental Management Commission, and the Federal Water Pollution Control Act, as amended,

United States Marine Corps

is hereby authorized to discharge stormwater and continue operation of oil water separators not associated with wastewater discharges from facilities located at:

Marine Corp Base Camp Lejeune and Marine Corps Air Station New River
herein referred to as Camp LeJeune
Onslow County

to receiving waters designated as Bear Creek (SB, NSW), Beaverdam Creek (SB, NSW), Cogdels Creek (SC, NSW), New River (SC, HQW, NSW, SC, NSW, SA), Wallace Creek (SB, NSW), Frenchs Creek (SC, NSW), Edwards Creek (SC, NSW), Strawhorn Creek (SC, NSW), Stick Creek (SC, HQW, NSW), Southwest Creek (C, NSW), Courthouse Bay (SA), Stones Creek (SA), Brinson Creek (SC, NSW), Northeast Creek (SC, HQW, NSW), Scales Creek (SC, HQW, NSW), Wilson Bay (SC, HQW, NSW), Mott Creek (C, NSW), Morgan Bay (SC, NSW), and Farnell Bay (SC, NSW) in the White Oak River Basin in accordance with the discharge limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, IV, V, VI, VII and VIII hereof.

This permit shall become effective April 1, 2021.

This permit shall expire at midnight on September 30, 2021.

Signed this day March 31, 2021..



for Brian Wrenn, Director
Division of Energy, Mineral, and Land Resources
By the Authority of the Environmental Management Commission

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PART I PERMIT COVERAGE

1. During the period beginning on the effective date of the permit and lasting until expiration, Marine Corp Base Camp Lejeune and Marine Corps Air Station New River herein referred to as Camp LeJeune, is authorized to discharge stormwater from the storm drainage system and continue operation of oil water separators not associated with wastewater discharges to receiving waters designated as Bear Creek (SB, NSW), Beaverdam Creek (SB, NSW), Cogdels Creek (SC, NSW), New River (SC, HQW, NSW, SC, NSW, SA), Wallace Creek (SB, NSW), Frenchs Creek (SC, NSW), Edwards Creek (SC, NSW), Strawhorn Creek (SC, NSW), Stick Creek (SC, HQW, NSW), Southwest Creek (C, NSW), Courthouse Bay (SA), Stones Creek (SA), Brinson Creek (SC, NSW), Northeast Creek (SC, HQW, NSW), Scales Creek (SC, HQW, NSW), Wilson Bay (SC, HQW, NSW), Mott Creek (C, NSW), Morgan Bay (SC, NSW), and Farnell Bay (SC, NSW) in the White Oak River Basin. Such discharge will be controlled, limited and monitored in accordance with Camp LeJeune's Comprehensive Stormwater Management Program Plan, herein referred to as the Stormwater Plan. The Stormwater Plan must detail Camp LeJeune's stormwater management program for the five-year term of the stormwater permit including, for each of the measure identified in the permit, a narrative description of the program, a table that identifies each best management practice (BMP) used, the frequency of the BMP, the measurable goals for each BMP, the implementation schedule, funding and the responsible person or position for implementation, title and responsibilities for implementing this permit. If major modifications are proposed to the Stormwater Plan, the Division will be notified of the reasons and justifications for these changes. The Division may comment on these changes as deemed necessary to assure appropriate implementation of the Stormwater Plan. No provisions of this permit shall be interpreted as or constitute a commitment that Camp LeJeune will obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. Section 1341.
2. All discharges authorized herein shall be lawfully managed in accordance with the terms and conditions of this permit. Any other point source discharge to surface waters of the state is prohibited unless it is an allowable non-stormwater discharge or is covered by another permit, authorization, or approval.
3. This permit does not relieve Camp LeJeune from responsibility for compliance with any other applicable federal, state, or local law, rule, standard, ordinance, order, judgment, or decree.
4. This permit covers current and future activities associated with the discharge of stormwater from the Camp LeJeune.
5. Under the authority of Section 402(p) of the Clean Water Act and implementing regulations 40 CFR Part 122, 123 and 124, North Carolina General Statutes 143-215.1 and Session Law 2006-246 and in accordance with the approved Stormwater Plan, all provisions contained and referenced in the Stormwater Plan are enforceable parts of this permit. Camp LeJeune will develop and implement its approved Stormwater Plan in accordance with Section 402(p)(3)(B) of the Clean Water Act, provisions outlined by the Director, and the provisions of this permit.
6. The permit requires the development and proper implementation of the Stormwater Plan. The purpose of the Stormwater Plan is to reduce the discharge of pollutants from Camp LeJeune to the maximum extent practicable, to protect water quality, and to satisfy the applicable water quality requirements of the Clean Water Act. Implementation of best management practices consistent with the provisions of the Stormwater Plan constitutes compliance with the standard of reducing

pollutants to the maximum extent practicable. Successive iterations of the Stormwater Plan and other components of this permit will be driven by the objective of assuring that discharges do not cause or contribute to the violation of water quality standards, through the expansion and tailoring of management measures within the scope of the Stormwater Plan.

7. The permit authorizes the point source discharge of stormwater runoff from Camp LeJeune. In addition, discharges of non-stormwater are also authorized through the MS4 if such discharges are:
- (a) Permitted by, and in compliance with, another NPDES discharge permit including discharges of process and non-process wastewater, and stormwater associated with industrial activity; or
 - (b) Determined to be incidental non-stormwater flows that do not significantly impact water quality and may include:
 - water line flushing;
 - landscape irrigation;
 - diverted stream flows;
 - rising groundwaters;
 - uncontaminated groundwater infiltration;
 - uncontaminated pumped groundwater;
 - discharges from potable water sources;
 - foundation drains;
 - air conditioning condensate (commercial/residential);
 - irrigation waters;
 - springs;
 - water from crawl space pumps;
 - footing drains;
 - lawn watering;
 - residential and charity car washing;
 - flows from riparian habitats and wetlands;
 - dechlorinated swimming pool discharges;
 - street wash water;
 - flows from emergency fire fighting;
 - releases of clean waters from hydrostatic testing; and
 - drainage of uncontaminated stormwater from secondary containment after visual monitoring.

The Division may require that non-stormwater flows of this type be controlled by Camp LeJeune's Stormwater Plan.

PART II FINAL LIMITATIONS AND CONTROLS FOR PERMITTED DISCHARGES

SECTION A: PROGRAM IMPLEMENTATION

Camp LeJeune will implement, manage and oversee all provisions of its Stormwater Plan to reduce pollutants discharged from Camp LeJeune. This includes, but is not limited to, the following areas:

1. Camp LeJeune will develop and maintain a Stormwater Plan with the authority to implement all provisions of the Stormwater Plan. Camp LeJeune, will keep the Division advised of the status of development of appropriate authorities and will pursue these authorities in accordance with the schedule outlined in the Stormwater Plan. **If major modifications are proposed to the Stormwater Plan, the Division will be notified the reasons and justifications for those changes. The Division may comment on modifications as deemed necessary to assure appropriate implementation of the Stormwater Plan.**
2. Camp LeJeune's Stormwater Plan will be implemented and managed such that the discharge of pollutants from Camp LeJeune is reduced to the maximum extent practicable. It is anticipated that in order to meet this provision, implementation of the Stormwater Plan will occur with emphasis given to priority areas and to management measures and programs that are most effective and efficient at varying stages of the plan's implementation.
3. Camp LeJeune will maintain adequate funding and staffing to implement and manage the provisions of the Stormwater Plan.
4. Camp LeJeune will implement programs to address the contribution of pollutants to the storm drainage system from industrial areas including planning, monitoring, education, and operation and maintenance activities.
5. Camp LeJeune will implement the components of the Stormwater Plan to prohibit, to the maximum extent practicable, illicit connections, spills and illegal dumping.
6. Camp LeJeune will implement provisions of the Stormwater Plan as appropriate to monitor and assess the performance of the various management measures that are a part of the Stormwater Plan and of this permit.
7. Camp LeJeune will implement appropriate education, training, outreach, and public involvement programs to support the objectives of this stormwater discharge permit and the Stormwater Plan.
8. Camp LeJeune will implement a program to reduce pollution from construction site runoff as described in the Stormwater Plan and in accordance with this permit.
9. Camp LeJeune will implement a monitoring program as described herein. Monitoring will be used to assess the effectiveness of program components and modify program components as necessary.

SECTION B: PUBLIC EDUCATION AND OUTREACH

1. Objectives for Public Education and Outreach

Distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on water bodies and the steps that the public can take to reduce pollutants in storm water runoff.

2. BMPs for Public Education and Outreach

Camp LeJeune shall implement the following BMPs to meet the objectives of the Public Education and Outreach Program.

BMP	Measurable Goals
(a) Goals and Objectives	Camp LeJeune shall define the goals and objectives of the Bases Public Education and Outreach Program based on at least three high priority community wide issues.
(b) Identify target pollutants and/or stressors	Camp LeJeune shall identify and maintain a description of the target pollutants and/or stressors and likely sources.
(c) Identify target audiences	Camp LeJeune shall identify, assess annually and update as necessary target audiences likely to have significant storm water impacts and why they were selected.
(d) Identify residential and industrial/commercial issues	Camp LeJeune shall identify and describe issues, such as specific pollutants, the sources of those pollutants, impacts on biology, and the physical attributes of stormwater runoff, in their education/outreach program. A minimum of three residential and three industrial/commercial issues should be targeted as part of the education/outreach program.
(e) Identify and describe watersheds in need of protection and the issues that may threaten the quality of these waters	Where applicable, the education/outreach program shall identify and describe watersheds in need of protection and the issues that may threaten the quality of these waters.
(f) Informational Web Site	Camp LeJeune shall promote, maintain, assess and update as necessary internet web site.
(g) Distribute public education materials to identified target audiences and user groups. For example, schools, homeowners, and/or businesses.	Camp LeJeune shall distribute, assess and update as necessary stormwater educational material to appropriate target groups in such a way that is designed to convey the program's message to the target audience each year. Instead of developing its own materials, Camp LeJeune may rely on Public Education and Outreach materials supplied by the state, and/or other entities through a cooperative agreement, as available, when implementing its own program.

BMP	Measurable Goals
(h) Maintain Hotline/Help line	Camp LeJeune shall promote and maintain a stormwater hotline/helpline. Camp LeJeune may utilize an existing hotline/helpline so long as it also promotes for stormwater concerns or may train staff to transfer calls to the stormwater administrator.
(i) Implement a Public Education and Outreach Program.	Camp LeJeune's outreach program shall include a combination of approaches that are effective at reaching the identified target audiences based on data and information collected by Camp LeJeune. For each media, event or activity, including those elements implemented locally or through a cooperative agreement measure and record the extent of exposure.

SECTION C: PUBLIC INVOLVEMENT AND PARTICIPATION

1. Objectives for Public Involvement and Participation

Comply with State and local public notice requirements when implementing a public involvement and participation program.

2. BMPs for Public Involvement and Participation

Camp LeJeune shall implement the following BMPs to meet the objectives of the Public Involvement and Participation.

BMP	Measurable Goals
a. Allow the public an opportunity to review and comment on the Stormwater Plan	Camp LeJeune shall conduct at least one public meeting during the term of the permit to allow the public an opportunity to review and comment on the Stormwater Plan.
b. Volunteer community involvement program	Camp LeJeune shall include and promote volunteer opportunities as part of its stormwater program designed to promote ongoing participation.
c. Mechanism for Public involvement	Camp LeJeune shall provide and promote a mechanism for public involvement that provides for input on stormwater issues and the stormwater program. Camp LeJeune may establish a stand-alone group or utilize an existing group or processes.
d. Hotline/Help line	Camp LeJeune shall promote and maintain hotline/helpline. Camp LeJeune may utilize an existing hotline/helpline so long as it also promotes stormwater concerns or may train staff to transfer calls to the stormwater administrator.

SECTION D: ILLICIT DISCHARGE DETECTION AND ELIMINATION

1. Objectives for Illicit Discharge Detection and Elimination

- a. Develop, implement and enforce a program to detect and eliminate illicit discharges into your small MS4.
- b. Develop and maintain a storm sewer system map, showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls;
- c. Effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions;
- d. Develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, to your system; and
- e. Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.
- f. Address the following categories of non-storm water discharges or flows (i.e., illicit discharges) only if you identify them as significant contributors of pollutants to your small MS4: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (discharges or flows from fire fighting activities are excluded from the effective prohibition against non-storm water and need only be addressed where they are identified as significant sources of pollutants to waters of the United States).

2. BMPs for Illicit Discharge Detection and Elimination

Camp LeJeune shall implement the following BMPs to meet the objectives of the Illicit Discharge Detection and Elimination Program.

BMP	Measurable Goals
a. Maintain a Storm Sewer System Base Map of Major Outfalls.	Camp LeJeune shall maintain, assess, and update as necessary a map identifying major outfalls. At a minimum, components include major outfalls and receiving streams, and type of conveyance system (i.e., either closed pipe or open drainage). For closed pipe systems identify the pipe material, shape, and size.
b. Detect dry weather flows	Camp LeJeune shall implement a program for conducting regular dry weather flow field observations for outfalls associated with industrial activities in accordance with written field screening procedure for detecting and tracing the sources of illicit discharges and for removing the sources or reporting the sources to the State to be properly permitted.

BMP	Measurable Goals
c. Investigations into the source of all identified illicit discharges.	Within the term of this permit, Camp LeJeune shall maintain, assess annually and update as necessary written procedures for conducting investigations into the source of all identified illicit discharges, including approaches to requiring such discharges to be eliminated.
d. Track investigations and document illicit discharges	Within the term of this permit, Camp LeJeune shall track all investigations and document the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.
e. Employee Training	Within the term of this permit, Camp LeJeune shall implement and document a training program for appropriate personnel, who, as part of their normal job responsibilities, may come into contact with or otherwise observe an illicit discharge or illicit connection to the storm sewer system. The training program shall identify appropriate personnel, the schedule for conducting the training and the proper procedures for reporting and responding to an illicit discharge or connection. Follow-up training must be provided as needed to address changes in personnel, procedures, or techniques.
f. Provide Public Education	Within the term of this permit, Camp LeJeune shall inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.
g. Reporting mechanism	Within the term of this permit, Camp LeJeune shall promote, publicize, and facilitate a reporting mechanism for the public and staff to report illicit discharges and establish and implement citizen request response procedures. Camp LeJeune must conduct reactive inspections in response to complaints and follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party to achieve and maintain compliance.
h. Procedures to identify and report sanitary sewer overflows.	Within the term of this permit, Camp LeJeune shall implement, assess annually, and update as necessary written procedures to identify and report sanitary sewer overflows and sewer leaks to the system operator.

SECTION E: CONSTRUCTION SITE RUNOFF CONTROLS

1. Compliance with the NCDENR Division of Land Resources Erosion and Sediment Control Program effectively meets the requirements of the Construction Site Runoff Controls. This program is authorized under the Sediment Pollution Control Act of 1973 and Chapter 4 of Title 15A of the North Carolina Administrative Code. This program includes procedures for public input, sanctions to ensure compliance, requirements for construction site operators to implement appropriate erosion and sediment control practices, review of site plans which incorporates consideration of potential water quality impacts, and procedures for site inspection and enforcement of control measures. The NCG010000 permit establishes requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.
2. Camp LeJeune must provide and promote a means for the public to notify the appropriate authorities of observed erosion and sedimentation problems. Camp LeJeune may implement a plan promoting the existence of the NCDENR, Division of Land Resources "Stop Mud" hotline to meet the requirements of this paragraph.

SECTION F: POST-CONSTRUCTION SITE RUNOFF CONTROLS

1. Objectives for Post-Construction Site Runoff Controls

- a. Develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects, including public transportation maintained by Camp LeJeune.
- b. Develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the base; and
- c. Ensure adequate long-term operation and maintenance of BMPs.

2. Post-Construction Site Runoff Controls

- a. Construction projects that are performed by, or under contract for, Camp LeJeune, including roads and bridges, must meet the requirements the stormwater management and water quality protection required by Session Law 2008-211, Sections 2.(a), 2.(b), 2.(c), 2.(d), 2.(e) and 2.(f). Roads and bridges must minimize built-upon surfaces, divert stormwater away from surface waters as much as possible and employ other best management practices to minimize water quality impacts to the maximum extent practicable. To comply with the Post Construction requirements, Camp LeJeune shall submit an application and appropriate fee to the Wilmington Regional Office for all projects, including public roads and bridge,s subject to Session Law 2008-211, Sections 2.(a), 2.(b), 2.(c), 2.(d), 2.(e) and 2.(f). All designs shall comply with the State BMP Manual. The state will withhold approvals for projects not meeting the design standards in Session Law 2008-211.
- b. Comprehensive Watershed Protection Plans. Camp LeJeune may develop and implement a comprehensive watershed protection plan, approved by the State, to meet part or all of the requirements for a post-construction program.
- c. By the base adopting a Post-Construction Program that complies with the requirements of 15A NCAC 02H .1020 and the requirements of 15A NCAC 02B .0104(f) otherwise known as the Universal Stormwater Management Program (USMP), the base meets the requirement to develop and implement a Post-Construction Program. The base may elect to have the Division administer and implement the Universal Stormwater Management Program, either whole or in part, following their adoption of the program. Adoption of the USMP may not satisfy water quality requirements associated with the protection of threatened or endangered species or those requirements associated with a Total Maximum Daily Load (TMDL).

SECTION G: POLLUTION PREVENTION AND GOOD HOUSEKEEPING

1. Objective for Pollution Prevention and Good Housekeeping

- a. Develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff.
- b. Provide employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

2. BMPs for the Pollution Prevention and Good Housekeeping

Camp LeJeune shall implement the following BMPs to meet the objectives of the Pollution Prevention and Good Housekeeping Program.

BMP	Measurable Goals
a. Inventory of facilities and operations with the potential for generating polluted stormwater runoff	Camp LeJeune shall develop an inventory of facilities and operations with the potential for generating polluted stormwater runoff.
b. Map facilities and operations with the potential for generating polluted stormwater runoff	Camp LeJeune shall identify and either maintain a map or list facilities and operations with the potential for generating polluted stormwater runoff. The map must identify the stormwater outfalls corresponding to each of the facilities as well as the receiving waters to which these facilities discharge. The map must be maintained and updated annually and be available for review by the permitting authority.
c. Operation and Maintenance (O&M) for facilities and operations with the potential for generating polluted stormwater runoff	Camp LeJeune shall maintain and implement an Operation and Maintenance (O&M) program for facilities and operations with the potential for generating polluted stormwater runoff. The O&M program shall specify the frequency of inspections and routine maintenance requirements.
d. Spill Response Procedures for facilities and operations with the potential for generating polluted stormwater runoff	Camp LeJeune shall have written spill response procedures for facilities and operations with the potential for generating polluted stormwater runoff.
e. Streets, roads, and parking lots maintenance	Camp LeJeune shall implement BMPs selected to reduce polluted stormwater runoff from municipally-owned streets, roads, and parking lots.

BMP	Measurable Goals
f. Operation and Maintenance (O&M) for catch basins and conveyance systems	Camp LeJeune shall develop an O&M program for the stormwater sewer system including catch basins and conveyance systems. The O&M program shall include route maps and specify the frequency of inspections and routine maintenance requirements.
g. Identify and map for structural stormwater controls (e.g., structural BMPs)	Camp LeJeune shall identify and map or maintain a list structural stormwater controls. The map must identify the stormwater outfalls corresponding to each structural stormwater control as well as the receiving waters to which these facilities discharge. The map must be maintained and updated regularly and be available for review by the permitting authority.
h. O&M for structural stormwater controls	Camp LeJeune shall maintain and implement an O&M program for structural stormwater controls. The O&M program shall specify the frequency of inspections and routine maintenance requirements. Camp LeJeune shall inspect and maintain all structural stormwater controls in accordance with the schedule developed by Camp LeJeune. Camp LeJeune shall document inspections and maintenance of all structural stormwater controls.
i. Training	Camp LeJeune shall maintain and implement a training program for personnel involved in implementing pollution prevention and good housekeeping practices.
j. Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning	Camp LeJeune shall describe and implement measures that prevent or minimize contamination of the stormwater runoff from all areas used for vehicle and equipment cleaning

SECTION H: INDUSTRIAL ACTIVITIES

1. Objective

Develop, maintain, and implement a Stormwater Pollution Prevention Plan (Plan) for each facility with an industrial activity covered by this permit.

2. Industrial Activities as defined in 40 CFR 122.26 (b)(14)

- a. Camp LeJeune shall implement the requirements of General Permit NCG080000, to control stormwater point source discharges associated with activities that have vehicle maintenance areas (including vehicle rehabilitation, mechanical repair, painting, fueling, lubrication, equipment cleaning operation areas and like activities deemed by DEMLR to be similar in the process and/or the exposure of raw materials, products, by-products, or waste materials). Implementation of the requirements of General Permit NCG080000 constitutes compliance with the requirements develop, maintain and implement a Stormwater Pollution Prevention Plan (Plan) and Monitoring Plan for each facility and/or area with an industrial activity covered by this permit.
- b. Camp LeJeune shall implement the requirements of General Permit NCG150000, to control stormwater point source discharges associated with industrial activity from Air Transportation including air transportation, airports, and aircraft service and maintenance including: aircraft cleaning; aircraft servicing/repairing, and aircraft maintenance shops (including aircraft and equipment rehabilitation, mechanical repairs, painting, fueling, lubrication); and material handling facilities. Implementation of the requirements of General Permit NCG150000 constitutes compliance with the requirements develop, maintain and implement a Stormwater Pollution Prevention Plan (Plan) and Monitoring Plan for each facility and/or area with an industrial activity covered by this permit.
- c. Camp LeJeune shall seek coverage under the NPDES program for their wastewater treatment plant. Coverage under the general permit, NCG11000, is applicable to all owners or operators of stormwater point source discharges associated Treatment Works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, with a design flow of 1.0 million gallons per day or more, or required to have an approved pretreatment program under Title 40 Code of Federal Regulations (CFR) Part 403, including lands dedicated to the disposal of sewage sludge that is located within the confines of the facility.

3. Base Wide Stormwater Pollution Prevention Plan (Plan)

In lieu of complying with the requirements of paragraph 2 of this section, Camp LeJeune may propose and submit to the Division for their approval a base wide Stormwater Pollution Prevention Plan (Plan) that effectively meets the requirements to develop, maintain and implement a Stormwater Pollution Prevention Plan (Plan) for each facility and/or area with an industrial activity covered by this permit.

4. Base Wide Monitoring Plan

- a. In lieu of complying with the requirements of paragraph 2 of this section, Camp LeJeune may propose and submit to the Division for their approval a base wide Monitoring Plan that effectively meets the requirements to develop, maintain and implement a Monitoring Plan for each facility and/or area with an industrial activity covered by this permit.
- b. Monitoring results will be used by Camp LeJeune to modify the program components as necessary to accomplish the intent of the Stormwater Program. Results of the monitoring program will be submitted to the Division according to the provisions of Part IV of this permit. Description of the location of each sample point, the activities which they drain, and the water bodies to which they drain shall be described in the base wide Monitoring Plan.

SECTION I: OIL WATER SEPARATORS

All oil water separators that discharge to either the stormwater system, directly into the waters of the state, or have engineered diversionary catchment basins, including in the event of a bypass, will be fully described in the SPPP. The description will include:

- a) The location of the oil water separator
- b) The activities that occur in the oil water separator's drainage area
- c) The materials that are handled in the drainage area
- d) The name of the water body to which it drains
- e) The number of the outfall that the oil water separator discharges into
- f) The drainage area draining into the oil water separator
- g) The oil water separator's design capacity

SECTION J: MONITORING REQUIREMENTS

1. Camp LeJeune shall implement a monitoring program for their industrial. These monitoring results will be used to modify the program components as necessary to accomplish the intent of the Stormwater Program. Camp LeJeune shall identify parameters based on contributing activities. Description of the location of each sample point, the activities which they drain, and the water bodies to which they drain are to be described in the Stormwater Pollution Prevention Plan (SPPP).
 - a. Base-wide Analytical Monitoring Requirements. The following list of parameters shall be monitored at each outfall associated with an industrial activity during a storm event,
 - b. Samples shall be collected at each stormwater discharge outfall associated with an industrial activity unless representative outfall status (ROS) has been granted. The permittee may petition the Director for ROS using DEMLR's ROS Request Form. DEMLR may grant ROS if stormwater discharges from a single outfall are representative of discharges from multiple outfalls. Approved ROS will reduce the number of outfalls where the analytical sampling requirements apply and will be documented in a letter to the permittee. A copy of the Division's letter granting ROS shall be kept on site.

Parameter	Units	Measurement Frequency	Sample Type
Oil and Grease	mg/l	Once per year	Grab
pH	Standard Units	Once per year	Grab
Total Suspended Solids (TSS)	mg/l	Once per year	Grab
Total Flow	MG	Once per year	
Event Duration	Minutes	Once per year	
Total Rainfall	inches	Once per year	

- c. Analytical Monitoring Schedule.

Monitoring Period	Start	End
Year 1	April 1, 2016	March 31, 2017
Year 2	April 1, 2017	March 31, 2018
Year 3	April 1, 2018	March 31, 2019
Year 4	April 1, 2019	March 31, 2020
Year 5	April 1, 2020	March 31, 2021

- d. Cutoff Concentrations. For each parameter, the arithmetic mean of all analytical sampling results collected during the term of the permit shall be calculated for each individual outfall and compared to the cut-off concentrations listed below. At a minimum, Camp LeJeune must perform analytical sampling during the first year of the permit. If the analytical results fall at or below the cutoff concentrations listed below, Camp LeJeune is not required to sample that parameter at that outfall for the remainder of the permit. If analytical results exceed the cutoff concentration, subsequent sampling is required annually. Each year, Camp LeJeune has the option to assess if the arithmetic mean of data collected for each parameter at each outfall is below the cutoff concentration. If the arithmetic mean is less than the cutoff concentration then Camp LeJeune is not required to continue analytical monitoring for that parameter at that outfall

during the remainder of the term of the permit unless a significant change in the operations in the drainage area occurs.

Parameter	Cut-off Concentration
Oil and Grease	30 mg/l
pH (do not take average, use most recent pH sample result)	6-9 standard units
TSS	100 mg/l

- e. Qualitative monitoring (color, odor, clarity, floating solids, suspended solids, foam, oil sheen, erosion or deposition at the outfall, and other visual indicators of stormwater pollution) requires a visual inspection of each stormwater outfall associated with industrial activities and/or oil water separators regardless of representative outfall status. No analytical tests are required. Qualitative monitoring of stormwater outfalls does not need to be performed during a representative storm event. All qualitative monitoring will be performed twice per year, once during the spring (April-June) and once in the fall (September-November). If the permittee's qualitative monitoring indicates either that existing stormwater BMPs are ineffective, or that significant stormwater contamination is present, the permittee shall investigate potential causes, evaluate the feasibility of corrective actions, and implement those corrective actions appropriate. A written record of the permittee's investigation, evaluation, and response actions shall be kept in the Stormwater Pollution Prevention Plan.
2. Implementation of the requirements of General Permit NCG080000 constitutes compliance with the requirements develop, maintain and implement a Monitoring Plan for each facility and/or area with an industrial activity covered by this permit.
3. Camp leJeune may propose and submit to the Division for their approval modifications to the base wide Monitoring Plan that effectively meets the requirements develop, maintain and implement a Monitoring Plan for each industrial activity covered by this permit.

SECTION K: IMPAIRED WATERS and TOTAL MAXIMUM DAILY LOADS (TMDLs)

1. For impaired waters Camp LeJeune shall evaluate strategies and tailor and/or expand BMPs within the scope of the six minimum measures to enhance water quality recovery strategies in the watershed(s) and describe the strategies and tailored and/or expanded BMPs in their annual reports.
2. Camp LeJeune shall comply with the requirements of an approved TMDL.
3. Within 12 months of the final approval of a TMDL, Camp LeJeune's annual reports shall include a description of existing programs, controls, partnerships, projects, and strategies to address impaired waters and a brief explanation as to how the programs, controls, partnerships, projects and strategies address impaired waters.
4. Within 24 months of the final approval of a TMDL, Camp LeJeune's annual reports shall include an assessment of whether additional structural and/or non-structural BMPs are necessary to address impaired waters and a brief explanation as to how the programs, controls, partnerships, projects and strategies address impaired waters.
5. Within 36 months of the final approval of a TMDL, Camp LeJeune's annual reports shall include a description of activities expected to occur and when the activities are expected to occur within the remainder of the permit term.

PART III PROGRAM ASSESSMENT

1. Implementation of the Stormwater Plan will include documentation of all program components that are being undertaken including, but not limited to, inspections, maintenance activities, educational programs, implementation of BMPs, enforcement actions, and other stormwater activities. If monitoring and sampling are being performed documentation of results shall be included. Documentation will be kept on-file by Camp LeJeune for a period of three years and made available to the Director or his authorized representative immediately upon request.
2. Camp LeJeune's Stormwater Plan will be reviewed and updated as necessary, but at least on an annual basis. Camp LeJeune will submit a report of this evaluation to the Division on an annual basis. Camp LeJeune's reporting will include appropriate information to accurately describe the progress, status, and results of Camp LeJeune's Stormwater Plan and will include, but is not limited to, the following components:
 - (a) Camp LeJeune will give a detailed description of the status of implementation of the Stormwater Plan. This will include information on development and implementation of all components of the Stormwater Plan for the past year and schedules and plans for the year following each report.
 - (b) Camp LeJeune will adequately describe and justify any proposed changes to the Stormwater Plan. This will include descriptions and supporting information for the proposed changes and how these changes will impact the Stormwater Plan (results, effectiveness, implementation schedule, etc.).
 - (c) Camp LeJeune will document any necessary changes to programs or practices for assessment of management measures implemented through the Stormwater Plan. In addition, any changes in the cost of, or funding for, the Stormwater Plan will be documented.
 - (d) Camp LeJeune will include a summary of data accumulated as part of the Stormwater Plan throughout the year along with an assessment of what the data indicates in light of the Stormwater Plan.
 - (e) Camp LeJeune will provide a summary of activities undertaken as part of the Stormwater Plan throughout the year. This summary will include, but is not limited to, information on the establishment of appropriate legal authorities, project assessments, inspections, enforcement actions, continued inventory and review of the storm sewer system, education, training and results of the illicit discharge detection and elimination program.
3. The Director may notify Camp LeJeune when the Stormwater Plan does not meet one or more of the lawful requirements of the permit. Within 30 days of such notice, Camp LeJeune will submit a plan and time schedule to the Director for modifying the Stormwater Plan to meet the requirements. The Director may approve the corrective action plan, approve a plan with modifications, or reject the proposed plan. Camp LeJeune will provide certification in writing (in accordance with Part IV, Paragraph 2) to the Director that the changes have been made. Nothing in this paragraph shall be construed to limit the Director's ability to conduct enforcement actions for violations of this permit.

4. The Division may request additional reporting information as necessary to assess the progress and results of Camp LeJeune's Stormwater Plan.

PART IV REPORTING AND RECORD KEEPING REQUIREMENTS

1. Records Retention

Visual monitoring shall be documented and records maintained at the facility along with the Stormwater Pollution Prevention Plan. Copies of analytical monitoring results shall also be maintained on-site. Camp LeJeune shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, and copies of all reports required by this Permit for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

2. Report Submittals

- (a) A signed copy of all reports required herein, shall be submitted to the following addresses:

Department of Environmental Quality
Division of Energy, Mineral and Land Resources
Land Quality Section
1612 Mail Service Center
Raleigh, North Carolina 27699-1612

and

Wilmington Regional Office
Division of Energy, Mineral and Land Resources
Land Quality Section
127 Cardinal Drive Extension
Wilmington, North Carolina 28405-2845

- (b) All applications, reports, or information submitted to DEMLR shall be signed by duly authorized representative. A person is a duly authorized representative only if:
- (i) The authorization is made in writing by a principal executive officer or ranking elected official;
 - (ii) The authorization specified either an individual or a position having responsibility for the overall operation of a regulated facility or activity or an individual or position having overall responsibility for environmental/stormwater matters; and
 - (iii) The written authorization is submitted to the Director.
- (c) Any person signing a document under paragraphs (a) or (b) of this section shall make the following certification:

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my

inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowing submitting false information, including the possibility of fines and imprisonment for knowing violations."

3. Recording Results

For each activity performed or information collected pursuant to the requirements of this permit, Camp LeJeune shall record the following information:

- (a) The dates, exact place, and time of the activity or information collected;
- (b) The individual(s) who performed activity;
- (c) The techniques or methods used; and
- (d) The results of such activity or information collected.

4. Twenty-four Hour Reporting

Camp LeJeune shall report to the central office or the appropriate regional office any noncompliance that may constitute an imminent threat to health or the environment. Any information shall be provided orally within 24 hours from the time Camp LeJeune became aware of the circumstances. A written submission shall also be provided within 5 days of the time Camp LeJeune becomes aware of the circumstances.

The written submission shall contain a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time compliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

5. Additional Reporting

The Director may request reporting information on a more frequent basis as deemed necessary either for specific portions of Camp LeJeune's Stormwater Plan, or for the entire Program.

6. Other Information

Where Camp LeJeune becomes aware that it failed to submit any relevant facts in applying to be covered under this permit or in any report to the Director, it shall promptly submit such facts or information.

PART V STANDARD CONDITIONS

SECTION A: COMPLIANCE AND LIABILITY

1. Duty to Comply

Camp LeJeune must comply with all lawful conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of permit coverage upon renewal application.

- (a) Camp LeJeune shall comply with standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.
- (b) The Clean Water Act provides that any person who violates a permit condition is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently \$27,500 per day for each violation). Any person who negligently violates any permit condition is subject to criminal penalties of \$2,500 to \$25,000 per day of violation, or imprisonment for not more than 1 year, or both. Any person who knowingly violates permit conditions is subject to criminal penalties of \$5,000 to \$50,000 per day of violation, or imprisonment for not more than 3 years, or both. Also, any person who violates a permit condition may be assessed an administrative penalty not to exceed \$11,000 per violation with the maximum amount not to exceed \$137,500. [Ref: Section 309 of the Federal Act 33 USC 1319 and 40 CFR 122.41(a).]
- (c) Under state law, a daily civil penalty of not more than twenty-five thousand dollars (\$25,000) per violation may be assessed against any person who violates or fails to act in accordance with the terms, conditions, or requirements of a permit. [Ref: North Carolina General Statutes 143-215.6A]
- (d) Any person may be assessed an administrative penalty by the Administrator for violating sections 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Pursuant to 40 CFR Part 19 and the Act, administrative penalties for Class I violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently \$11,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$27,500). Pursuant to 40 CFR Part 19 and the Act, penalties for Class II violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently \$11,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$137,500).

2. Duty to Mitigate

Camp LeJeune shall take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

3. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve Camp LeJeune from any responsibilities, liabilities, or penalties for noncompliance pursuant to NCGS 143-215.3, 143-215.6A, 143-215.6B, 143-215.6C or Section 309 of the Federal Act, 33 USC 1319. Furthermore, Camp LeJeune is responsible for consequential damages, such as fish kills, even though the responsibility for effective compliance may be temporarily suspended.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve Camp LeJeune from any responsibilities, liabilities, or penalties to which Camp LeJeune is or may be subject to under NCGS 143-215.75 et seq. or Section 311 of the Federal Act, 33 USC 1321.

5. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

6. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

7. Duty to Provide Information

Camp LeJeune shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the coverage issued pursuant to this permit or to determine compliance with this permit. Camp LeJeune shall also furnish to the Director upon request, copies of records required by this permit.

8. Penalties for Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

9. Penalties for Falsification of Reports

The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both.

10. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The notification of planned changes or anticipated noncompliance does not stay any permit condition.

11. Permit Expiration

The permittee is not authorized to discharge after the expiration date. In order to receive automatic authorization to discharge beyond the expiration date, Camp LeJeune shall submit forms and fees as are required by the Division no later than 180 days prior to the expiration date.

12. Transfers

This permit is not transferable to any person except after notice to and approval by the Director. The Director may require modification or revocation and reissuance of the permit to change the name and incorporate such other requirement as may be necessary under the Clean Water Act. Camp LeJeune is required to notify the Division in writing in the event the permitted facility is sold or closed.

SECTION B: OPERATION AND MAINTENANCE of POLLUTION CONTROLS**1. Proper Operation and Maintenance**

Camp LeJeune shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are owned and/or operated by Camp LeJeune to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by Camp LeJeune only when the operation is necessary to achieve compliance with the conditions of this permit.

2. Need to Halt or Reduce not a Defense

It shall not be a defense for Camp LeJeune in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the condition of this permit.

3. Bypassing of Stormwater Control Facilities

Bypass is prohibited and the Director may take enforcement action against Camp LeJeune for bypass unless:

- a. Bypass was unavoidable to prevent loss of life, personal injury or severe property damage; and
- b. There were no feasible alternatives to the bypass, such as the use of auxiliary control facilities, retention of stormwater or maintenance during normal periods of equipment downtime or dry weather. This condition is not satisfied if adequate backup controls should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
- c. Camp LeJeune submitted notices as required under Section E of this Part.

If the Director determines that it will meet the three conditions listed above, the Director may approve an anticipated bypass after considering its adverse effects.

SECTION C: MONITORING AND RECORDS

1. Representative Sampling

When required herein, stormwater samples collected and measurements taken shall be characteristic of the volume and nature of the permitted discharge. Analytical stormwater sampling shall be performed during a representative storm event. These samples shall be taken on a day and time that is characteristic of the discharge. Where appropriate, all stormwater samples shall be taken before the discharge joins or is diluted by any other waste stream, body of water, or substance. When specified herein, monitoring points established in this permit shall not be changed without notification to and approval of the Director.

If a facility has multiple discharge locations with substantially identical stormwater discharges that are required to be sampled, Camp LeJeune may petition the Director for representative outfall status. If it is established that the stormwater discharges are substantially identical and Camp LeJeune is granted representative outfall status, then sampling requirements may be performed at a reduced number of outfalls.

2. Flow Measurements

Where required, appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges.

3. Test Procedures

Test procedures for the analysis of pollutants shall conform to the EMC regulations published pursuant to NCGS 143-215.63 et. seq, the Water and Air Quality Reporting Acts, and to regulations published pursuant to Section 304(g), 33 USC 1314, of the Federal Water Pollution Control Act, as Amended, and Regulation 40 CFR 136.

To meet the intent of the monitoring required by this permit, all test procedures must produce minimum detection and reporting levels and all data generated must be reported down to the minimum detection or lower reporting level of the procedure.

4. Inspection and Entry

Camp LeJeune shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Director), or in the case of a facility which discharges through a separate storm sewer system, an authorized representative of a municipal operator or the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to;

- a. Enter upon Camp LeJeune's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

5. Availability of Reports

Except for data determined to be confidential under NCGS 143-215.3(a)(2) or Section 308 of the Federal Act, 33 USC 1318, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division. As required by the Act, analytical data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NCGS 143-215.6B or in Section 309 of the Federal Act.

6. Bypass

- a. Anticipated bypass. If Camp LeJeune knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass; including an evaluation of the anticipated quality and effect of the bypass.
- b. Unanticipated bypass. Camp LeJeune shall submit notice within 24 hours of becoming aware of an unanticipated bypass.

7. Other Noncompliance

Camp LeJeune shall report all instances of noncompliance not reported under 24 hour reporting at the time monitoring reports are submitted.

8. Anticipated Noncompliance

Camp LeJeune shall give notice to the Director as soon as possible of any planned changes at the permitted facility which may result in noncompliance with the Permit requirements.

9. Planned Changes

Camp LeJeune shall give notice to the Director as soon as possible of any planned changes at the permitted facility which could significantly alter the nature or quantity of pollutants discharged. This notification requirement includes pollutants which are not specifically listed in the Permit or subject to notification requirements under 40 CFR Part 122.42 (a).

10. Non-Stormwater Discharges

If the storm event monitored in accordance with this Permit coincides with a non-stormwater discharge, Camp LeJeune shall separately monitor all parameters as required under the non-stormwater discharge permit and provide this information with the stormwater discharge monitoring report.

11. Discharge Monitoring Reports

Camp LeJeune shall retain all monitoring information for a period of at least 5 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

When no discharge has occurred from the facility during the report period, Camp LeJeune shall indicate "NO FLOW" as per NCAC T15A 02B .0506.

Camp LeJeune shall record the required qualitative monitoring observations on the SDO Qualitative Monitoring Report form provided by the Division, and shall retain the completed forms on site. Visual monitoring results should not be submitted to the Division, except upon DEMLR's specific requirement to do so.

PART VI LIMITATIONS REOPENER

The issuance of this permit does not prohibit the Director from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit as allowed by the laws, rules, and regulations contained in Title 40, Code of Federal Regulations, Parts 122 and 123; Title 15A of the North Carolina Administrative Code, Subchapter 2H .0100; and North Carolina General Statute 143-215.1 et al.

This permit shall be modified or alternatively, revoked and reissued, to comply with any effluent guideline or water quality standard issued or approved under Sections 302(b)(2)(c), and (d), 304(b)(2) and 307(a) of the Clean Water Act, if the effluent guideline or water quality standard so issued or approved;

- a. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit.
- b. Controls any pollutant not limited in the permit.

This permit as modified or reissued under this paragraph shall also contain other requirements in the Act then applicable.

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PART VII ADMINISTERING AND COMPLIANCE MONITORING FEE REQUIREMENTS

Camp LeJeune must pay the reasonable administering and compliance monitoring fee within 30 (thirty) days after being billed by the Division. Failure to pay the fee in a timely manner in accordance with 15A NCAC 2H .0105(b)(4) may cause this Division to initiate action to revoke the permit.

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PART VIII DEFINITIONS

1. Act

See Clean Water Act.

2. Arithmetic Mean

The arithmetic mean of any set of values is the summation of the individual values divided by the number of individual values.

3. Best Management Practice (BMP)

Measures or practices used to reduce the amount of pollution entering surface waters. BMPs can be structural or non-structural and may take the form of a process, activity, physical structure or planning (see non-structural BMP).

4. Built-upon Area

Built upon area has the same meaning as in Session Law 2006-246 and means that portion of a project that is covered by impervious or partially impervious surface including, but not limited to, buildings; pavement and gravel areas such as roads, parking lots, and paths; and recreation facilities such as tennis courts. "Built upon area" does not include a wooden slatted deck, the water area of a swimming pool, or pervious or partially pervious paving material to the extent that the paving material absorbs water or allows water to infiltrate through the paving material.

5. Bulk Storage of Liquid Products

Liquid raw materials, manufactured products, waste materials or by-products with a single above ground storage container having a capacity of greater than 660 gallons or with multiple above ground storage containers located in close proximity to each other having a total combined storage capacity of greater than 1,320 gallons.

6. Bypass

A bypass is the known diversion of stormwater from any portion of a stormwater control facility including the collection system, which is not a designed or established operating mode for the facility.

7. Clean Water Act

The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), as amended, 33 USC 1251, et. seq.

8. Common Plan of Development

A construction or land disturbing activity is part of a larger common plan of development if it is completed in one or more of the following ways:

- In separate stages
- In separate phases
- In combination with other construction activities

It is identified by the documentation (including but not limited to a sign, public notice or hearing, sales pitch, advertisement, loan application, drawing, plats, blueprints, marketing plans, contracts, permit application, zoning request, or computer design) or physical demarcation (including but not limited to boundary signs, lot stakes, or surveyor markings) indicating that construction activities may occur on a specific plot. .

It can include one operator or many operators.

9. Department (DEQ)

Department means the North Carolina Department of Environment Quality

10. Division (DEMLR))

The Division of Energy, Mineral and Land Resources (DEMLR).

11. Director

The Director of the Division of Energy, Mineral and Land Resources (DEMLR), the permit issuing authority.

12. EMC

The North Carolina Environmental Management Commission.

13. Grab Sample

An individual sample collected instantaneously. Grab samples that will be directly analyzed or qualitatively monitored must be taken within the first 30 minutes of discharge.

14. Hazardous Substance

Any substance designated in 40 CFR Part 116 pursuant to Section 311 of the Clean Water Act.

15. Illicit Discharge

Any discharge to a MS4 that is not composed entirely of stormwater except discharges pursuant to an NPDES permit (other than the NPDES MS4 permit), allowable non-stormwater discharges, and discharges resulting from fire-fighting activities.

16. Industrial Activity

Industrial activities shall mean all industrial activities as defined in 40 CFR 122.26.

17. Landfill

A disposal facility or part of a disposal facility where waste is placed in or on land and which is not a land treatment facility, a surface impoundment, an injection well, a hazardous waste long-term storage facility or a surface storage facility.

18. Municipal Separate Storm Sewer System (MS4)

A conveyance or system of conveyances (including roads and street with drainage systems, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

- a. Owned or operated by the United States, a State, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the Clean Water Act (CWA) that discharges to waters of the United States or waters of the State.
- b. Designed or used for collecting or conveying stormwater;
- c. Which is not a combined sewer; and
- d. Which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR 122.2

19. Non-stormwater Discharge Categories

The following are categories of non-stormwater discharges that Camp LeJeune must address if it identifies them as significant contributors of pollutants to the storm sewer system: water line flushing, landscape irrigation, diverted stream flows, rising groundwater, uncontaminated groundwater infiltration, [as defined in 40 CFR 35.2005(20)], uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water (discharges or flows from fire fighting activities are excluded from the definition of illicit discharge and only need to be addressed where they are identified as significant sources of pollutants to waters of the United States).

20. Non-structural BMP

Non-structural BMPs are preventive actions that involve management and source controls such as: (1) Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along sensitive water bodies, minimize impervious surfaces, and/or minimize disturbance of soils and vegetation; (2) policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure; (3) education programs for developers and the public about minimizing water quality impacts; (4) other measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source

control measures often thought of as good housekeeping, preventive maintenance and spill prevention.

21. Outfall

The point of wastewater or stormwater discharge from a discrete conveyance system. See also point source discharge of stormwater.

22. Overburden

Any material of any nature, consolidated or unconsolidated, that overlies a mineral deposit, excluding topsoil or similar naturally-occurring surface materials that are not disturbed by mining operations.

23. Permittee

The owner or operator issued this permit.

24. Point Source Discharge of Stormwater

Any discernible, confined and discrete conveyance including, but not specifically limited to, any pipe, ditch, channel, tunnel, conduit, well, or discrete fissure from which stormwater is or may be discharged to waters of the state.

25. Redevelopment

Means any rebuilding activity unless that rebuilding activity;

- a. Results in no net increase in built-upon area, and
- b. Provides equal or greater stormwater control than the previous development.

26. Representative Storm Event

A storm event that measures greater than 0.1 inches of rainfall. The time between this storm event and the previous storm event measuring greater than 0.1 inches must be at least 72 hours. A single storm event may have a period of no precipitation of up to 10 hours. For example, if it rains but stops before producing any collectable discharge, a sample may be collected if the next rain producing a discharge begins within 10 hours.

27. Representative Outfall Status

When it is established that the discharge of stormwater runoff from a single outfall is representative of the discharges at multiple outfalls, the DEMLR may grant representative outfall status. Representative outfall status allows Camp LeJeune to perform analytical monitoring at a reduced number of outfalls.

28. Residential Development Activities

Residential development activities has the same meaning as in 15A NCAC 02B .0202(54).

29. Rinse Water Discharge

The discharge of rinse water from equipment cleaning areas associated with industrial activity. Rinse waters from vehicle and equipment cleaning areas are process wastewaters and do not include washwaters utilizing any type of detergent or cleaning agent.

30. Secondary Containment

Spill containment for the contents of the single largest tank within the containment structure plus sufficient freeboard to allow for the 25-year, 24-hour storm event.

31. Section 313 Water Priority Chemical

A chemical or chemical category which:

- a. Is listed in 40 CFR 372.65 pursuant to Section 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986, also titled the Emergency Planning and Community Right-to-Know Act of 1986;
- b. Is present at or above threshold levels at a facility subject to SARA title III, Section 313 reporting requirements; and
- c. Meets at least one of the following criteria:
 - (1) Is listed in appendix D of 40 CFR part 122 on Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols) or Table IV (certain toxic pollutants and hazardous substances);
 - (2) Is listed as a hazardous substance pursuant to Section 311(b)(2)(A) of the CWA at 40 CFR 116.4; or
 - (3) Is a pollutant for which EPA has published acute or chronic water quality criteria.

32. Severe Property Damage

Means substantial physical damage to property, damage to the control facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

33. Significant Materials

Includes, but is not limited to: raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw materials used in food processing or production; hazardous substances designated under Section 101(14) of CERCLA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag and sludge that have the potential to be released with stormwater discharges.

34. Significant Spills

Includes, but is not limited to: releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.10 and CFR 117.21) or Section 102 of CERCLA (Ref: 40 CFR 302.4). Reportable quantity means that quantity, the release of which requires notification pursuant to Section 311 of the Clean Water Act (Ref: 40 CFR 110.10 and CFR 117.21) or Section 102 of CERCLA (Ref: 40 CFR 302.4).

35. Stormwater Discharge Outfall (SDO)

The point of departure of stormwater from a discernible, confined, or discrete conveyance, including but not limited to, storm sewer pipes, drainage ditches, channels, spillways, or channelized collection areas, from which stormwater flows directly or indirectly into waters of the State of North Carolina.

36. Stormwater Runoff

The flow of water which results from precipitation and which occurs immediately following rainfall or as a result of snowmelt.

37. Stormwater Associated with Industrial Activity

The discharge from any point source which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing or raw material storage areas at an industrial site. Facilities considered to be engaged in "industrial activities" include those activities defined in 40 CFR 122.26(b)(14). The term does not include discharges from facilities or activities excluded from the NPDES program.

38. Stormwater Pollution Prevention Plan

A comprehensive site-specific plan which details measures and practices to reduce stormwater pollution and is based on an evaluation of the pollution potential of the site.

39. Ten Year Design Storm

The maximum 24 hour precipitation event expected to be equaled or exceeded on the average once in ten years. Design storm information can be found in the State of North Carolina Erosion and Sediment Control Planning and Design Manual.

40. Total Flow

The flow corresponding to the time period over which the entire storm event occurs. Total flow shall be either; (a) measured continuously, (b) calculated based on the amount of area draining to the outfall, the amount of built-upon (impervious) area, and the total amount of rainfall, or (c) estimated by the measurement of flow at 20 minute intervals during the rainfall event.

41. Total Maximum Daily Load (TMDL)

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is a detailed water quality assessment that provides the scientific foundation for an implementation plan. The implementation plan outlines the steps necessary to reduce pollutant loads in a certain body of water to restore and maintain water quality standards in all seasons. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs.

42. Toxic Pollutant

Any pollutant listed as toxic under Section 307(a)(1) of the Clean Water Act.

43. Upset

Means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of Camp LeJeune. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment or control facilities, inadequate treatment or control facilities, lack of preventive maintenance, or careless or improper operation.

44. Vegetative Buffer

Vegetative buffer has the same meaning as in 15A NCAC 02H .1002(22) and means an area of natural or established vegetation directly adjacent to surface waters through which stormwater runoff flows in a diffuse manner to protect surface waters from degradation due to development activities.

45. Vegetative Conveyance

Vegetative conveyance means a permanent, designed waterway lined with vegetation that is used to convey stormwater runoff at a non-erosive velocity within or away from a developed area. As used herein, "conveyance system" shall not include a stormwater collection system.

46. Vehicle Maintenance Activity

Vehicle or vessel rehabilitation, mechanical repairs, painting, fueling, lubrication, cleaning operations, or airport deicing operations.

47. Visible Sedimentation

Solid particulate matter, both mineral and organic, that has been or is being transported by water, air, gravity, or ice from its site of origin which can be seen with the unaided eye.

48. 25-year, 24 hour storm event

The maximum 24-hour precipitation event expected to be equaled or exceeded, on the average, once in 25 years.

**STATE of NORTH CAROLINA DEPARTMENT of ENVIRONMENTAL QUALITY
DIVISION of ENERGY, MINERAL, and LAND RESOURCES**

PERMIT NO. NCS000290

**TO DISCHARGE STORMWATER UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM**

In compliance with applicable law, including the regulations promulgated and adopted by the North Carolina Environmental Management Commission, and the Federal Water Pollution Control Act, as amended,

United States Marine Corps

is hereby authorized to discharge stormwater and continue operation of oil water separators not associated with wastewater discharges from facilities located at:

Marine Corp Base Camp Lejeune and Marine Corps Air Station New River
herein referred to as Camp LeJeune
Onslow County

to receiving waters designated as Bear Creek (SB, NSW), Beaverdam Creek (SB, NSW), Cogdels Creek (SC, NSW), New River (SC, HQW, NSW, SC, NSW, SA), Wallace Creek (SB, NSW), Frenchs Creek (SC, NSW), Edwards Creek (SC, NSW), Strawhorn Creek (SC, NSW), Stick Creek (SC, HQW, NSW), Southwest Creek (C, NSW), Courthouse Bay (SA), Stones Creek (SA), Brinson Creek (SC, NSW), Northeast Creek (SC, HQW, NSW), Scales Creek (SC, HQW, NSW), Wilson Bay (SC, HQW, NSW), Mott Creek (C, NSW), Morgan Bay (SC, NSW), and Farnell Bay (SC, NSW) in the White Oak River Basin in accordance with the discharge limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, IV, V, VI, VII and VIII hereof.

This permit shall become effective October 1, 2021.

This permit and the authorization to discharge are subject to applicable law and shall expire at midnight on September 30, 2026.

Signed this day **DATE**.

DRAFT

for Brian Wrenn, Director
Division of Energy, Mineral, and Land Resources
By the Authority of the Environmental Management Commission

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PART 1: PERMIT COVERAGE

1. During the period beginning on the effective date of the permit and lasting until expiration, Marine Corp Base Camp Lejeune and Marine Corps Air Station New River, herein referred to as Camp LeJeune and/or the permittee, is authorized to discharge stormwater from the Municipal Separate Storm Sewer System (MS4) and continue operation of oil water separators not associated with wastewater discharges to receiving waters.
2. Receiving waters for discharges from the permittee's MS4 are designated as: Bear Creek (SB, NSW), Beaverdam Creek (SB, NSW), Cogdels Creek (SC, NSW), New River (SC, HQW, NSW, SC, NSW, SA), Wallace Creek (SB, NSW), Frenchs Creek (SC, NSW), Edwards Creek (SC, NSW), Strawhorn Creek (SC, NSW), Stick Creek (SC, HQW, NSW), Southwest Creek (C, NSW), Courthouse Bay (SA), Stones Creek (SA), Brinson Creek (SC, NSW), Northeast Creek (SC, HQW, NSW), Scales Creek (SC, HQW, NSW), Wilson Bay (SC, HQW, NSW), Mott Creek (C, NSW), Morgan Bay (SC, NSW), Farnell Bay (SC, NSW), and their tributaries in the White Oak River Basin.
3. Discharges from the permittee's MS4 shall be controlled, limited and monitored in accordance with this permit and the permittee's Comprehensive Stormwater Management Program Plan, herein referred to as the Stormwater Plan.
4. Under the authority of Section 402(p) of the Clean Water Act and implementing regulations 40 CFR Part 122, 123 and 124, North Carolina General Statutes 143-215.1 and Session Law 2006-246, all provisions contained and referenced in the Stormwater Plan are enforceable parts of this permit.
5. The issuance of this permit does not prohibit the Division from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit as allowed by the laws, rules, and regulations contained in Title 40, Code of Federal Regulations, Parts 122 and 123; Title 15A of the North Carolina Administrative Code, Subchapter 2H .0100; and North Carolina General Statute 143-215.1 et. al.
6. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.
7. No provisions of this permit shall be interpreted as or constitute a commitment that the permittee will obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. Section 1341.
8. All discharges authorized herein shall be lawfully managed in accordance with the terms and conditions of this permit. Any other point source discharge to surface waters of the state is prohibited unless it is an allowable non-stormwater discharge or is covered by another permit, authorization, or approval.
9. This permit does not relieve Camp LeJeune from responsibility for compliance with any other applicable federal, state, or local law, rule, standard, ordinance, order, judgment, or decree.
10. The permit authorizes the point source discharge of stormwater runoff from the permittee's MS4. Unless the Division requires that specific non-stormwater flows be controlled, the

discharge of non-stormwater is also authorized through the MS4 if such discharges are:

- (a) Permitted by, and in compliance with, another NPDES discharge permit including discharges of process and non-process wastewater, and stormwater associated with industrial activity; or
- (b) Determined to be incidental non-stormwater flows that do not significantly impact water quality and may include:
 - water line flushing;
 - landscape irrigation;
 - diverted stream flows;
 - rising groundwaters;
 - uncontaminated groundwater infiltration;
 - uncontaminated pumped groundwater;
 - discharges from potable water sources;
 - foundation drains;
 - air conditioning condensate (commercial/residential);
 - irrigation waters;
 - springs;
 - water from crawl space pumps;
 - footing drains;
 - lawn watering;
 - residential and charity car washing;
 - flows from riparian habitats and wetlands;
 - dechlorinated swimming pool discharges;
 - street wash water;
 - flows from emergency fire fighting;
 - releases of clean waters from hydrostatic testing; and
 - drainage of uncontaminated stormwater from secondary containment after visual monitoring.

PART 2: LIMITATIONS AND CONTROLS FOR PERMITTED DISCHARGES**SECTION A: STORMWATER MANAGEMENT PROGRAM IMPLEMENTATION**

The permittee shall implement, manage and oversee all provisions of its Comprehensive Stormwater Management Program and Stormwater Plan to reduce pollutants discharged from the MS4. This includes, but is not limited to, the following provisions:

1. Stormwater Plan

- (a) The permittee shall develop, maintain and implement a Stormwater Plan in accordance with Section 402(p)(3)(B) of the Clean Water Act, provisions outlined by the Director, and the provisions of this permit.
- (b) The Stormwater Plan shall include, at a minimum, specific and measurable goals that define program elements to fully implement each of the six minimum control measures (MCMs) defined in 40 CFR §122.34(b): public education and outreach on stormwater impacts, public involvement and participation, illicit discharge detection and elimination, construction site runoff control, post-construction stormwater management, and pollution prevention/good housekeeping for municipal operations, as well as any required Total Maximum Daily Load (TMDL) requirements.
- (c) The Stormwater Plan shall detail the permittee's Stormwater Management Program for the five-year term of the stormwater permit. Each MCM shall have: a narrative description of the program, a table that identifies each best management practice (BMP) used, the frequency of the BMP, the measurable goals for each BMP, the implementation schedule, funding, and the responsible person or position for implementation.
- (d) The Stormwater Plan shall identify specific position(s) and responsibilities for the implementation of each MCM and any TMDL requirements, as well as overall coordination and management of the Comprehensive Stormwater Management Program.
- (e) If discharges are determined to cause or contribute to non-attainment of an applicable water quality standard, the permittee shall expand or better tailor its BMPs within the scope of the six minimum control measures to address the discharges.
- (f) The purpose of the Stormwater Plan is to reduce the discharge of pollutants from the MS4 to the maximum extent practicable, to protect water quality, and to satisfy the applicable water quality requirements of the Clean Water Act. Implementation of best management practices consistent with the provisions of the Stormwater Plan constitutes compliance with the standard of reducing pollutants to the maximum extent practicable.
- (g) The Division may notify the permittee when the Stormwater Plan does not meet one or more of the requirements of the permit or the maximum extent practicable standard. Within ninety (90) days of such notice, the permittee shall submit a plan and time schedule to the Division for modifying the Stormwater Plan to meet the requirements. The Division may approve the plan, approve a plan with modifications, or reject the proposed plan. Nothing in this paragraph shall be construed to limit the Division's ability to conduct enforcement actions for violations of this permit. When changes to the

program are required by the Division, the permittee shall provide certification in writing to the Division that the changes have been made.

- (h) The permittee shall make its Stormwater Plan available to the Division upon request.

2. Legal Authority

The permittee shall develop and maintain the authority to implement and enforce all provisions of the Stormwater Plan.

3. Program Funding

The permittee shall maintain adequate funding and staffing to comply with this permit and implement and manage the Comprehensive Stormwater Management Program and all provisions of the Stormwater Plan.

SECTION B: PUBLIC EDUCATION AND OUTREACH PROGRAM

The Stormwater Plan shall identify the specific elements and implementation of a Public Education and Outreach Program designed to share educational materials, promote educational opportunities for the basewide community, conduct outreach activities on the impacts of stormwater pollutants and discharges to water bodies, and inform base occupants on how they can reduce pollutants in stormwater runoff and properly dispose of waste. The program shall include a combination of approaches that are effective at reaching identified target audiences.

The permittee shall document the extent of exposure of each media, event or activity, including those elements implemented locally or through a cooperative agreement and, at a minimum, shall:

1. Annually evaluate, identify and define the target pollutants, potential sources, and associated target audiences likely to have significant stormwater impacts on base.
2. Provide educational information and/or outreach to identified target audiences on target pollutants and/or stormwater issues. At a minimum, the permittee shall:
 - (a) Identify and address three high priority community-wide issues.
 - (b) Address a minimum of three residential and three industrial/commercial issues.
 - (c) Provide educational information to base employees, operational forces, businesses and the public of hazards associated with illicit discharges, illegal dumping, and improper disposal of waste.
 - (d) Inform the community on watersheds in need of special protection, and the issues that may threaten the quality of these waters.
3. Provide and maintain a website designed to convey the stormwater program's purpose and scope. The web page should include educational information and opportunities to improve stormwater discharges from the MS4.

4. Provide and maintain a stormwater hotline/helpline for public education and outreach.

SECTION C: PUBLIC INVOLVEMENT AND PARTICIPATION

The Stormwater Plan shall identify the specific elements and implementation of a Public Involvement and Participation Program designed to provide and promote volunteer opportunities for the basewide community, and to provide opportunities for feedback on the Stormwater Plan.

The permittee shall document the extent of exposure of each media, event or activity, including those elements implemented locally or through a cooperative agreement and, at a minimum, shall:

1. Conduct at least one public meeting during the term of the permit to allow the community an opportunity to review and comment on the Stormwater Plan.
2. Promote and provide a mechanism for group involvement and input on the stormwater program.
3. Promote and provide a minimum of one stormwater volunteer event or opportunity each year.
4. Provide and maintain a stormwater hotline/helpline for reporting stormwater issues and concerns on base.

SECTION D: ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM

The Stormwater Plan shall identify the specific elements and implementation of an Illicit Discharge Detection and Elimination (IDDE) Program in accordance with 40 CFR §122.34(b)(3). At a minimum, the IDDE Program shall:

1. Develop, update and maintain a municipal storm sewer system map including stormwater conveyances, flow direction, major outfalls and waters of the United States receiving stormwater discharges.
2. Develop and maintain a regulatory mechanism that provides legal authority to prohibit, detect, and eliminate illicit connections and discharges, illegal dumping and spills into the MS4, including enforcement procedures and actions.
3. Maintain and implement a written IDDE Plan to detect and address illicit discharges, illegal dumping, spills and any non-stormwater discharges identified as significant contributors of pollutants to the MS4. The plan shall provide standard procedures and documentation to:
 - (a) Locate priority areas likely to have illicit discharges,
 - (b) Conduct routine dry weather inspections of all major outfalls,
 - (c) Identify illicit discharges and trace sources,

- (d) Eliminate the source(s) of an illicit discharge, and
 - (e) Evaluate and assess the IDDE Program.
4. Provide a mechanism for tracking and documenting each illicit discharge, illicit connection or illegal dumping event including date(s) reported and/or observed, the results of the investigation, any follow-up of the investigation, the date the investigation was closed, the issuance of enforcement actions, and the ability to identify chronic violators.
 5. Train municipal staff and contractors who, as part of their normal job responsibilities, may observe an illicit discharge, illicit connection, illegal dumping or spills. Training shall include how to identify and report illicit discharges, illicit connections, illegal dumping and spills. Each staff training event shall be documented, including the agenda/materials, date, and number of staff participating. The training program shall identify appropriate personnel, the schedule for conducting the training and the proper procedures for reporting and responding to an illicit discharge or connection. Follow-up training must be provided as needed to address changes in personnel, procedures, or techniques.
 6. Promote and provide a reporting mechanism for the public and staff to report illicit discharges, and establish and implement response procedures. The permittee shall conduct reactive inspections in response to reports/complaints and perform follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party to achieve and maintain compliance.
 7. Implement, assess annually, and update as necessary written procedures to identify and report sanitary sewer overflows and sewer leaks to the system operator

SECTION E: CONSTRUCTION SITE RUNOFF CONTROL PROGRAM

Compliance with the North Carolina Sediment Pollution Control Act of 1973 (SPCA) program as defined in 15A NCAC Chapter 04 shall meet requirements for public input, sanctions to ensure compliance, requirements for construction site operators to implement appropriate erosion and sediment control practices, review of site plans which incorporates consideration of potential water quality impacts, and procedures for site inspection and enforcement of control measures.

At a minimum, the permittee's Construction Site Runoff Control Program shall:

1. Require construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impact to water quality.
2. Provide and promote a means for the community to notify the appropriate authorities of observed erosion and sedimentation problems.

SECTION F: POST-CONSTRUCTION SITE RUNOFF CONTROL PROGRAM

The Stormwater Plan shall identify the specific elements to develop, implement, and enforce a Post-

Construction Site Runoff Control Program (PC Program) to address stormwater runoff from development projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4. At a minimum, the Post-Construction Program shall comply with 15A NCAC 02H .1017 and .1019, and the permittee's PC Program shall include the following provisions:

1. The permittee shall notify the Division of the specific post-construction program it will implement. Notification shall be received by the Division no later than December 31, 2021.
2. Establish local authority to review, approve and enforce the PC Program no later than October 1, 2022.
3. Implement the full PC Program no later than October 1, 2022.
4. The permittee shall establish and maintain adequate legal authorities through ordinance or other regulatory mechanism(s) to:
 - (a) Review designs and proposals for development projects to determine whether adequate stormwater control measures will be installed, implemented, and maintained.
 - (b) Request information such as stormwater plans, inspection reports, monitoring results, and other information deemed necessary to evaluate compliance with the Post-Construction Program.
 - (c) Enter property for the purpose of inspecting at reasonable times any facilities, equipment, practices, or operations related to stormwater discharges to determine compliance with the Post-Construction Program.
5. The permittee shall develop, maintain and implement plan review and approval authority, standards, and procedures to:
 - (a) Conduct site plan reviews of all new development and redeveloped sites that disturb greater than or equal to one acre, and sites that disturb less than one acre that are part of a larger common plan of development or sale for compliance with 15A NCAC 02H .1017 and .1019.
 - (b) Ensure that each project has an Operation and Maintenance Agreement that complies with 15A NCAC 02H .1050(11).
 - (c) Ensure that each project has recorded deed restrictions and protective covenants, or their equivalent, that require the project to be maintained consistent with approved plans.
 - (d) Ensure that each SCM and associated maintenance accesses be protected in a permanent recorded easement or equivalent mechanism per 15A NCAC 02H 1050 (9) and (10).
6. The permittee shall maintain inspection and enforcement authority, standards, and procedures to:
 - (a) Conduct post-construction inspections prior to issuing a Certificate of Occupancy, Temporary Certificate of Occupancy or equivalent approval.
 - (b) Ensure that the project has been constructed in accordance with the approved plan(s)

- (c) Ensure annual inspection of each permitted SCM to ensure compliance with the approved Operation and Maintenance Agreement.
 - (d) Require that inspections be conducted by a qualified professional.
- 7. The permittee shall maintain adequate documentation and standardized inspection and tracking mechanisms to:
 - (a) Maintain an inventory of post-construction SCMs and permitted projects.
 - (b) Document, track and maintain records of inspections and enforcement actions. Tracking shall include the ability to identify chronic violators.
 - (c) Make available to developers all relevant ordinances, post-construction requirements, design standards, checklists, and/or other materials.
- 8. Construction projects that are performed by or under contract for the permittee, including roads and bridges, must meet the requirements the stormwater management and water quality protection required by Session Law 2008-211, Sections 2.(a), 2.(b), 2.(c), 2.(d), 2.(e) and 2.(f). Roads and bridges must minimize built-upon surfaces, divert stormwater away from surface waters as much as possible and employ other best management practices to minimize water quality impacts to the maximum extent practicable.
- 9. As an alternative to the requirements above, the permittee may develop and implement a Division-approved Comprehensive Watershed Protection Plan (CWPP) to meet all or part of the requirements for a PC Program. Any previous Division-approved CWPP(s) shall be updated and resubmitted to the Division for review, comment and approval within twelve (12) months of permit issuance.

SECTION G: POLLUTION PREVENTION AND GOOD HOUSEKEEPING PROGRAMS

The Stormwater Plan shall identify the specific elements for development and implementation of a comprehensive suite of operation and maintenance programs to prevent and minimize pollutants in runoff from base facilities and operations. At a minimum, pollution prevention and good housekeeping for municipal operations shall include the following programs.

At a minimum, the permittee shall develop, implement, document and maintain the following pollution prevention and good housekeeping programs:

- 1. Facilities Operation and Maintenance Program to manage facilities that are owned and operated by the permittee and have the potential for generating polluted stormwater runoff. The permittee shall maintain a current inventory of municipal facilities and corresponding outfalls and receiving waters; perform facility inspections and routine maintenance; establish specific frequencies, schedules, and standard documentation; provide staff training on general stormwater awareness and implementing pollution prevention and good housekeeping practices.
- 2. Spill Response Program for facilities and operations that store and/or use materials that have the potential to contaminate stormwater runoff if spilled. The permittee shall maintain written spill response procedures and train staff annually on spill response procedures.

3. MS4 Operation and Maintenance Program to minimize pollutants in the stormwater collection system. The permittee shall provide operation and maintenance staff training on stormwater awareness and pollution prevention, perform MS4 inspections, maintain the collection system including catch basins and conveyances; and establish specific frequencies, schedules, and standard documentation.
4. Municipal SCM Operation and Maintenance Program to manage structural SCMs that are installed for compliance with the permittee's post-construction program. The permittee shall maintain a current inventory of SCMs, perform annual SCM inspections, perform routine maintenance in accordance with the SCM O&M Plan, and shall establish specific frequencies, schedules, and documentation.
5. Pesticide, Herbicide and Fertilizer Management Program for staff and contractors to minimize water quality impacts from the use of landscape chemicals. The permittee shall provide routine pollution prevention and chemical use, storage and handling training, and shall ensure compliance with permits and applicator certifications.
6. Vehicle and Equipment Maintenance Program to prevent and minimize contamination of stormwater runoff from areas used for municipal vehicle and equipment maintenance and/or cleaning. The permittee shall ensure that municipal industrial facilities subject to NPDES industrial permitting comply with those permit requirements, provide routine pollution prevention training to staff, perform routine inspections, and establish specific frequencies, schedules, and documentation.
7. Pavement Management Program to reduce pollutants in stormwater runoff from streets, roads, parking lots and runways within the permittee's jurisdictional limits. The permittee shall implement measures to control litter, leaves, debris, particulate matter and fluids associated with vehicles and aircraft, and shall establish specific frequencies, schedules, and documentation.

SECTION H: INDUSTRIAL ACTIVITIES

The permittee shall be deemed to have general permit coverage for industrial facilities subject to the Division's general permits for vehicle maintenance and air transportation (NCG080000 and NCG015000, respectively). Industrial facilities that are subject to individual stormwater permitting and any other general permit shall obtain and maintain an industrial stormwater permit from the Division.

To maintain deemed general permit coverage for an NCG080000 or NCG015000 facility, the permittee shall:

1. Maintain an inventory of subject vehicle maintenance and air transportation facilities.
2. Develop, maintain, and implement a Stormwater Pollution Prevention Plan (SWPPP) at each vehicle maintenance and air transportation facility. The SWPPP shall include all items that are listed in current general permit requirements in NCG080000 and NCG150000. Either a base-wide SWPPP or individual SWPPPs for each facility shall be acceptable to meet this permit requirement.
3. Within twelve (12) months, update and submit to the Division for review and approval an updated Base-wide Monitoring Plan. The Base-wide Monitoring Plan shall target analytical monitoring efforts at stormwater outfalls considered most likely to cause or contribute to water quality degradation based on either previously collected data or an analysis of activities within the drainage

area, or both.

4. Include all analytical monitoring data in the annual report as well as any changes to the Base-wide Monitoring Plan that will occur during the upcoming year.

SECTION I: OIL WATER SEPARATORS

All oil water separators (OWS) that discharge to either the MS4, directly into the waters of the state, or have engineered diversionary catchment basins, including in the event of a bypass, shall be fully described in a SPPP which includes the following information for each OWS:

1. Location,
2. Drainage area,
3. Drainage area activities that could impact stormwater discharges,
4. Materials used/stored/handled in the drainage area that could impact stormwater discharges,
5. Name of water body ultimately receiving any discharge,
6. Design capacity of the device.

SECTION J: IMPAIRED WATERS and TOTAL MAXIMUM DAILY LOADS (TMDLs)

1. The permittee shall evaluate strategies and tailor and/or expand BMPs for impaired waters within the scope of the six minimum measures to enhance water quality recovery strategies in the watershed(s) and describe the strategies and tailored and/or expanded BMPs in each annual report.
2. The permittee shall comply with the requirements of an approved TMDL stormwater Waste Load Allocation (WLA) for any watershed directly receiving discharges from the permitted MS4.
3. If no stormwater WLA exists for an approved TMDL, the permittee shall evaluate strategies and tailor and/or expand BMPs within the scope of the six MCMs to enhance water quality recovery strategies and reduce pollutants of concern in the watershed(s) to which the TMDL applies. The permittee shall describe the strategies and tailored and/or expanded BMPs in their Stormwater Management Plan and annual reports.
4. Upon the date of EPA's final approval of a TMDL, the following shall apply:
 - (a) Within 12 months, the permittee's annual reports shall include a description of, and a brief explanation as to how existing programs, controls, partnerships, projects, and strategies address impaired waters.
 - (b) Within 24 months, the permittee's annual reports shall include an assessment of whether additional structural and/or non-structural BMPs are necessary to address impaired waters.
 - (c) Within 36 months, the permittee's SWMP shall be updated to include appropriate BMPs to address impaired waters.

PART 3: ANNUAL PROGRAM ASSESSMENT

1. Implementation of the Stormwater Plan shall include documentation of all program components that are being undertaken including, but not limited to, inspections, maintenance activities, educational programs, implementation of BMPs, enforcement actions, and other stormwater activities. If monitoring and sampling are being performed documentation of results shall be included. Documentation will be kept on-file by Camp LeJeune for a period of three years and made available to the Director or his authorized representative immediately upon request.
2. The Stormwater Plan shall be reviewed and updated as necessary, but at least on an annual basis. The report shall include appropriate information to accurately describe the program progress, status, and results.

The annual program assessment shall include, but is not limited to, the following components:

- (a) A detailed description of the status of implementation of the Stormwater Plan. This will include information on development and implementation of all components of the Stormwater Plan for the past year and schedules and plans for the year following each report.
 - (b) Describe and justify any proposed changes to the Stormwater Plan. This will include descriptions and supporting information for the proposed changes and how these changes will impact the Stormwater Plan (results, effectiveness, implementation schedule, etc.).
 - (c) Document any necessary changes to programs or practices for assessment of management measures implemented through the Stormwater Plan. In addition, any changes in the cost of, or funding for, the Stormwater Plan will be documented.
 - (d) A summary of data accumulated as part of the Stormwater Plan throughout the year along with an assessment of what the data indicates.
 - (e) A summary of activities undertaken as part of the Stormwater Plan throughout the year. This summary will include, but is not limited to, information on the establishment of appropriate legal authorities, project assessments, inspections, enforcement actions, continued inventory and review of the storm sewer system, education, training and results of the illicit discharge detection and elimination program.
3. The permittee shall submit an annual self-assessment of the previous federal fiscal year activities to the Division no later than December 31 of each year.
 4. The Division may notify the permittee when the Stormwater Plan does not meet one or more of the lawful requirements of the permit. Within thirty (30) calendar days of such notice, the permittee shall submit a plan and time schedule to the Director for modifying the Stormwater Plan to meet the requirements. The Division may approve the plan, approve a plan with modifications, or reject the proposed plan. The permittee shall provide certification in writing to the Division that the changes have been made. Nothing in this paragraph shall be construed to limit the Division's ability to conduct enforcement actions for violations of this permit.

5. The Division may request additional reporting information as necessary to assess the progress and results of the permitted stormwater program.

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PART 4: REPORTING AND RECORD KEEPING REQUIREMENTS

1. Electronic Submittals

Beginning on December 21, 2020, and in accordance with federal reporting requirements established in the final NPDES Electronic Reporting Rule adopted and effective December 21, 2015, the permittee shall electronically submit any required annual reports and monitoring data. All required electronic submittals shall be made in accordance with Division guidance.

2. Non-Electronic Submittals

All reports required herein, not submitted electronically, shall be submitted to the following address:

Department of Environmental Quality
Division of Energy, Mineral, and Land Resources - Stormwater Program
1612 Mail Service Center
Raleigh, North Carolina 27699-1612

3. Signatory Authority

All applications, reports, or information, other than those submitted electronically, shall be signed by a principal executive officer, ranking elected official, or duly authorized representative. A person is a duly authorized representative only if:

- (a) The authorization is made in writing by a principal executive officer or ranking elected official;
- (b) The authorization specified either an individual or a position having responsibility for the overall operation of a regulated facility or activity or an individual or position having overall responsibility for environmental/stormwater matters; and
- (c) The written authorization is submitted to the Division.

4. Signatory Certification

Any person signing a document under these permit requirements shall, at a minimum, make the following certification:

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

5. Record Keeping Requirements

- (a) Documentation shall be kept on-file by the permittee for a period of five years from the date of expiration of this permit and made available to the Division or authorized representative upon request.
- (b) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all reports required by this permit, for a period of at least five years from the date of expiration of this permit. This period may be extended by request of the Division.

6. Supplemental or Corrected Information

Where the permittee becomes aware that it failed to submit any relevant facts or submitted incorrect information in a permit application or in any report to the Division, it shall promptly submit such facts or information.

PART 5: COMPLIANCE AND LIABILITY

1. Duty to Comply

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of permit coverage upon renewal application.

- (a) The permittee shall comply with standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.
- (b) The Clean Water Act provides that any person who violates a permit condition is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently \$37,500 per day for each violation). Any person who negligently violates any permit condition is subject to criminal penalties of \$2,500 to \$25,000 per day of violation, or imprisonment for not more than 1 year, or both. Any person who knowingly violates permit conditions is subject to criminal penalties of \$5,000 to \$50,000 per day of violation, or imprisonment for not more than 3 years, or both. Also, any person who violates a permit condition may be assessed an administrative penalty not to exceed \$16,000 per violation with the maximum amount not to exceed \$177,500. [Ref: Section 309 of the Federal Act 33 USC 1319 and 40 CFR 122.41(a).]
- (c) Under state law, a daily civil penalty of not more than twenty-five thousand dollars (\$25,000) per violation may be assessed against any person who violates or fails to act in accordance with the terms, conditions, or requirements of a permit. [Ref: North Carolina General Statutes 143-215.6A]
- (d) Any person may be assessed an administrative penalty by the Administrator for violating sections 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Pursuant to 40 CFR Part 19 and the Act, administrative penalties for Class I violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently \$11,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$27,500). Pursuant to 40 CFR Part 19 and the Act, penalties for Class II violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently \$11,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$137,500).

2. Duty to Mitigate

The permittee shall take reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

3. Twenty-four Hour Noncompliance Reporting

The permittee shall report to the Division any noncompliance that may constitute an imminent threat to health or the environment. Any information shall be provided orally within 24 hours from the time the permittee became aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances.

The written submission shall contain a description of the noncompliance, and its causes, the period of noncompliance and if the noncompliance has not been corrected, the anticipated time compliance is expected to continue, and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

4. Civil and Criminal Liability

Nothing in this permit shall be construed to relieve the permittee from any responsibilities, liabilities, or penalties for noncompliance pursuant to NCGS 143-215.3, 143-215.6A, 143-215.6B, 143-215.6C or Section 309 of the Federal Act, 33 USC 1319. Furthermore, the permittee is responsible for consequential damages, such as fish kills, even though the responsibility for effective compliance may be temporarily suspended.

5. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under NCGS 143-215.75 et seq. or Section 311 of the Federal Act, 33 USC 1321.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

7. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

8. Duty to Provide Information

The permittee shall furnish to the Division, within a reasonable time, any information which the Division may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the coverage issued pursuant to this permit or to determine compliance with this permit. The permittee shall also furnish to the Division upon request, copies of records required by this permit.

9. Penalties for Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

10. Penalties for Falsification of Reports

The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both.

11. Need to Halt or Reduce not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the condition of this permit.

12. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are owned and/or operated by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures as necessary. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

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PART 6: INSPECTION, ENTRY AND AVAILABILITY OF REPORTS**1. Inspection and Entry**

The permittee shall allow the Division, or an authorized representative (including an authorized contractor acting as a representative of the Division), or in the case of a facility which discharges through a municipal separate storm sewer system, an authorized representative of a municipal operator or the separate storm sewer system receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to;

- (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records shall be kept under the conditions of this permit;
- (b) Have access to and copy, at reasonable times, any records of the permittee that shall be kept under the conditions of this permit;
- (c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations of the permittee regulated or required under this permit; and
- (d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location under the control of the permittee.

2. Availability of Reports

Except for data determined to be confidential under NCGS 143-215.3(a)(2) or Section 308 of the Federal Act, 33 USC 1318, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Division of Energy, Mineral, and Land Resources. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NCGS 143-215.6B or in Section 309 of the Federal Act.

PART 7: DEFINITIONS

1. Act: See Clean Water Act.
2. Annual Self-Assessment (ASA): The standard document submitted by the permittee on an annual basis that summarizes the SWMP implementation and activities conducted during the previous fiscal year.
3. Best Management Practice (BMP): Measures or practices used to reduce the amount of pollution entering surface waters. BMPs can be structural or non-structural and may take the form of a process, activity, physical structure or planning (see non-structural BMP). See also SCM.
4. Clean Water Act (CWA or Act): The Federal Water Pollution Control Act, also known as the Clean Water Act, as amended, 33 USC 1251, et. seq.
5. Common Plan of Development: A construction or land disturbing activity is part of a larger common plan of development if it is completed in one or more of the following ways: in separate stages, in separate phases, or in combination with other construction activities. It is identified by the documentation (including but not limited to a sign, public notice or hearing, sales pitch, advertisement, loan application, drawing, plats, blueprints, marketing plans, contracts, permit application, zoning request, or computer design) or physical demarcation (including but not limited to boundary signs, lot stakes, or surveyor markings) indicating that construction activities may occur on a specific plot. It can include one operator or many operators.
6. Construction Activity: The disturbance of soils associated with clearing, grading, excavating, filling of land, or other similar activities which may result in soil erosion.
7. Department (DEQ): The North Carolina Department of Environmental Quality.
8. Division (DEMLR): The Division of Energy, Mineral, and Land Resources in the Department of Environmental Quality.
9. Illicit Discharge: Any discharge to a MS4 that is not composed entirely of stormwater except discharges pursuant to an NPDES permit (other than the NPDES MS4 permit), allowable non-stormwater discharges, and discharges resulting from fire-fighting activities.
10. Industrial Activity: For the purposes of this permit, industrial activities shall mean all industrial activities as defined in 40 CFR 122.26.
11. Major Municipal Separate Storm Sewer Outfall (or “Major Outfall”): Major municipal separate storm sewer outfall (or “major outfall”) means a municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe that is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of 2 acres or more).
12. Maximum Extent Practicable (MEP): MEP is defined in the *Federal Register* (U.S. EPA, 1999, p. 68754). This document says that “Compliance with the conditions of the general permit and the series of steps associated with identification and implementation of the minimum control measures will satisfy the MEP standard.” Minimum control measures are defined in the *Federal Register* as (1) public education and outreach, (2) public

participation/involvement, (3) illicit discharge detection and elimination, (4) construction site runoff control, (5) post-construction runoff control, and (6) pollution prevention/good housekeeping. MEP are the controls necessary for the reduction of pollutants discharged from a MS4, which consist of a combination of BMPs, control techniques, system design and such other provisions as described in the SWMP. Implementation of BMPs consistent with the provisions of the stormwater management program required pursuant to this permit constitutes compliance with the standard of reducing pollutants to the MEP. Stormwater management programs must be assessed and adjusted, as part of an iterative process, to maximize their efficiency and make reasonable progress toward as ultimate goal of reducing the discharge of pollutants to the MEP.

13. Municipal Separate Storm Sewer System (MS4): Pursuant to 40 CFR 122.26(b)(8) means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains) owned or operated by the United States, a State, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the Clean Water Act (CWA) that discharges to waters of the United States or waters of the State that is designed or used for collecting or conveying stormwater; that is not a combined sewer; and which is not part of a Publicly Owned Treatment Works (POTW) as defined in 40 CFR 122.2.
14. Non-structural BMP: Non-structural BMPs are preventive actions that involve management and source controls such as: (1) Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along sensitive water bodies, minimize impervious surfaces, and/or minimize disturbance of soils and vegetation; (2) policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure; (3) education programs for developers and the public about minimizing water quality impacts; (4) other measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source control measures often thought of as good housekeeping, preventive maintenance and spill prevention.
15. Outfall: Outfall means a point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer discharges to waters of the United States and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States.
16. Permittee: The owner or operator issued this permit.
17. Point Source Discharge of Stormwater: Any discernible, confined and discrete conveyance including, but not specifically limited to, any pipe, ditch, channel, tunnel, conduit, well, or discrete fissure from which stormwater is or may be discharged to waters of the state.
18. Redevelopment: "Redevelopment" has the same meaning as in G.S. 143-214.7.
19. Storm Sewer System: Is a conveyance or system of conveyances which are designed or used to collect or convey stormwater runoff that is not part of a combined sewer system or treatment works. This can include, but is not limited to, streets, catch basins, pipes, curbs, gutters, ditches, man-made channels or storm drains that convey stormwater runoff.
20. Stormwater Associated with Industrial Activity: The discharge from any point source which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing or raw material storage areas at an industrial site. Facilities considered to be engaged in "industrial activities" include those

activities defined in 40 CFR 122.26(b)(14). The term does not include discharges from facilities or activities excluded from the NPDES program.

21. Stormwater Control Measures (SCM): "Stormwater Control Measure" or "SCM," also known as a structural "Best Management Practice" or "BMP," means a permanent device that is designed, constructed, and maintained to remove pollutants from stormwater runoff by promoting settling or filtration; or to mimic the natural hydrologic cycle by promoting infiltration, evapo-transpiration, post-filtration discharge, reuse of stormwater, or a combination thereof.
22. Stormwater Management Program: The term Stormwater Management Program refers to the comprehensive stormwater management program that is required to be developed and implemented by MS4 permittees.
23. Stormwater Management Plan (SWMP): The Stormwater Management Plan is the written plan that is used to describe and define the various control measures and activities the permittee will undertake to implement the stormwater management program to meet the MEP standard.
24. Stormwater Runoff: The flow of water which results from precipitation and which occurs immediately following rainfall or as a result of snowmelt.
25. Total Maximum Daily Load (TMDL): A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is a detailed water quality assessment that provides the scientific foundation for an implementation plan. The implementation plan outlines the steps necessary to reduce pollutant loads in a certain body of water to restore and maintain water quality standards in all seasons. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs.
26. Waste Load Allocation (WLA): A WLA is a TMDL pollutant reduction target allocating a specific load reduction to specific point source discharge(s) of the pollutant. Some stormwater point source discharges are assigned a WLA.

APPENDIX B

Outfalls with Regulated Industrial Activity

Appendix B Outfalls With Regulated Industrial Activity

MCIEAST-MCB CAMLEJ



Outfall No. (GIS ID)	Easting	Northing	Total Area (acres)	Receiving Stream	Industrial Activities	Monitoring Status
OAB-001	927069.11	12562984.91	7.30	Courthouse Bay	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. A47)	Visual
OAB-002	926808.53	12562591.75	4.85	Courthouse Bay	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. A47)	Visual
OAB-003	926396.83	12562270.39	0.95	Courthouse Bay	4225 General Warehousing and Storage (Bldg. A1)	Visual
OAB-006	926955.89	12562837.21	3.14	Courthouse Bay	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. A47)	Visual
OAB-007	925295.86	12563052.44	32.18	UT to Courthouse Bay	* 4225 General Warehousing and Storage (Bldg. A1) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. A71, Bldg. A66)	Visual
OAS-001	910497.64	12603283.29	138.53	Southwest Creek	* 3732 Boat Building and Repairing (Bldg. AS2820) * 4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS890)	Visual
OAS-002	910390.78	12605923.46	15.47	New River	4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS840)	Visual
OAS-003	910434.69	12607058.78	18.92	New River	4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS840, Bldg. AS842)	Visual
OAS-004	899756.29	12606781.84	23.27	Southwest Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. AS4158)	Visual
OAS-005	902704.69	12604604.28	280.16	UT to Southwest Creek	* 2499 Wood Products (Bldg. AS122) * 4225 General Warehousing and Storage (Bldg. AS186, Bldg. AS4085, Bldg. AS4081, Bldg. AS4110, Bldg. AS4171) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. AS4146, Bldg. AS4135, Bldg. AS4188, Bldg. AS118) * 4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS4109, Bldg. AS3900, Bldg. AS3905, Bldg. AS518, Bldg. AS4106, Bldg. AS4100, Bldg. AS4108) * 5171 Petroelum Bulk Stations and Terminals (Bldg. AS143)	Analytical
OAS-006	899863.94	12607667.28	12.95	Southwest Creek	4225 General Warehousing and Storage (Bldg. AS4192)	Visual
OAS-008	910107.34	12604882.58	9.59	Southwest Creek	4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS890)	Visual
OAS-010	910102.18	12605562.86	16.63	Southwest Creek	4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS890)	Visual
OAS-014	906697.86	12603334.10	85.62	UT to Southwest Creek	* 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation Bldg. AS3534) * 5171 Petroleum Bulk Stations and Terminals (Bldg. AS3517) * Hazardous Material Treatment, Storage, or Disposal Facilities (Bldg. AS3525)	Visual
OAS-018	902988.89	12605178.63	251.56	UT to Southwest Creek	4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS3905, Bldg. AS518, Bldg. AS4106, Bldg. AS4100, Bldg. AS4108, Bldg. AS515, Bldg. AS514, Bldg. AS488, Bldg. AS511, Bldg. AS480, Bldg. AS498, Bldg. AS516)	Analytical
OAS-021	908628.26	12609247.25	132.13	New River	4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS516, Bldg. AS508, Bldg. AS427)	Visual
OAS-030	907203.55	12612164.90	85.19	Stick Creek	* 4225 General Warehousing and Storage (Bldg. AS541, Bldg. AS424) * 4581 Airports, Flying Fields, and Airport Terminal Services (Bldg. AS516, Bldg. AS265)	Visual

Appendix B Outfalls With Regulated Industrial Activity

MCIEAST-MCB CAMLEJ



Outfall No. (GIS ID)	Easting	Northing	Total Area (acres)	Receiving Stream	Industrial Activities	Monitoring Status
OAS-032	905969.63	12613549.34	81.37	Strawhorn Creek	* 2499 Wood Products (Bldg. AS122) * 4225 General Warehousing and Storage (Bldg. AS130) * 4231 Terminal and Joint Terminal Maintenance Facilities (Bldg. AS118)	Visual
OAS-037	909667.92	12602370.90	4.88	Southwest Creek	4493 Marinas (Bldg. AS2800)	Visual
OCB-001	929542.41	12559022.93	44.91	UT to New River	* 3732 Bboat Building and Repairing (Bldg. BB329) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. BB51)	Visual
OCB-013	930981.66	12558985.73	10.36	UT to New River	* 3732 Boat Building and Repairing (Bldg. BB329) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transporation (Bldg. BB51)	Visual
OCB-014	931982.12	12561076.21	5.67	Courthouse Bay	5171 Petroleum Bulk Stations and Terminals (CONT161)	Visual
OCB-016	931411.48	12559317.14	80.79	UT to New River	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. BB360)	Visual
OCJ-001	917573.15	12612862.20	10.24	Northeast Creek	* 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. M90) * 5171 Petroleum Bulk Stations and Terminals (Bldg. SM192A)	Visual
OCJ-003	917073.97	12612414.01	73.78	Northeast Creek	4225 General Warehousing and Storage (Bldg. M287, New UPO PEB Warehouse)	Visual
OCJ-004	914454.40	12616909.82	67.49	UT to Wilson Bay	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. M107, Bldg. M151)	Visual
OFC-001	941702.54	12582297.52	20.76	UT to Cowhead Creek	Wastewater Treatment Works (Bldg. FC436)	Visual
OFC-002	938655.11	12580778.07	110.52	UT to Frenchs Creek	Wastewater Treatment Works (Bldg. FC436)	Visual
OFC-003	941451.02	12584311.33	61.78	UT to Cowhead Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC230, Bldg. FC251, Bldg. FC356, Bldg. FC241, Bldg. FC263, Bldg. FC255)	Analytical
OFC-004	946204.66	12583259.21	39.91	Cowhead Creek	5171 Petroleum Bulk Stations and Terminals (CONT160)	Visual
OFC-005	941565.45	12583750.05	21.96	UT to Cowhead Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC263, Bldg. FC255)	Visual
OFC-006	943854.87	12587531.11	47.40	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC40, Bldg. FC286, Bldg. FC45)	Visual
OFC-008	942169.27	12586657.40	46.19	Cogdels Creek	* 2499 Wood Products (Bldg. ES101) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC200, Bldg. FC280, Bldg. FC281, Bldg. FC286)	Visual
OFC-009	942201.29	12586640.04	26.00	Cogdels Creek	*2499 Wood Products (Bldg. ES101) *4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC143, Bldg. FC270, Bldg. FC211)	Visual
OFC-012	940584.84	12587222.05	34.09	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC100, Bldg. FC120)	Visual

Appendix B Outfalls With Regulated Industrial Activity

MCIEAST-MCB CAMLEJ



Outfall No. (GIS ID)	Easting	Northing	Total Area (acres)	Receiving Stream	Industrial Activities	Monitoring Status
OFC-013	943804.99	12587506.17	7.56	Cogdels Creek	4225 General Warehousing and Storage (Bldg. 989)	Visual
OFC-026	938931.76	12584997.93	25.52	UT to Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC375)	Visual
OFC-027	942518.35	12587949.56	10.21	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. FC57)	Visual
OHP-001	937717.84	12586252.38	29.76	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1880, Bldg. 575)	Visual
OHP-002	938791.61	12587695.60	3.54	UT to Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1854)	Visual
OHP-003	938813.62	12587389.45	3.34	UT to Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1854)	Visual
OHP-004	937921.41	12587909.57	63.64	UT to Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1880, Bldg. 1854, Bldg. 1829, Bldg. 1710)	Analytical
OHP-005	938468.01	12587899.84	1.26	UT to Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1780)	Visual
OHP-006	938950.70	12588698.68	147.96	UT to Cogdels Creek	* 3499 Fabricated Metal Products (Bldg. 1202) * 4173 Terminal and Service Facilities for Motor Vehicle Passenger Transportation (Bldg. 1408) * 4225 General Warehousing and Storage (Bldg. 1501, Bldg. 1601, Bldg. 1403, Bldg. 1301, Bldg. 1402)) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1829, Bldg. 1710, Bldg. 1775, Bldg. 1405, Bldg. 1522, Bldg. 1406, Bldg. 1502, Bldg. 1311, Bldg. 1506, Bldg. 1445, Bldg. 1450, Bldg. 1470, Bldg. 1205/1206)	Visual
OHP-007	937253.72	12594264.46	52.89	Beaverdam Creek	* 3499 Fabricated Metal Products (Bldg. 1202) * 4225 General Warehousing and Storage (Bldg. 1101)	Visual
OHP-008	940433.08	12590066.86	117.65	UT to Cogdels Creek	* 2499 Wood Products (Bldg. HP1016) * 4225 General Warehousing and Storage (Bldg. 915, Bldg. 916, Bldg. 906, Bldg. 907, Bldg. 1116, Bldg. 1211, Bldg. 1317, Bldg. 905, Bldg. 1212, Bldg. 1011, Bldg. 1012, Bldg. 1316, Bldg. 1117, Bldg. 1015, Bldg. HP1017) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1205/1206, Bldg. 1323) * Hazardous Material Treatment, Storage, or Disposal Facilities (Bldg. 1038) * Recycling and Scraps/Salvage (Bldg. 1023)	Analytical
OHP-010	937297.66	12592523.77	36.96	UT to Beaverdam Creek	4225 General Warehousing and Storage (Bldg. 1301, Bldg. 1402, Bldg. 1101, Bldg. 1201, Bldg. 1108)	Visual
OHP-011	941837.80	12591715.09	16.38	UT to Cogdels Creek	4225 General Warehousing and Storage (Bldg. 914)	Visual
OHP-012	940143.00	12596521.65	79.68	Bearhead Creek	* Hazardous Material Treatment, Storage, or Disposal Facilities (Bldg. 977) * 4225 General Warehousing and Storage (Bldg. 902, Bldg. 901) * 5171 Petroleum Bulk Stations and Terminals (Bldg. 1070)	Visual
OHP-013	942488.11	12594832.54	103.37	Bearhead Creek	4225 General Warehousing and Storage (Bldg. 901, Bldg. 903, Bldg. 904)	Visual

Appendix B
Outfalls With Regulated Industrial Activity

MCIEAST-MCB CAMLEJ



Outfall No. (GIS ID)	Easting	Northing	Total Area (acres)	Receiving Stream	Industrial Activities	Monitoring Status
OHP-014	937231.34	12585936.06	26.11	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 575)	Visual
OHP-015	933917.41	12586446.27	191.37	New River	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1747)	Visual
OHP-017	938572.03	12586446.62	7.91	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1854, Bldg. 1841)	Visual
OHP-018	931552.36	12588776.60	141.83	New River	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. HP232, Bldg. HP237)	Visual
OHP-019	931430.40	12590892.11	85.86	New River	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. HP250)	Visual
OHP-021	930642.73	12594291.92	99.25	Wallace Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. HP104, Bldg. HP100)	Visual
OHP-022	939976.51	12596515.71	97.44	Bearhead Creek	Recycling and Scraps/Salvage (Bldg. 1081)	Visual
OHP-024	936076.82	12592414.55	63.65	UT to Beaverdam Creek	4225 General Warehousing and Storage (Bldg. 1402, Bldg. 1501)	Visual
OHP-027	931687.16	12595914.12	27.49	Wallace Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 25)	Visual
OHP-035	936501.93	12585267.20	36.64	Cogdels Creek	5171 Petroluem Bulk Stations and Terminals (CONT162)	Visual
OHP-038	938030.86	12586574.46	3.36	Cogdels Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. 1841)	Visual
OHP-042	940907.49	12588536.85	18.83	Cogdels Creek	4225 General Warehousing and Storage (Bldg. 1462, Bldg. 1461, Bldg. 1463, Bldg. 1464, Bldg. 1465)	Visual
OHP-043	941670.37	12589626.55	6.42	Cogdels Creek	3732 Boat Building and Repairing (Bldg. 1047)	Visual
OHP-044	940773.61	12590018.43	5.33	UT to Cogdels Creek	3732 Boat Building and Repairing (Bldg. 1047)	Visual
OHP-045	940733.88	12596399.02	15.11	Bearhead Creek	Recycling and Scraps/Salvage (Bldg. 1002)	Visual
OLF-001	941209.83	12596318.17	82.10	Bearhead Creek	* Recycling and Scraps/Salvage (Bldg. 978) * Landfills, Land Application Sites, and Open Dumps (Bldg. 982)	Visual
OLF-002	943338.37	12596412.68	312.43	UT to Wallace Creek	Landfills, Land Application Sites, and Open Dumps (Bldg. 982)	Visual
ONH-001	932728.31	12612237.42	417.36	Northeast Creek	4173 Terminal and Service Facilites for Motor Vehicle Passenger Transportation (Bldg. NH118)	Visual
ONH-002	931657.28	12611988.93	17.01	Northeast Creek	5171 Petroluem Bulk Stations and Terminals (Bldg. NH100)	Visual
OOH-008	930046.98	12594362.34	19.30	Wallace Creek	4493 Marinas (Bldg. 198)	Visual
ORR-001	902411.92	12563843.27	8.18	Stones Creek	2499 Wood Products (Bldg. RR13)	Visual
ORR-003	906047.80	12564041.86	14.15	UT to Stones Bay	2499 Wood Products (Bldg. RR149)	Visual
ORR-012	903593.50	12559368.93	65.59	UT to Stones Bay	* 2499 Wood Products (Bldg. RR480) * 4225 General Warehousing and Storage (Bldg. RR465) * 4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. RR430, Bldg. RR425)	Visual
ORR-013	902149.14	12563013.76	15.22	Stones Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. RR121)	Visual
ORR-014	902310.86	12564415.25	2.68	UT to Stones Creek	2499 Wood Products (Bldg. RR13)	Visual

Appendix B
Outfalls With Regulated Industrial Activity

MCIEAST-MCB CAMLEJ



Outfall No. (GIS ID)	Easting	Northing	Total Area (acres)	Receiving Stream	Industrial Activities	Monitoring Status
OSR-001	890928.34	12570961.08	8.16	Swamp Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. SR72)	Visual
OTC-002	903178.56	12618107.02	6.65	UT to Brinson Creek	4225 General Warehousing and Storage (Bldg. G485)	Visual
OTC-002B	902016.70	12618074.82	37.80	UT to Brinson Creek	4225 General Warehousing and Storage (Bldg. G484)	Visual
OTC-003	904874.58	12617345.34	39.59	Brinson Creek	* 4225 General Warehousing and Storage (Bldg. TC562) * 5171 Petroleum Bulk Stations and Terminals (Bldg. TC366)	Analytical
OTC-004	906934.60	12616007.20	63.79	New River	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. G773)	Visual
OTC-005	903861.45	12614540.27	391.33	Edwards Creek	4225 General Warehousing and Storage (Bldg. G865)	Visual
OWC-001	934675.22	12595082.00	42.00	Beaverdam Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. WC200)	Analytical
OWC-002	934125.05	12595106.23	12.93	Beaverdam Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. WC200)	Visual
OWC-003	935731.36	12597147.19	6.82	Wallace Creek	4225 General Warehousing and Storage (Bldg. WC177, Bldg. WC178)	Visual
OWC-004	937033.97	12600068.75	14.81	Wallace Creek	4231 Terminal and Joint Terminal Maintenance Facilities for Motor Freight Transportation (Bldg. WC501)	Visual
OWC-005	938154.88	12599555.82	18.90	Wallace Creek	4225 General Warehousing and Storage (Bldg. WC512)	Visual
OWF-001	940166.48	12601779.74	224.67	Wallace Creek	Hazardous Material Treatment, Storage, or Disposal Facilities (Bldg. 490)	Visual

APPENDIX C

Stormwater Discharge Outfall (SDO) Monitoring Report - Blank

**STORMWATER DISCHARGE OUTFALL (SDO)
MONITORING REPORT**

Permit Number NCS _____

SAMPLES COLLECTED DURING CALENDAR YEAR: _____

(This monitoring report shall be received by the Division no later than 30 days from the date the facility receives the sampling results from the laboratory.)

FACILITY NAME _____
 PERSON COLLECTING SAMPLE(S) _____
 CERTIFIED LABORATORY(S) _____ Lab # _____
 _____ Lab # _____

COUNTY _____
 PHONE NO. (____) _____

**SIGNATURE OF PERMITTEE OR DESIGNEE
REQUIRED ON PAGE 2.**

Part A: Specific Monitoring Requirements

Outfall No.	Date Sample Collected	50050 Total Flow (if app.) MG	Total Rainfall inches						
	mo/dd/yr								

Does this facility perform Vehicle Maintenance Activities using more than 55 gallons of new motor oil per month? yes no
 (if yes, complete Part B)

Part B: Vehicle Maintenance Activity Monitoring Requirements

Outfall No.	Date Sample Collected	50050 Total Flow (if applicable) MG	Total Rainfall inches	00556 Oil & Grease (if appl.) mg/l	Non-polar O&G/TPH (Method 1664 SGT-HEM), if appl.	00530 Total Suspended Solids mg/l	00400 pH unit	New Motor Oil Usage gal/mo
	mo/dd/yr							

STORM EVENT CHARACTERISTICS:

Date _____

Total Event Precipitation (inches): _____

Event Duration (hours): _____ (only if applicable – see permit.)

(if more than one storm event was sampled)

Date _____

Total Event Precipitation (inches): _____

Event Duration (hours): _____ (only if applicable – see permit.)

Mail Original and one copy to:

Division of Energy Mineral and Land Resources

Attn: Central Files

1617 Mail Service Center

Raleigh, North Carolina 27699-1617

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

(Signature of Permittee)

(Date)

APPENDIX D

Stormwater Discharge Outfall (SDO) Qualitative Monitoring Report - Blank



Stormwater Discharge Outfall (SDO) Qualitative Monitoring Report

For guidance on filling out this form, please visit <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permits/stormwater-permits/npdes-industrial-sw#tab-4>

Permit No.: N/C/ / / / / / / / / or Certificate of Coverage No.: N/C/G/ / / / / / / / /

Facility Name: _____

County: _____ Phone No. _____

Inspector: _____

Date of Inspection: _____

Time of Inspection: _____

Total Event Precipitation (inches): _____

All permits require qualitative monitoring to be performed during a “measurable storm event.”

A “**measurable storm event**” is a storm event that results in **an actual discharge** from the permitted site outfall. The previous measurable storm event must have been at least 72 hours prior. The 72-hour storm interval does not apply if the permittee is able to document that a shorter interval is representative for local storm events during the sampling period, and the permittee obtains approval from the local DEMLR Regional Office.

By this signature, I certify that this report is accurate and complete to the best of my knowledge:

(Signature of Permittee or Designee)

1. Outfall Description:

Outfall No. _____ Structure (pipe, ditch, etc.): _____

Receiving Stream: _____

Describe the industrial activities that occur within the outfall drainage area: _____

2. **Color:** Describe the color of the discharge using basic colors (red, brown, blue, etc.) and tint (light, medium, dark) as descriptors: _____

3. **Odor:** Describe any distinct odors that the discharge may have (i.e., smells strongly of oil, weak chlorine odor, etc.): _____

4. **Clarity:** Choose the number which best describes the clarity of the discharge, where 1 is clear and 5 is very cloudy:

1 2 3 4 5

5. **Floating Solids:** Choose the number which best describes the amount of floating solids in the stormwater discharge, where 1 is no solids and 5 is the surface covered with floating solids:

1 2 3 4 5

6. **Suspended Solids:** Choose the number which best describes the amount of suspended solids in the stormwater discharge, where 1 is no solids and 5 is extremely muddy:

1 2 3 4 5

7. Is there any **foam** in the stormwater discharge? ☐ Yes ☐ No. _____

8. Is there an **oil sheen** in the stormwater discharge? ☐ Yes ☐ No. _____

9. Is there evidence of **erosion or deposition** at the outfall? ☐ Yes ☐ No. _____

10. **Other Obvious Indicators of Stormwater Pollution:**

List and describe _____

Note: Low clarity, high solids, and/or the presence of foam, oil sheen, or erosion/deposition may be indicative of pollutant exposure. These conditions warrant further investigation.

APPENDIX E

Stormwater Discharge Outfall Qualitative Monitoring Report Supplement SWU-242A: Guidance for Rating Stormwater Discharge

Stormwater Discharge Outfall (SDO) Qualitative Monitoring Report Supplement SWU-242A: Guidance for Rating Stormwater Discharge

This supplement is intended only as a guide for rating visually observed parameters on a scale of 1-5. The inspector should use best professional judgment when characterizing the quality of stormwater discharge. Also, the pictures included here do not necessarily show stormwater discharges but serve to illustrate the characteristics described.

Clarity

(1 is clear, and 5 is very opaque or cloudy)



1



3



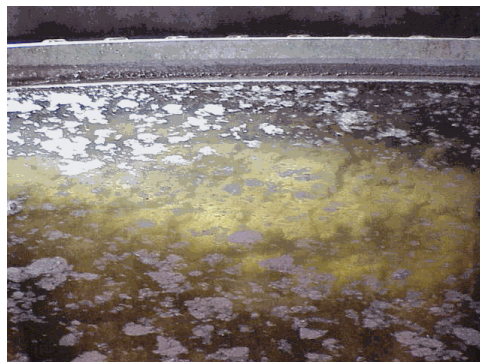
5

Floating Solids

(1 is no solids, and 5 is the surface covered with floating solids or significant trash/debris)



1



3



5



Suspended Solids

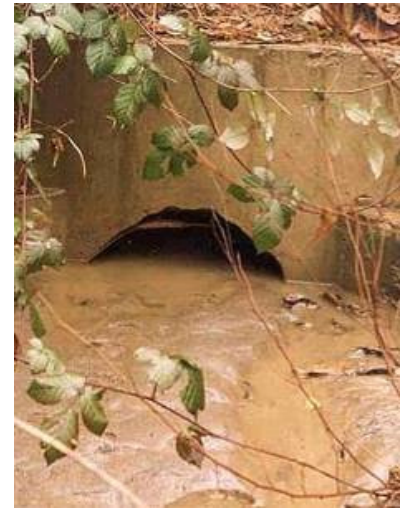
(1 is no solids, and 5 is extremely muddy or clouded with other particles)



1



3



5

Tannic Water

Water naturally high in tannins in the eastern part of North Carolina may still have low amounts of suspended solids and high clarity but not appear “clear” because of coloration. The examples below will help rate discharges that must be observed in tannic waters.

Clear tannic water may look like tea or coffee, but waters that look more “milky” or like “chocolate milk” have less clarity and higher suspended solids.

Suspended Solids / Clarity in waterbodies naturally high in tannins



1 / 1



3 / 3



5 / 5

Example 1



1. Outfall Description: Example 1 of 4

Outfall No. 001 Structure (pipe, ditch, etc.) Pipe

Receiving Stream: _____

Describe the industrial activities that occur within the outfall drainage area: _____

2. Color: Describe the color of the discharge using basic colors (red, brown, blue, etc.) and tint (light, medium, dark) as descriptors: light brown

3. Odor: Describe any distinct odors that the discharge may have (i.e., smells strongly of oil, weak chlorine odor, etc.): none

4. Clarity: Choose the number which best describes the clarity of the discharge, where 1 is clear and 5 is very cloudy:

1 2 3 4 5

5. Floating Solids: Choose the number which best describes the amount of floating solids in the stormwater discharge, where 1 is no solids and 5 is the surface covered with floating solids:

1 2 3 4 5

6. Suspended Solids: Choose the number which best describes the amount of suspended solids in the stormwater discharge, where 1 is no solids and 5 is extremely muddy:

1 2 3 4 5

Example 1 of 4, cont.

7. Is there any **foam** in the stormwater discharge?

Yes

No

Possibly small amount of foam near pipe outlet.

8. Is there an **oil sheen** in the stormwater discharge?

Yes

No

9. Is there evidence of **erosion or deposition** at the outfall?

Yes

No

Deposition of sand to the right of pipe outlet.

10. **Other Obvious Indicators of Stormwater Pollution:**

List and describe N/A _____

Example 2



1. Outfall Description: Example 2 of 4

Outfall No. 001 Structure (pipe, ditch, etc.) Ditch

Receiving Stream: _____

Describe the industrial activities that occur within the outfall drainage area: _____

2. Color: Describe the color of the discharge using basic colors (red, brown, blue, etc.) and tint (light, medium, dark) as descriptors: medium gray-green

3. Odor: Describe any distinct odors that the discharge may have (i.e., smells strongly of oil, weak chlorine odor, etc.): none

4. Clarity: Choose the number which best describes the clarity of the discharge, where 1 is clear and 5 is very cloudy:

1 2 3 4 5

Note in lower right corner of picture, leaf shadow is visible on the bottom of outlet. Clarity decreases beyond outlet.

5. Floating Solids: Choose the number which best describes the amount of floating solids in the stormwater discharge, where 1 is no solids and 5 is the surface covered with floating solids:

1 2 3 4 5

Floating solids observed here are mostly tree debris that fell in after discharge.

6. Suspended Solids: Choose the number which best describes the amount of suspended solids in the stormwater discharge, where 1 is no solids and 5 is extremely muddy:

1 2 3 4 5

Solids have settled out near outfall and are more “dissolved” out in the water near the top of the picture (where water appears more gray). At the outlet, there are not any swirls, clouds, or suspended particles.

Example 2 of 4, cont.

- | | | | |
|----|-------------------------------------------------------------------|--------------------------------------|-------------------------------------|
| 7. | Is there any foam in the stormwater discharge? | Yes | <input checked="" type="radio"/> No |
| 8. | Is there an oil sheen in the stormwater discharge? | Yes | <input checked="" type="radio"/> No |
| 9. | Is there evidence of erosion or deposition at the outfall? | <input checked="" type="radio"/> Yes | No |

10. Other Obvious Indicators of Stormwater Pollution:

List and describe Some displacement of gravel and sediment observed at the outfall. Also, lots of solids that have settled. The water becomes more turbid/cloudy beyond the outfall (i.e., clarity decreases). Evidence of excessive solids being carried into receiving water. _____

This example illustrates how additional information in number 10. can be important to characterizing stormwater discharge impacts.

Example 3



1. Outfall Description: Example 3 of 4

Outfall No. 001 Structure (pipe, ditch, etc.) Pipe

Receiving Stream: _____

Describe the industrial activities that occur within the outfall drainage area: _____

2. Color: Describe the color of the discharge using basic colors (red, brown, blue, etc.) and tint (light, medium, dark) as descriptors: medium brown/tan

3. Odor: Describe any distinct odors that the discharge may have (i.e., smells strongly of oil, weak chlorine odor, etc.): oily smell

4. Clarity: Choose the number which best describes the clarity of the discharge, where 1 is clear and 5 is very cloudy:

1 2 3 4 5

5. Floating Solids: Choose the number which best describes the amount of floating solids in the stormwater discharge, where 1 is no solids and 5 is the surface covered with floating solids:

1 2 3 4 5

Rating based on amount of scum/oil covering surface, not tree debris.

6. Suspended Solids: Choose the number which best describes the amount of suspended solids in the stormwater discharge, where 1 is no solids and 5 is extremely muddy:

1 2 3 4 5

Example 3 of 4, cont.

- | | | | |
|----|-------------------------------------------------------------------|--------------------------------------|--------------------------|
| 7. | Is there any foam in the stormwater discharge? | Yes | <input type="radio"/> No |
| 8. | Is there an oil sheen in the stormwater discharge? | <input checked="" type="radio"/> Yes | No |
| 9. | Is there evidence of erosion or deposition at the outfall? | Yes | <input type="radio"/> No |

10. Other Obvious Indicators of Stormwater Pollution:

List and describe Oil and scummy substance floating on top. Dead duck found. _____

Example 4



1. Outfall Description: Example 4 of 4

Outfall No. 001 Structure (pipe, ditch, etc.) Pipe

Receiving Stream: _____

Describe the industrial activities that occur within the outfall drainage area: _____

2. Color: Describe the color of the discharge using basic colors (red, brown, blue, etc.) and tint (light, medium, dark) as descriptors: clear

3. Odor: Describe any distinct odors that the discharge may have (i.e., smells strongly of oil, weak chlorine odor, etc.): none

4. Clarity: Choose the number which best describes the clarity of the discharge, where 1 is clear and 5 is very cloudy:

1 2 3 4 5

5. Floating Solids: Choose the number which best describes the amount of floating solids in the stormwater discharge, where 1 is no solids and 5 is the surface covered with floating solids:

1 2 3 4 5

6. Suspended Solids: Choose the number which best describes the amount of suspended solids in the stormwater discharge, where 1 is no solids and 5 is extremely muddy:

1 2 3 4 5

Example 4 of 4, cont.

7. Is there any **foam** in the stormwater discharge? Yes ☐ No ☒

8. Is there an **oil sheen** in the stormwater discharge? Yes ☐ No ☒

9. Is there evidence of **erosion or deposition** at the outfall? Yes ☐ No ☒

10. Other Obvious Indicators of Stormwater Pollution:

List and describe N/A _____

APPENDIX F

Blank Annual Summary Data Monitoring Report

STORMWATER DISCHARGE OUTFALL (SDO)
ANNUAL SUMMARY DATA MONITORING REPORT (DMR) / SPPP Annual Update DATA REVIEW FORM
Calendar Year _____

Individual NPDES Permit No. NCS or
 Certificate of Coverage (COC) No. NCG

This monitoring report summary of the calendar year should be kept on file on-site with the facility SPPP.

Facility Name: _____

County: _____

Phone Number: (____)_____ Total no. of SDOs monitored _____

Outfall No. _____

Is this outfall currently in Tier 2 (monitored monthly)? Yes ☐ No ☐

Was this outfall ever in Tier 2 (monitored monthly) during the past year? Yes ☐ No ☐

If this outfall was in Tier 2 last year, why was monthly monitoring discontinued?

Enough consecutive samples below benchmarks to decrease frequency

Received approval from DWQ to reduce monitoring frequency

Other _____

Was this SDO monitored because of vehicle maintenance activities? Yes ☐ No ☐

	Total Rainfall, inches	Parameter, (units)							
Benchmark	N/A								
Date Sample Collected, mm/dd/yy									

Outfall No. _____

Yes ☐ No ☐

Yes ☐ No ☐

Enough consecutive samples below benchmarks to decrease frequency ☐

Received approval from DWQ to reduce monitoring frequency ☐

Other _____ ☐

Yes ☐ No ☐

SWU-264 - Generic Annual DMR
Last revised 6/01/2018

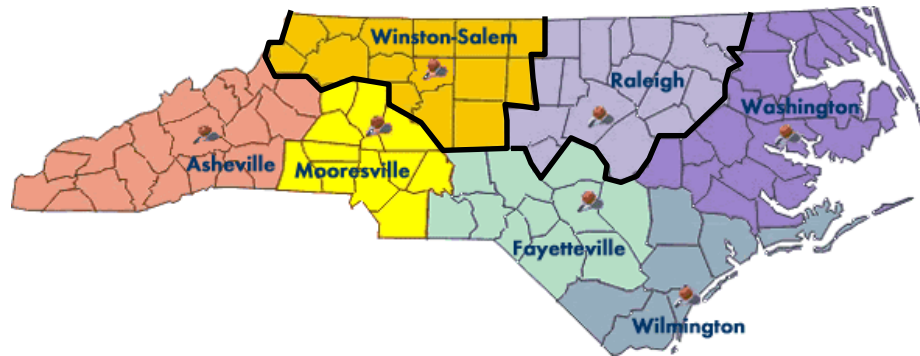
"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

Signature _____

Date _____

For questions, contact your local Regional Office:

DEMLR Regional Office Contact Information:



ASHEVILLE REGIONAL OFFICE 2090 US Highway 70 Swannanoa, NC 28778 (828) 296-4500	FAYETTEVILLE REGIONAL OFFICE 225 Green Street Systel Building Suite 714 Fayetteville, NC 28301-5043 (910) 433-3300	MOORESVILLE REGIONAL OFFICE 610 East Center Avenue/Suite 301 Mooresville, NC 28115 (704) 663-1699
RALEIGH REGIONAL OFFICE 3800 Barrett Drive Raleigh, NC 27609 (919) 791-4200	WASHINGTON REGIONAL OFFICE 943 Washington Square Mall Washington, NC 27889 (252) 946-6481	WILMINGTON REGIONAL OFFICE 127 Cardinal Drive Extension Wilmington, NC 28405-2845 (910) 796-7215
WINSTON-SALEM REGIONAL OFFICE 450 Hanes Mill Rd, Suite 300 Winston-Salem, NC 27105 (336) 776-9800	CENTRAL OFFICE 1617 Mail Service Center Raleigh, NC 27699-1617 (919) 807-6300	

APPENDIX G

Blank MCIEAST-MCB CAMLEJ Simple Method Runoff Volume Spreadsheet

**MARINE CORPS INSTALLATIONS EAST
BASE CAMP LEJEUNE AND MARINE CORPS AIR STATION
STORMWATER ANALYTICAL SAMPLING EVENTS
(NCDENR PERMIT NO. NCS000290)**

[illegible]

APPENDIX H

Complex Method for Calculating Flow Rate

COMPLEX METHOD INFORMATION

Complex Method - Calculation of Total Event Flows

The complex method involves measuring the conveyance (channel or pipe) geometry, the slope of the conveyance, determining the roughness coefficient, and then measuring the depth of flow (stage) at constant time intervals during the storm event. These values are then inputted into Manning's Equation to calculate the flow rate in cubic feet per second (cfs) which when multiplied by the time intervals yields the total flow volume.

This method is shown in case composite samples are ever collected, or if Camp Lejeune elects to install gauging meters to measure flow depths. The geometry of the conveyance is measured in order to develop a stage-discharge relationship that can convert flow depth to a flow rate. The conveyance geometry is input to the Manning's Equation, which calculates flow rate.

Circular Pipes

A reinforced concrete pipe (RCP) is a typical storm water conveyance found at industrial facilities. Other pipe materials may be corrugated metal pipe (CMP), or vitrified clay pipe (VCP). The geometry required to be measured is the diameter in feet, and the slope of the pipe at the sampling point. The slope is measured as a percent, or as ft/ft. The pipe slope can be measured using a surveyor's level and rod to determine the invert elevations at each end of the pipe and the distance between the pipe ends. Another acceptable means of measuring slope is to place an 18-inch or longer carpenter's level at the bottom of the pipe, get it level, and then measure the gap between the level and the pipe invert. The slope is calculated as:

$$\text{Slope} = \text{Gap (inches)} / \text{Length of Level (inches)}$$

For circular pipes and open channels, the slope can also be calculated from inverts and distances measured with global positioning system (GPS) equipment.

Open Channels

An open channel or ditch may be selected as a sampling point. If the channel cross section and slope is fairly uniform for about 10 feet up- and downstream of the sampling point location, and the flow is more than a couple of inches deep, then samples can be collected and the flow calculated without constructing a weir. If a weir is necessary, refer to a hydraulics textbook for the design and installation of an appropriate device.

The geometry required is the channel cross-section dimensions (depth, bottom and top widths, side slopes). Channel shapes may be V-shaped, U-shaped, rectangular, or trapezoidal. Slope can be measured using a surveyor's level and rod, or using a 6 ft. or 8 ft. straight 2x4 to extend the carpenter's level range.

Manning's Equation

With a given depth of flow y in a uniform conveyance, the mean discharge Q can be computed thus:

$$Q = A (1.49/n) R^{2/3} S^{1/2}$$

Where: A = Area of cross section of flow.

R = Hydraulic radius = area of cross section of flow divided by wetted perimeter, or A/WP .

S = Slope.

n = Manning's roughness coefficient.

Q will have units of cubic feet per second.

The following table shows the roughness coefficient (Manning's n) for several conveyances.

Table 1 Manning's Roughness Coefficient, n

CONVEYANCE	n
Concrete pipe, RCP	0.013
Corrugated metal pipe, CMP	0.024
Vitrified clay pipe, VCP	0.012
Cast iron pipe, CIP	0.013
Rip-rap lined channel	0.031
Grass-lined channel, dense weeds	0.030
Grass-lined channel, mowed	0.024

The Manning's equation will give a reliable estimate of discharge if the variables are constant over a sufficient distance to establish uniform flow conditions. Strictly speaking, uniform flow conditions rarely exist in nature. For practical purposes, however, the Manning equation is satisfactory for most stream flow problems by making judicious assumptions.

A Stage-Discharge curve can be computed for each sampling point. For any given depth of flow as measured by the flow depth, there is a corresponding flow rate. The formulas for computing the various variables can be entered in a spreadsheet program for output of an appropriate graph or table. The necessary formulas are provided below to aid MCBCL in computing flow rates and flow volumes.

To calculate the flow volume with the complex method, multiply the flow rate at each time interval by the number of seconds in each time interval. Sum these products for the duration of the measured period to derive the total flow volume.

Equations for Computing Channel Cross-Section Areas:

Partially Full Pipe

For circular pipes flowing under partial flow, the following equations apply (set calculator to “radians” mode):

Equation 1:

$$A = \frac{D^2}{8} \left[\left(2 \sin^{-1} \left(2 \frac{\sqrt{y(D-y)}}{D} \right) - \sin \left(2 \sin^{-1} 2 \frac{\sqrt{y(D-y)}}{D} \right) \right) \right]$$

Equation 2:

$$WP_p = 2 \sin^{-1} \left(2 \frac{\sqrt{y(D-y)}}{D} \right) \left(\frac{D}{114.5916} \right)$$

Equation 3:

$$R_p = \frac{A}{WP_p}$$

Where: A = area of cross section of flow.
D = diameter of pipe, ft.
y = depth of flow, ft.
WP_p = wetted perimeter of pipe.
R_p = hydraulic radius of pipe.

Trapezoidal Channels

For the trapezoidal application, the following equations apply:

Equation 1:

$$WP_c = B + 2y\sqrt{1 + M^2}$$

Equation 2:

$$A = By + My^2$$

Equation 3:

$$R_c = \frac{A}{WP_c}$$

Where: A = area of cross section of flow.
B = bottom width, ft.
M = side slope ratio
y = depth of flow, ft.
WP_c = wetted perimeter of channel.
R_c = hydraulic radius of channel.