MONITORING YEAR 7 ANNUAL REPORT
Final

NORKETT BRANCH STREAM MITIGATION SITE
Union County, NC
DEQ Contract 004673
DMS Project Number 95360
USACE Action ID Number 2012-01082
NCDWR Project Number 13-0250

Data Collection Period: March – November 2020
Final Submission Date: January 19, 2021

PREPARED FOR:

North Carolina Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

PREPARED BY:

Wildlands Engineering, Inc.
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Mitigation Project Name	**Norkett Branch**	**USACE Action ID**	**2012-01082**
DMS ID	**95360**	**DWR Permit**	**2013-0250**
River Basin	**Yadkin**	**Date Project Instituted**	**7/5/2012**
Cataloging Unit	**03040105**	**Date Prepared**	**4/20/2020**
County	**Union**	**Stream/Wet. Service Area**	**Yadkin 03040105**

Todd J Tugwell 9/21/2020

Signature & Date of Official Approving Credit Release

1 - For NCDMS, no credits are released during the first milestone

2 - For NCDMS projects, the initial credit release milestone occurs automatically when the as-built report (baseline monitoring report) has been made available to the IRT by posting it to the DMS portal, provided the following have been met:

1) Approved of Final Mitigation Plan

2) Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property.

3) Completion of all physical and biological improvements to the mitigation site pursuant to the mitigation plan.

4) Receipt of necessary DA permit authorization or written DA approval for projects where DA permit issuance is not required.

3 - A 10% reserve of credits is to be held back until the bankfull event performance standard has been met.

Credit Release Milestone	**Warm Stream Credits**						
Project Credits	**Scheduled Releases %**	**Proposed Releases %**	**Proposed Released #**	**Not Approved # Releases**	**Approved Credits**	**Anticipated Release Year**	**Actual Release Date**
1 - Site Establishment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2 - Year 0 / As-Built	30.00%	30.00%	3,029.400	0.000	3,029.400	2014	7/24/2014
3 - Year 1 Monitoring	10.00%	10.00%	1,009.800	0.000	1,009.800	2015	4/23/2015
4 - Year 2 Monitoring	10.00%	10.00%	1,009.800	0.000	1,009.800	2016	4/25/2016
5 - Year 3 Monitoring	10.00%	10.00%	1,009.800	0.000	1,009.800	2017	8/8/2017
6 - Year 4 Monitoring	5.00%	5.00%	504.900	0.000	504.900	2018	4/25/2018
7 - Year 5 Monitoring	10.00%	10.00%	1,009.800	0.000	1,009.800	2019	4/26/2019
8 - Year 6 Monitoring	5.00%	5.00%	504.900	0.000	504.900	2020	4/20/2020
9 - Year 7 Monitoring	10.00%					2021	
Stream Bankfull Standard	10.00%	10.00%	1,009.800	0.000	1,009.800	2016	4/25/2016
			Totals	0.000	9,088.200		

Total Gross Credits	10,098.000
Total Unrealized Credits to Date	0.000
Total Released Credits to Date	9,088.200
Total Percentage Released	90.00%
Remaining Unreleased Credits	1,009.800

Notes

Contingencies (if any)

Project Quantities

Mitigation Type	**Restoration Type**	**Physical Quantity**
Warm Stream	Restoration	9,196.000
Warm Stream	Enhancement II	2,255.000

Mitigation Project Name	**Norkett Branch**	**USACE Action ID**	**2012-01082**
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Cataloging Unit	**03040105**	**Date Prepared**	**4/20/2020**
County	**Union**	**Stream/Wet. Service Area**	**Yadkin 03040105**

Debits

							Stream Restoration Credits
Beginning Balance (mitigation credits)							**10,098.000**
Released Credits							**9,088.200**
Unrealized Credits							**0.000**
Owning Program	**Req. Id**	**TIP #**	**Project Name**	**USACE Permit #**	**DWR Permit #**	**DCM Permit #**	
NCDOT Stream & Wetland ILF Program	REQ-006143	P-5208A P-5208C P-5208G	RR Improvements from Haydock to Junker	2010-01630			270.600
NCDOT Stream & Wetland ILF Program	REQ-006298	R-2559 R-3329	R-2559 - R-3329 - Monroe Bypass/Connector	2009-00876	2002-0672		2,758.800
NCDOT Stream & Wetland ILF Program	REQ-006335	I-3802A B-5804	I-85 Improvements	2008-03229	2015-0362		2,758.800
NCDOT Stream & Wetland ILF Program	REQ-006335	I-3802A B-5804	I-85 Improvements	2008-03229	2015-0362		270.600
NCDOT Stream & Wetland ILF Program	REQ-007422	R-2248E	I-485 - Charlotte Outer Loop	2011-01237	2011-0431		1,514.700
Total Credits Debited							**7,573.500**
Remaining Available balance (Released credits)							**1,514.700**
Remaining balance (Unreleased credits)							**1,009.800**

January 19, 2021

Mr. Matthew Reid
NC Department of Environmental Quality
Division of Mitigation Services
5 Ravenscroft Dr., Suite 102
Asheville, NC 28801

RE: Norkett Branch Stream Mitigation Site - Year 7 Monitoring Report
Final Submittal for DMS
Contract Number 004673, RFP Number 16-004110, DMS# 95360
Yadkin River Basin – CU# 03040105; Union County, NC

Dear Mr. Reid:

Wildlands Engineering, Inc. (Wildlands) has reviewed the Division of Mitigation Services' (DMS) comments and observations from the Norkett Branch Stream Mitigation Site Draft Year 7 Monitoring Report. DMS' comments are noted below in **bold**. Wildlands' responses to DMS' comments and observations from the report noted in *italics*.

Report Comments

DMS Comment: The last sentence of the executive summary indicates that a closeout report will be prepared in 2021. Since Norkett Branch is an instrument project and has followed the credit release process, a closeout report will not be necessary. The closeout process will be handled at the 2021 IRT Credit Release Meeting. A closeout site visit will likely be scheduled at that time. Please remove this sentence from the report.

Wildlands' Response: The last sentence has been removed from the executive summary as requested.

DMS' Comment: Please add a few sentences to the executive summary indicating that MY7 is the final year of monitoring for the Norkett Branch site and the site will be presented to the IRT for Regulatory Closeout in 2021.

Wildlands' Response: The executive summary has been updated as requested.

DMS' Comment: Section 1.3 Monitoring Year 7 Summary: The closeout report is mentioned in this section as well. Please remove and add similar comment above concerning closeout in 2021.

Wildlands' Response: Section 1.3 has been updated as requested.

DMS' Comment: There were just two instances of minor conservation easement encroachment noted in MY7 on UT1 and Norkett R1. As the project will be moving to stewardship in 2021, please work with the landowner to rectify this in the future and add additional t-posts and signage, as necessary.

Wildlands' Response: Wildlands will communicate with the landowner to rectify the issue. T-posts and/or signage will be added in these areas, if necessary.

Digital Files Review Comments

DMS' Comment: The MY7 spatial data cannot be accessed. Please verify that the geodatabase is not corrupted and resubmit with final.

Wildlands' Response: The geodatabase has been reformatted and should be accessible. The updated geodatabase is included with the final submittal.

DMS' Comment: DMS does not currently have the following features:

- **BMP's**
- **Photo Points**
- **Crest Gauges**
- **Water Quality Sampling Points**
- **Precipitation Gauge**

Please include these features with the final submittal.

Wildlands' Response: Spatial data for the above listed features has been added to the geodatabase and included with the final submittal.

Enclosed please find one (1) hard copy of the Year 7 Final Monitoring Report and one (1) CD or USB drive with the final electronic files for DMS' distribution. Please contact me at 704-332-7754 x110 if you have any questions.

Sincerely,

Kristi Suggs
Senior Environmental Scientist
ksuggs@wildlandseng.com

EXECUTIVE SUMMARY

Wildlands Engineering (Wildlands) restored and enhanced a total of 10,706 linear feet (LF) of stream on a full-delivery mitigation site in Union County, NC. The project streams consist of Norkett Branch, a third order stream, two unnamed first order tributaries to Norkett Branch (UT1 and UT2), and two intermittent tributaries to Norkett Branch (UT2A and UT3). Water quality treatment Best Management Practices (BMPs) were installed to treat water quality on the non-jurisdictional headwaters of UT3 and an adjacent ephemeral drainage feature. The project is expected to provide 10,098 stream mitigation units (SMUs).

The Norkett Branch Stream Mitigation Site (Site) is located in southeastern Union County, NC, approximately ten miles southeast of the City of Monroe and five miles north of the South Carolina state line. The Site is located in the Yadkin River Basin eight-digit Cataloging Unit (CU) 03040105 and the 14-digit Hydrologic Unit Code (HUC) 03040105081020 (Figure 1). This CU was identified as a targeted local watershed in the *2009 Lower Yadkin-Pee Dee River Basin Restoration Priority* (RBRP) plan. This plan identifies agricultural practices and runoff as the probable major sources of water quality impairment in the Middle Lanes Creek watershed. The 2008 North Carolina Division of Water Resources' (NCDWR) Basinwide Water Quality Plan (BWQP) lists turbidity and nutrient concentrations of nitrogen and phosphorus as specific concerns in the Rocky River watershed portion of the Yadkin-Pee Dee River basin. Other pollutants of concern cited in this report are fecal coliform bacteria, iron, and copper. The project reaches flow off-site, directly into Lanes Creek, which is included on the NCDWR 303d list of impaired streams. The section of Lanes Creek downstream of the Site is listed as impaired due to turbidity (NCDWR, 2012). The project goals established in the Mitigation Plan (Wildlands, 2013) were completed with careful consideration of goals and objectives that were described in the RBRP and NCDWR BWQR and to meet the North Carolina Division of Mitigation Services (DMS) mitigation needs while maximizing the ecological and water quality uplift within the watershed.

The following project goals were established to address the watershed and project Site stressors:

- Improve aquatic and terrestrial habitat within the riparian corridor and provide habitat corridor extension from adjacent downstream forested habitat,
- Improve additional water quality aspects within stream channels on Site,
- Decrease sediment inputs to the stream channels and decrease turbidity in receiving Lanes Creek, and
- Decrease phosphorus, nitrogen, and fecal coliform inputs to the stream channels.

Stream restoration and enhancement, water quality treatment BMP construction, and planting efforts were completed between December 2013 and April 2014. Baseline as-built monitoring activities were completed between April and May 2014. A conservation easement is in place on the 31.6 acres of riparian corridor and stream resources to protect them in perpetuity.

This is the seventh and final monitoring year (MY7) as established in the Mitigation Plan (Wildlands, 2013). The site will be presented to the Interagency Review Team (IRT) for regulatory closeout in 2021. Overall, the Site has met the required stream, hydrologic, and vegetation success criteria for MY7 except for the average planted stem height in some vegetation plots. Geomorphically, each restored and enhanced stream has remained stable with cross-sectional dimensions falling within the range of parameters for the appropriate Rosgen (1996) stream type. Visual stream assessments indicate channel beds, banks, and engineered structures are functioning as designed with little to no sign of instability. The average planted stem density for the Site is 405 stems per acre which exceeds the final density criteria of 210 stems per acre. A majority (18 of 26) of the vegetation plots meet or exceed the final average stem height requirement of 10 feet at the end of MY7. Visual vegetative assessments indicate good vegetative cover across the Site with only isolated spots of invasive plant populations. The Site met

final hydrological success criteria after MY3, and all three of the restored reaches (Norkett Branch, UT1, and UT2) recorded multiple bankfull events during MY7. Water quality results indicated sporadic pollutant removal by the stormwater BMPs in MY7 compared to previous monitoring years.

TABLE OF CONTENTS

APPENDICES

Section 1: PROJECT OVERVIEW

The Site is located in southeastern Union County, NC, approximately ten miles southeast of the City of Monroe and five miles north of the South Carolina state line. The Site is in the Yadkin River Basin eight-digit Cataloging Unit (CU) 03040105 and the 14-digit Hydrologic Unit Code (HUC) 03040105081020 (Figure 1). The Site is located in the Carolina Slate Belt of the Piedmont physiographic province (USGS, 1998). The project watershed consists primarily of agricultural land, pasture, and forest. A conservation easement was recorded on 31.6 acres within the seven parcels (Deed Book 06095, Pages 0530-0589).

The Site is located within the North Carolina Division of Water Resources (NCDWR) subbasin 03-07-14. The project streams consist of Norkett Branch, a third order stream, two unnamed first order tributaries to Norkett Branch (UT1 and UT2), and two intermittent tributaries to Norkett Branch (UT2A and UT3). Norkett Branch (DWQ Index No. 13-17-40-8) is the main tributary of the project and is classified as WS-V waters. Class WS-V waters are protected as water supplies draining to Class WS-IV waters or waters used by industry to supply drinking water or waters formerly used as water supply, and are protected for secondary recreation, fishing, wildlife, aquatic life, the maintenance of biotic integrity, and agriculture. The drainage area for the project Site is 2,034 acres (3.18 sq mi) at the lower end of Norkett Branch Reach 2.

Mitigation work at the Site included restoration on Norkett Branch, UT1, and UT2. Enhancement II was implemented on UT2A and UT3. Water quality treatment BMPs were also implemented to treat agricultural drainage upstream of UT3 and agricultural drainage in the right floodplain of Norkett Branch Reach 2. All on-site riparian areas were planted with native species. Construction and planting activities were completed in April 2014. Directions and a map of the Site are provided in Figure 1 and project components are illustrated in Figure 2.

1.1 Project Goals and Objectives

Prior to construction activities, the streams were routinely maintained to provide drainage for agricultural purposes. Impacts to the streams included straightening and ditching, eroding banks, and a lack of stabilizing riparian vegetation. The streams were also used as a water source for cattle in some areas resulting in over-widened, unstable, and trampled banks. Algal blooms, presumably from agricultural nutrient loading, were observed during Site visits. Trampled stream banks, over-widened channels, and banks illustrating signs of instability were a common occurrence throughout the Site. The alterations of the Site to promote farming resulted in an impairment of the ecological function of Site's streams. Specific functional losses at the Site included degraded aquatic habitat, altered hydrology, and the reduction of quality in-stream and riparian wetland habitats, as well as related water quality benefits. Table 4 in Appendix 1 and Tables 11 a-c in Appendix 4 present the Site's pre-restoration conditions in detail.

The mitigation project is intended to provide numerous ecological benefits such as pollutant removal and improved aquatic and terrestrial habitat. Expected improvements to water quality and ecological processes are outlined below as project goals and objectives. The agricultural stressors and pollutants have been specifically addressed by the Site design. The major goals of the stream mitigation project are to provide ecological and water quality enhancements to the Norkett Branch, Lane's Creek, Rocky River and Yadkin River Basins while creating a functional riparian corridor at the Site level and restoring a Piedmont Bottomland Forest as described by Schafale and Weakley (1990). These project goals were established with careful consideration of goals and objectives that were described in the RBRP and to meet the North Carolina Division of Mitigation Services (DMS) mitigation needs while maximizing the ecological and water quality uplift within the watershed.

The following project goals and objectives were established and listed in the Mitigation Plan (Wildlands, 2013) to address the effects listed above:

- *Improve aquatic and terrestrial habitat within the riparian corridor and provide habitat corridor extension from adjacent downstream forested habitat.* By restoring appropriate channel cross section and profile, including riffle and pool sequences, coarse substrate zones for macroinvertebrates and deep pool habitat for fish. Introduction of large woody debris, rock structures, brush toe, and native stream bank vegetation to provide additional habitat and cover for both fish and macroinvertebrates. Adjacent buffer areas will be restored by planting native vegetation which will provide habitat and forage for terrestrial species. These areas will be allowed to receive more regular inundating flows, and vernal pools may develop over time increasing habitat diversity. A watershed approach, restoring riparian corridor functions on multiple interconnected tributaries as well as treating agricultural drainage from headwater features with BMPs, will allow for large-scale riparian corridor connectivity.
- *Improve additional water quality aspects within stream channels on Site.* Riffle/pool sequences will be restored to provide re-aeration allowing for oxygen levels to be maintained in the perennial reaches. Creation of deep pool zones will lower temperature, helping to maintain dissolved oxygen concentrations. Establishment and maintenance of riparian buffers to create long-term shading of the stream and to minimize thermal heating. Water quality BMPs situated in the headwaters, upstream of jurisdictional streams, will treat agricultural runoff before it reaches project streams.
- *Decrease sediment inputs to the stream channels and decrease turbidity in receiving Lanes Creek.* Cattle will be fenced out of the riparian corridor, eliminating bank trampling. Sediment input from eroding stream banks will be reduced by bioengineering and installing in-stream structures while creating a stable channel form using geomorphic design principles. Sediment from off-site sources will be captured by deposition on restored floodplain areas where native vegetation will slow overland flow velocities. By allowing for more overbank flooding and by increasing channel roughness, in-channel velocities can be reduced. This will lower bank shear stress and decrease bank erosion.
- *Decrease phosphorus, nitrogen, and fecal coliform inputs to the stream channels.* Nitrogen- and phosphorus-laden chemical fertilizers, pesticides, and cattle waste will be decreased by buffering adjacent agricultural operations from the restored channels. Cattle will be fenced out to eliminate in-channel fecal pollution. Off-site nutrient input will be absorbed on-site by filtering flood flows through restored floodplain areas, water quality BMPs, and vernal pools positioned to treat concentrated overland flow. Flood flows will be allowed to disperse through native vegetation across the reconnected floodplain. Increased surface water residency time will provide contact treatment time and groundwater recharge potential.

1.2 Monitoring Year 7 Data Assessment

Annual monitoring was conducted between March and November 2020 to assess the condition of the project. The stream restoration success criteria for the Site follows the approved success criteria presented in the Mitigation Plan (Wildlands, 2013).

1.2.1 Vegetative Assessment

A total of 26 vegetation plots were established during the baseline monitoring within the project easement area using standard 10-meter by 10-meter vegetation monitoring plots. Plots were randomly established within planted portions of the stream restoration and enhancement areas to capture the heterogeneity of the designed vegetative communities. The plot corners were marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs were taken at the plot origin looking diagonally across the plot to the opposite corner to capture the same reference photograph locations as the as-built. The final vegetative success criteria will be the survival of 210 planted stems per acre in the riparian corridor along restored and enhanced reaches at the end of the seventh year of monitoring (MY7). Planted vegetation must average 10 feet in height in each plot by MY7.

The MY7 vegetation survey completed in September and October 2020 resulted in 23 of 26 vegetation plots meeting the year seven success criteria (210 stems per acre). Three vegetation plots (plots 5, 7, and 10) have planted individual stem densities of 202 stems per acre; however, vegetation plot 10 stem density increases to 243 stems/acre with inclusion of volunteers. Overall, the Site has an average planted stem density of 405 stems per acre which exceeds the year seven success criteria. The average woody stem density of the Site with volunteers is 601 stems per acre. In MY7, planted stems heights for the Site averaged 12.5 feet which is a 42% increase in height compared to the MY6 stem height average of 8.8 feet. Eight plots have average stem heights below the final success criteria of 10 feet. The average stem height in these plots range from 4.6 to 8.8 feet. Most planted woody stems (90%) within vegetation plots had a vigor rating of 3 or more.

In February 2015 during MY2, supplemental planting added 6,000 stems (37% of the MY1 stem total) on reaches east of Philadelphia Church Road. The supplemental planting was in response to low stem vigor of many plots and high bare root mortality between the as-built and MY1 which was attributed to dry site conditions, lack of soil fertility, scour flows shortly after installation, insects, and disease. An additional supplemental planting in MY5 added 400 containerized trees (3% of the MY5 stem total) on portions of Norkett Branch and UT1 in response to low stem density. In MY6, 50 containerized tree (less than 1% of the MY6 stem total) were added in areas of poor woody growth documented in MY5. Some of the monitoring plots showed an increase in planted stem densities in MY2 and MY5 because of the supplemental planting.

Refer to Appendix 2 for vegetation plot photographs, the Current Condition Plan View (CCPV) maps, and the vegetation condition assessment table and Appendix 3 for vegetation summary tables.

1.2.2 Vegetation Problem Areas

The planted riparian buffer continues to develop along project streams with minimal vegetative problem areas. In the late winter/early spring of MY4, several areas previously identified as “Bare/Poor Herbaceous Cover” were addressed through a combination of reseeding and the installation of hügelkultur (hugel) beds. The hugel beds provided additional organic matter and aided in moisture retention to encourage herbaceous and woody vegetation growth. Hugel bed installation involved the excavation of small floodplain trenches that were backfilled with organic matter, covered in a mixture of soil and brush, and planted with live whips, live stakes and seeded. The live stakes and whips were planted to anchor the beds. As the woody species established, they helped diffuse the energy of out of bank events and trap additional organic matter. During MY6 and MY7, several hugel beds have slightly

subsided which is likely a result of backfilled organic matter breaking down and/or compacting. Planted whips and lives stakes on the hugel beds were also not as vibrant as previous years however hugel beds have served their purpose as bare areas have filled in and woody vegetation continues to establish.

Pockets of invasive species including cattail (*Typha latifolia*), Chinaberry tree (*Melia azedarach*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and parrot feather (*Myriophyllum aquaticum*) were observed during MY7; however, most are localized pockets, too small to map (less than 1,000 square feet) and are not impacting planted vegetation. Mapped invasives account for less than 1% of the easement acreage. Parrot feather populations located along Norkett Branch Reaches 1 and 2 were treated with glyphosate between May and July 2020; however, this aquatic invasive may persist until the streambed becomes fully shaded. Areas of dense groundsel tree (*Baccharis halimifolia*), an aggressive coastal plain native evergreen shrub, were mechanically and chemically treated during MY4. This species is not typically considered a species of high concern for DMS-required monitoring; however, portions of the Site were infested with such dense thickets of this shrub that they were competing with planted woody and herbaceous vegetation. A cut/spray treatment was applied in MY5 to minor pockets of groundsel re-sprouts. During MY7, resprouts were present along Norkett Branch Reach 1 and UT1; however, they are now less of a competition threat to established planted vegetation.

Soil amendments were applied to areas of low woody growth between November 2019 and July 2020. Visual assessments that were conducted in November 2020 indicate improved tree growth across the site. Areas of poor woody growth decreased from approximately 10% of the planted easement acreage in MY6 to 1% in MY7 based on the mapping threshold of 0.25 acres. Minor encroachment into the conservation easement occurred along Norkett Reach 1 and UT1 during MY7 because of harvesting in adjacent row crop fields.

Adaptive Management - Vegetation

As warranted, future adaptive management activities may be employed through close-out to continue to improve growth rates of planted woody stems in targeted areas. Areas noted with invasive plant populations will be monitored and treated, as necessary. Easement encroachment will be addressed through landowner coordination and if necessary, the installation of additional conservation easement markers.

1.2.3 Stream Assessment

A total of 20 cross-sections were installed along the stream restoration reaches. One permanent cross-section was installed per 20 bankfull widths along stream restoration reaches, with riffle and pool sections in proportion to DMS guidance. Each cross-section was permanently marked with pins to establish its location. Annual cross-section survey includes points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. Photographs were taken looking upstream and downstream at each cross-section. Stream photographs were also taken at 51 permanent photograph reference points throughout the project area. A reach-wide pebble count was conducted along all restoration reaches (Norkett Branch Reach 1, Norkett Branch Reach 2, UT1, UT2 Reach 1, UT2 Reach 2, UT2 Reach 3A, and UT2 Reach 3B) for classification purposes. A wetted perimeter pebble count was conducted at each permanent riffle cross-section to characterize the pavement.

Riffle cross-sections on the restoration reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. All riffle cross-sections should fall within the parameters defined for channels of the appropriate Rosgen stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a vertically incising thalweg or eroding channel banks. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth. Substrate materials in the restoration reaches should

indicate a progression towards or the maintenance of coarser materials in the riffle features and smaller particles in the pool features.

Morphological surveys for MY7 were conducted in May 2020. All streams within the Site appear stable and have met success criteria. Riffle cross-section dimensions fell within the parameters defined for channels of the appropriate Rosgen stream type (Rosgen 1996) and generally show little change in the bankfull area, maximum depth ratio, or width-to-depth ratio. Minor channel adjustments were documented at cross-sections 3 (Norkett Branch Reach 1), 6 (Norkett Branch Reach 2), 9 (UT1), 10 (UT1), 14 (UT2), and 15 (UT2). Cross-section 3 (pool) exhibited minor bank scour on the lower, left (outer) bank. The scour was not noticeable during field assessments which could be attributed to the establishment of woody streambank vegetation. Bed scour at cross-section 6 (riffle) may be the related to large storm events during late MY6 coupled with previous beaver activity immediately upstream of the cross-section. Cross-section 9 (riffle) exhibited slight deepening in the center of the channel which could be attributed to the continued establishment of dense woody vegetation including silky dogwood (*Cornus amomum*) and silky willow (*Salix sericea*) on both streambanks. Bed and bank elevations shifted slightly downward at cross-section 10 (pool). No instability was noticeable during field assessments. Minor aggradation was recorded at cross-section 14 (pool) and 15 (riffle). The aggradation at cross-section 14 appears to be a natural adjustment in response to sediment transport. Cross-section 15 aggraded back towards design bed elevations after degradation in MY3. Subtle changes in cross-sections are expected and do not indicate instability.

In-stream structures used to enhance channel habitat and stability on the outside bank of meander bends, such as brush toe, are providing stability and habitat as designed. Per the Mitigation Plan (Wildlands 2013), pattern data will only be completed if there are indicators from the dimensions that significant geomorphic adjustments indicating a trend toward vertical or lateral instability. No changes were observed that indicated a change in the radius of curvature or channel belt width; therefore, pattern data was not collected or included in the MY7 report. Visual assessment during MY7 revealed little to no eroding banks.

In general, substrate materials in the restoration reaches indicate maintenance of coarser materials in the riffle features and finer particles in the pool features. Fluctuations in grain size distribution were documented with MY7 pebble counts; however, distributions generally fell within previous ranges indicative of cyclic changes in sediment transport.

Please refer to Appendix 2 for the stream visual assessment tables, the CCPV maps, and stream reference photographs. Refer to Appendix 4 for the morphological data and plots. Additional stream photographs were collected in 2020 to further document conditions at the upstream end of Norkett Branch (Station 100+00 to 103+00). During the monitoring phase of the project, a portion of Norkett Branch immediately above the Site had been channelized for the agricultural purposes. Visual assessment did not reveal any noticeable impacts from the upstream channelization. Refer to Appendix 7 for additional stream photographs.

1.2.4 Stream Problem Areas

One isolated area of bank scour was noted at Station 109+60 of Norkett Branch. The scour is approximately 10 feet in length along the left bank. The scour may have developed in response to instream deposition at that location which may be directing stream velocity vectors towards the left bank. Minor bank grading and live staking were performed in MY7 at Station 130+75 of Norkett Branch Reach 2 and Station 302+00 of UT2 to address areas affected by previous beaver dams. In October 2020, one beaver dam was observed at Station 128+50 of Norkett Branch Reach 2. Trappers with the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Services (APHIS) are in the

process of removing beaver at that location. The Site will be monitored for beaver activity through closeout.

Adaptive Management - Stream

Wildlands will continue to monitor the streams for potential areas of concern and if necessary, repairs may be implemented. Refer to Appendix 2 for the stream visual assessment tables, the CCPV maps, reference photographs, and photographs of the stream problem areas.

1.2.5 Hydrology Assessment

Hydrologic monitoring was accomplished using both manual crest gage readings and In-situ Rugged Troll 100 pressure transducers installed at three surveyed cross-sections throughout the Site (XS6 on Norkett Branch Reach 2, XS9 on UT1, and XS18 on UT2 Reach 3A). Rainfall data was used from a nearby weather station at the Monroe Airport (KEQY) (NCCRONOS, 2020). To meet hydrological success criteria, two or more bankfull events must occur in separate years within the restored reaches by the end of MY7. The success criteria were met for the project after MY3. During MY7, multiple bankfull events were recorded along Norkett Branch, UT1, and UT2. Please refer to Appendix 5 for hydrology data.

1.2.6 Water Quality BMPs

Water quality samples were collected during the monitoring period to assess the functionality of the Step Pool Storm Conveyance BMP (SPSC BMP) and the Pocket Wetland BMP (PW BMP). This sampling is not part of the success criteria for the project. However, the following expected rates for pollutant removal were established in the Mitigation Plan (Wildlands, 2013) and in accordance with published rates of removal from similar BMP approaches. The SPSC BMP is expected to provide similar pollutant removal rates as the published removal rates of a bioretention area with internal water storage (NCDWQ, 2007), which are 85% TSS removal, 40% TN removal, and 40% TP removal. The PW BMP is expected to provide 60% TSS removal, 20% TN removal, and 45% TP removal, which is similar to extended detention wetlands (Center for Watershed Protection, 2000 and United States Environmental Protection Agency, 2012).

The monitoring plan calls for quarterly sampling; however, samples were unable to be obtained during Q1 and Q4 due to the timing and intensity of rain events. Inflow and outflow points were sampled at each BMP after storm events on 4/30/2020 (Q2) and 9/18/2020 (Q3). First flush style sample bottles were used to capture stormflow, which filled during the rain event at a pre-determined stage height and were retrieved within 24 hours. Samples were analyzed for total suspended solids (TSS), phosphorus as total phosphorus (TP), nitrogen as total nitrogen (TN), Nitrate/Nitrite (NO_x), and Total Kjeldahl Nitrogen (TKN), by Waypoint Analytical. Refer to in Appendix 6 for water quality sampling results and pollutant removal rates.

The SPSC BMP provided pollutant removal of 89% of TN in the Q1 sample but an increase of 273% in TN was recorded in Q3. TP removal ranged from 40% to 53% in MY7 SPSC samples. TSS increased by 221% in the Q1 event but removal of 57% was documented in the Q3 sample.

PW BMP Q1 samples showed increases in TN and TP of 58% and 126% respectively but a decrease in TSS of 97%. The PW BMP provided removal rates of 26% (TN), 67% (TP), and 71% (TSS) in the Q3 sample.

1.2.7 Wetland Monitoring

A permanent photo station (photo point #16) was established in the existing wetland complex along Norkett Branch Reach 1 near station 104+00 on the left floodplain to visually monitor Site conditions of the existing wetland. The photo point (#16) is included in the Stream Photographs section of Appendix 2. The wetland complex is maintaining hydrology and supports a wetland plant community composition. Soil boring data points were collected in April 2020 within the wetland complex as requested by the IRT

at the 2020 credit release meeting. Hydric soil indicators were documented at each soil boring. Refer to Appendix 7 for soil boring descriptions and photographs. Soil boring locations are included on CCPV maps in Appendix 2.

1.3 Monitoring Year 7 Summary

Overall, the Site has met the required stream, vegetation density, and hydrology mitigation success criteria for MY7. The average planted stem density for the Site is 405 stems per acre meets final density criteria. The MY7 average stem height was 12.5 feet which is a 42% increase from the MY6 average stem height of 8.8 feet. Most vegetation plots exceed the 10-foot average stem height per plot final success criteria except for eight plots that are trending towards the 10-foot average. Morphological surveys indicate that the channel dimensions are stable and functioning as designed. Visual assessment indicates the channels show little to no sign of instability within the bed, bank, or engineered structures. All restored channels (Norkett Branch, UT1, and UT2) recorded multiple bankfull events during MY7. The hydrological success criteria for the Site were achieved after MY3. Water quality monitoring during MY7 indicated partial pollutant removal in both stormwater BMPs. MY7 is the final year of monitoring and the Site will be presented to the IRT for regulatory closeout in 2021.

Summary information/data related to various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting data can be found in the Mitigation Plan documents available on the DMS website. All raw data supporting the tables and figures in the appendices are available upon request.

Section 2: METHODOLOGY

Geomorphic data collected followed the standards outlined in *The Stream Channel Reference Site: An Illustrated Guide to Field Techniques* (Harrelson et al., 1994) and in the *Stream Restoration: A Natural Channel Design Handbook* (Doll et al., 2003). Longitudinal and cross-sectional data were collected using a total station and were georeferenced to established benchmarks and NC State Plane coordinates. Morphological surveys were conducted using a total station tied to these geo-referenced (control) points. Reachwide pebble counts were conducted along each restored reach for channel classification. Cross-section substrate analyses conducted in each surveyed riffle followed the 100-count wetted perimeter methodology to characterize pavement. All CCPV mapping was recorded using a Trimble handheld GPS with sub-meter accuracy and processed using was Pathfinder and ArcView. Crest gauges were installed during the baseline monitoring period in surveyed riffle cross-sections and are monitored quarterly. Hydrology attainment installation and monitoring methods are in accordance with the USACE (2003) standards. Vegetation monitoring protocols followed the Carolina Vegetation Survey-NCEEP Level 2 Protocol (Lee et al., 2008).

Section 3: REFERENCES

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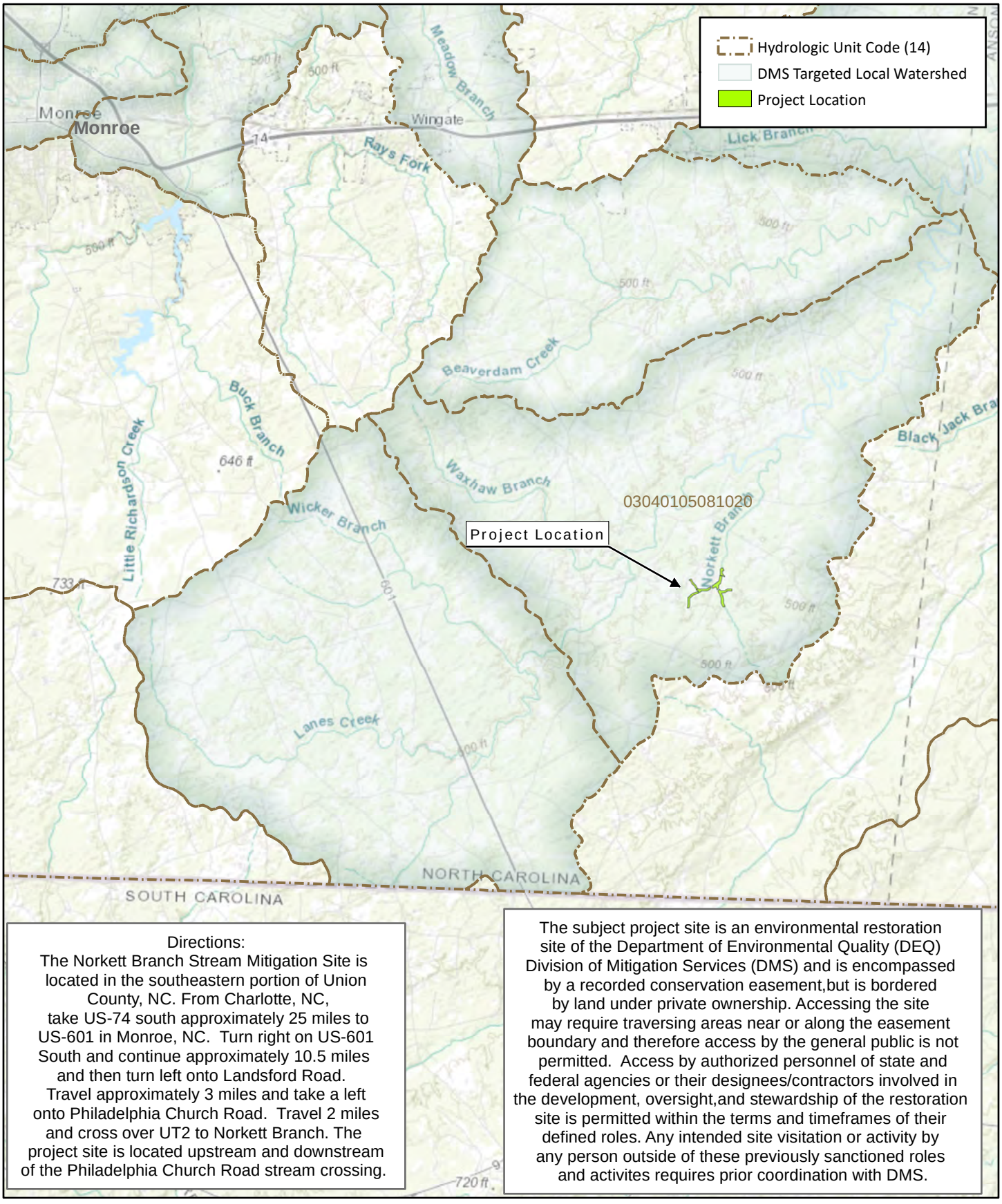
APPENDIX 1. General Tables and Figures



Directions:
The Norkett Branch Stream Mitigation Site is located in the southeastern portion of Union County, NC. From Charlotte, NC, take US-74 south approximately 25 miles to US-601 in Monroe, NC. Turn right on US-601 South and continue approximately 10.5 miles and then turn left onto Landsford Road. Travel approximately 3 miles and take a left onto Philadelphia Church Road. Travel 2 miles and cross over UT2 to Norkett Branch. The project site is located upstream and downstream of the Philadelphia Church Road stream crossing.

The subject project site is an environmental restoration site of the Department of Environmental Quality (DEQ) Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement,but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight,and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activites requires prior coordination with DMS.

WILDLANDS ENGINEERING

0 1 2 Miles

N

Figure 1 Project Vicinity Map
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020
Union County, NC

WILDLANDS ENGINEERING

0 300 600 Feet

N

Figure 2 Project Component/Asset Map
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020
Union County, NC

Table 1. Project Components and Mitigation Credits

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

Mitigation Credits									
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	9,196.000	902.000	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Project Components							
Reach ID	As-Built Stationing[1]	Existing Footage/ Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage/ Acreage[2]	Mitigation Ratio	Credits (SMU)[2]
STREAMS							
Norkett Branch Reach 1	100+31-117+60 & 118+60-124+00	1,980 LF	P1	R	2,313	1:1	2313.000
Norkett Branch Reach 2	124+00-131+84 & 132+25-138+99	1,505 LF	P1	R	1,513	1:1	1513.000
UT1	200+00-211+98	840 LF	P1	R	1,212	1:1	1212.000
UT2 Reach 1	300+41-310+80	820 LF	P1	R	1,033	1:1	1033.000
UT2 Reach 2	310+80-321+71 & 322+06-325+20	1,272 LF	P1	R	1,416	1:1	1416.000
UT2 Reach 3A	325+20-335+58	923 LF	P1	R	1,041	1:1	1041.000
UT2 Reach 3B	336+90-343+48	380 LF	P1/2	R	668	1:1	668.000
UT2A	401+53-411+46 & 411+84-415+31	1,296 LF	EII	EII	1,340	2.5:1	536.000
UT3	505+42-507+12	163 LF	EII	EII	170	2.5:1	68.000
SPSC BMP	Upstream of UT3 intermittent drainage		Step Pool Storm Conveyance	WQ BMP	29.7 ac treated	1:8	238.000 [3]
PW BMP	non-jurisdictional drainage in eastern Norkett Branch floodplain		Pocket Wetland	WQ BMP	19.9 ac treated	1:3	60.000 [3]

Component Summation						
Restoration Level	Stream (LF)	Riparian Wetland (acres)		Non-Riparian Wetland	Buffer (square feet)	Upland (acres)
Restoration	9,196					
Enhancement						
Enhancement I						
Enhancement II	1,510					
Creation						
Preservation						
High Quality Preservation						
Alternative Mitigation	49.6 ac treated					

N/A: not applicable

1. Stationing based off of centerline as-built alignment which matched with the design alignment.
2. Credits are based off of the as-built thalweg alignment.
3. Credits determined for the BMPs were established in the mitigation plan (2013).

Table 2. Project Activity and Reporting History

Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Activity or Report		Data Collection Complete	Completion or Scheduled
Mitigation Plan		July 2012 - October 2012	July 2013
Final Design - Construction Plans		July 2013 - November 2013	November 2013
Construction		December 2013 - April 2014	April 2014
Temporary S&E mix applied to entire project area[1]		December 2013 - April 2014	April 2014
Permanent seed mix applied to reach/segments		December 2013 - April 2014	April 2014
Bare root and live stake plantings for reach/segments		March 2014 - April 2014	April 2014
Baseline Monitoring Document (Year 0)		April 2014 - May 2014	June 2014
Year 1 Monitoring	Stream Assessment	October 2014	December 2014
	Vegetation Assessment	September 2014	
Maintenance and Replanting		October 2014 - February 2015	February 2015
Year 2 Monitoring	Stream Assessment	April 2015	December 2015
	Vegetation Assessment	September 2015	
Year 3 Monitoring	Stream Assessment	April 2016	December 2016
	Vegetation Assessment	June 2016	
Invasive Treatment		July 2016	December 2016
Bank repairs and hugel bed installation in bare areas		March 2017	Spring 2017
Year 4 Monitoring	Stream Assessment	August 2017	December 2017
	Vegetation Assessment	August 2017	
Invasive Treatment		June - July, November 2017	N/A
Supplemental planting		January - March 2018	Spring 2018
Invasive Treatment		June 2018	N/A
Year 5 Monitoring	Stream Assessment	June-August 2018	December 2018
	Vegetation Assessment	August 2018	
Invasive Treatment		March 2019	N/A
Supplemental seeding and planting		February - March 2019	Spring 2019
Year 6 Monitoring	Stream Assessment	April-October 2019	December 2019
	Vegetation Assessment	August 2019	
Beaver Removal		N/A	March - December 2019
Invasive Treatment		October 2019	October 2019
Soil Amendments		December 2019 - July 2020	July 2020
Minor bank repair/live staking of bare banks		April 2020	April 2020
Invasive Treatment		May - July 2020	July 2020
Year 7 Monitoring	Stream Assessment	May 2020	December 2020
	Vegetation Assessment	October 2020	
Beaver Removal		November - December 2020	N/A

[1]Seed and mulch is added as each section of construction is completed.

Table 3. Project Contact Table

Norkett Branch Stream Mitigation Site
DMS Project No.95360
Monitoring Year 7 - 2020

Designer Emily Reinicker, PE, CFM	**Wildlands Engineering, Inc.** 1430 S Mint St. Suite 104 Charlotte, NC 28203 704.332.7754
Construction Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seed Mix Sources	**Green Resource, Colfax, NC**
Nursery Stock Suppliers **Bare Roots** **Live Stakes**	**Bruton Natural Systems, Inc** **Dykes and Son Nursery, McMinnville, TN** **Foggy Bottom Nursery, Lansing, NC**
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring, POC	Kristi Suggs 704.332.7754, ext. 110

Table 4. Project Information and Attributes

Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Project Information	
Project Name	Norkett Branch Stream Mitigation Site
County	Union County
Project Area (acres)	31.6
Project Coordinates (latitude and longitude)	34°52'47.56"N, 80°22'9.19"W
Project Watershed Summary Information	
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province
River Basin	Yadkin
USGS Hydrologic Unit 8-digit	03040105
USGS Hydrologic Unit 14-digit	03040105081020
DWQ Sub-basin	03-07-14
Project Drainage Area (acres)	2,034
Project Drainage Area Percentage of Impervious Area	<1%
CGIA Land Use Classification	43% forested, 29% managed herbaceous cover, 28% cultivated land

Reach Summary Information

Parameters	Norkett Branch Reach 1	Norkett Branch Reach 2	UT1	UT2	UT2A	UT3
Length of reach (linear feet) - Post-Restoration[1]	2,369	1,499	1,198	4,175	1,378	170
Drainage area (acres)	1490	2034	48	457	72	28
Drainage area (sqmi)	2.3	3.2	0.08	0.72	0.11	0.04
NCDWQ stream identification score	43.75	41.5	32.25	35.75	23;30.75	25.75
NCDWQ Water Quality Classification	WS-V					
Morphological Desription (stream type)	P	P	P	P	I	I
Evolutionary trend (Simon's Model) - Pre- Restoration	III	III/IV	II/III	II, IV	IV	II/ III
Underlying mapped soils	Floodplain Soil Types for Site					
	Badin channery silt loam		Badin channery silt clay loam		Cid channery silt loam	Secrest-Cid complex
Drainage class	well-drained		well-drained		well-drained with moderate shrink-swell potential	well-drained
Soil Hydric status	N		N		N	Y
Slope	2-8%		2-8%		1-5%	0-3%
FEMA classification	AE	AE	N/A	N/A	N/A	N/A
Native vegetation community	Piedmont Bottomland Forest					
Percent composition exotic invasive vegetation - Post-Restoration	0%					

Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States - Section 404	X	X	USACE Nationwide Permit No.27 and DWQ 401 Water Quality Certification No. 3885.
Waters of the United States - Section 401	X	X	
Division of Land Quality (Dam Safety)	N/A	N/A	N/A
Endangered Species Act	X	X	Norkett Branch Mitigation Plan; Wildlands determined "no effect" on Union County listed endangered species.
Historic Preservation Act	X	X	No historic resources were found to be impacted (letter from SHPO dated 8/20/2012).
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N/A	N/A	N/A
FEMA Floodplain Compliance	X	X	CLOMR and LOMR Approved
Essential Fisheries Habitat	N/A	N/A	N/A

1. Total stream length does not exclude easement crossings.

Table 5. Monitoring Component Summary

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

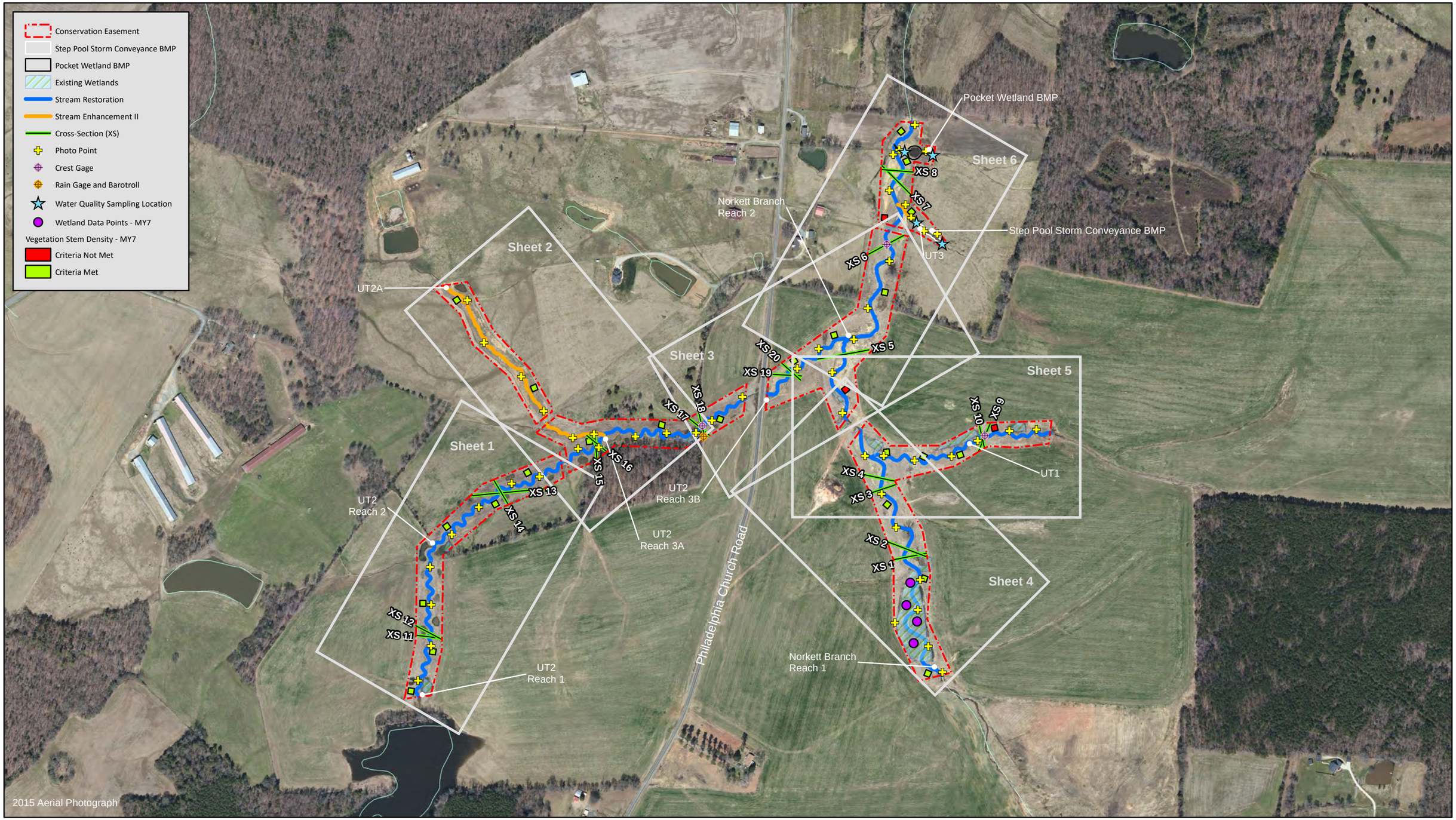
Parameter	Monitoring Feature	Quantity/ Length by Reach						Frequency
		Norkett Branch Reach 1	Norkett Branch Reach 2	UT1	UT2 Reach 1	UT2 Reach 2	UT2 Reach 3A	
	Riffle Cross Section	3	2	1	1	2	1	Annual
	Pool Cross Section	2	1	1	1	2	1	
Pattern	Pattern	N/A						N/A
Profile	Longitudinal Profile	N/A						N/A
Substrate	Reach Wide (RW) / Riffle (RF) 100 Pebble Count	RW-1, RF-3	RW-1, RF-2	RW-1, RF-1	RW-1, RF-1	RW-1, RF-2	RW-1, RF-1	Annual
Stream Hydrology	Crest Gage	1		1	1			Quarterly
Wetland Hydrology	Groundwater Gages	N/A						N/A
Vegetation[1]	CVS Level 2	26 (Total)						Annual
Visual Assessment	All Streams	Y	Y	Y	Y	Y	Y	Annual
Exotic and nuisance vegetation								
Project Boundary								
Reference Photos[2]	Photographs	51 (Total)						Annual

Parameter	Monitoring Feature	Quantity/ Length by Reach			Frequency
		UT2 Reach 3B	UT3	Storm Water BMPs	
	Riffle Cross Section	1	N/A	N/A	Annual
	Pool Cross Section	1	N/A	N/A	
Pattern	Pattern				N/A
Profile	Longitudinal Profile				N/A
Substrate	Reach Wide (RW) / Riffle (RF) 100 Pebble Count	RW-1, RF-1	N/A	N/A	Annual
Stream Hydrology	Crest Gage	N/A	N/A	N/A	Quarterly
Wetland Hydrology	Groundwater Gages	N/A			N/A
Vegetation[1]	CVS Level 2	26 (Total)			Annual
Visual Assessment	All Streams	Y	Y	Y	Annual
Exotic and nuisance vegetation					
Project Boundary					
Reference Photos[2]	Photographs	51 (Total)			Annual

[1]A deviation from the vegetation plot quantity indicated in the Mitigation Plan is due to a smaller than expected planted area.

[2]Additional reference photo locations were added for site documentation to exceed quantity indicated in the Mitigation Plan.

APPENDIX 2. Visual Assessment Data



0 500 1,000 Feet

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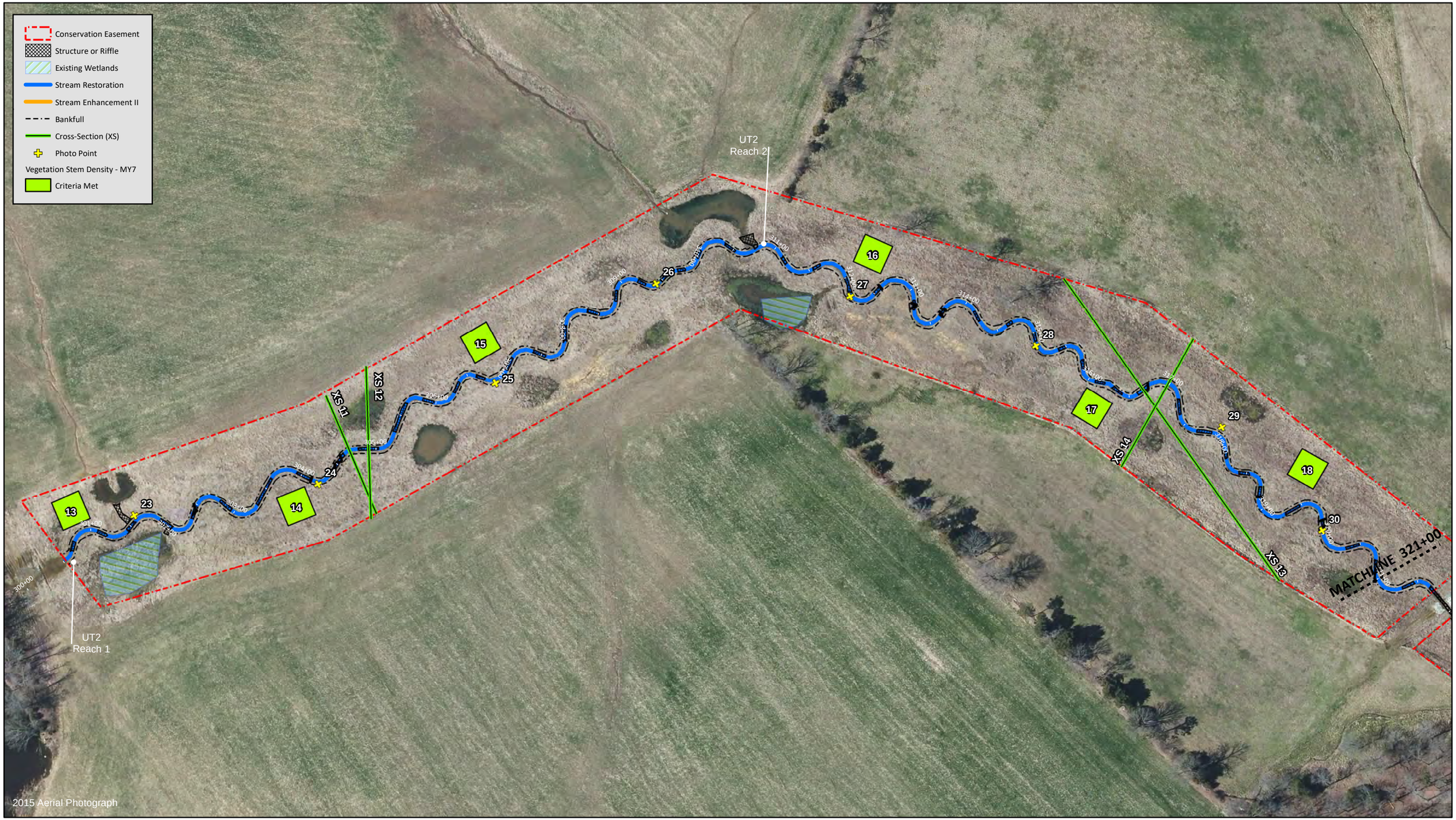
Figure 3.0 Integrated Current Condition Plan View (Key)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Union County, NC



0 100 200 Feet

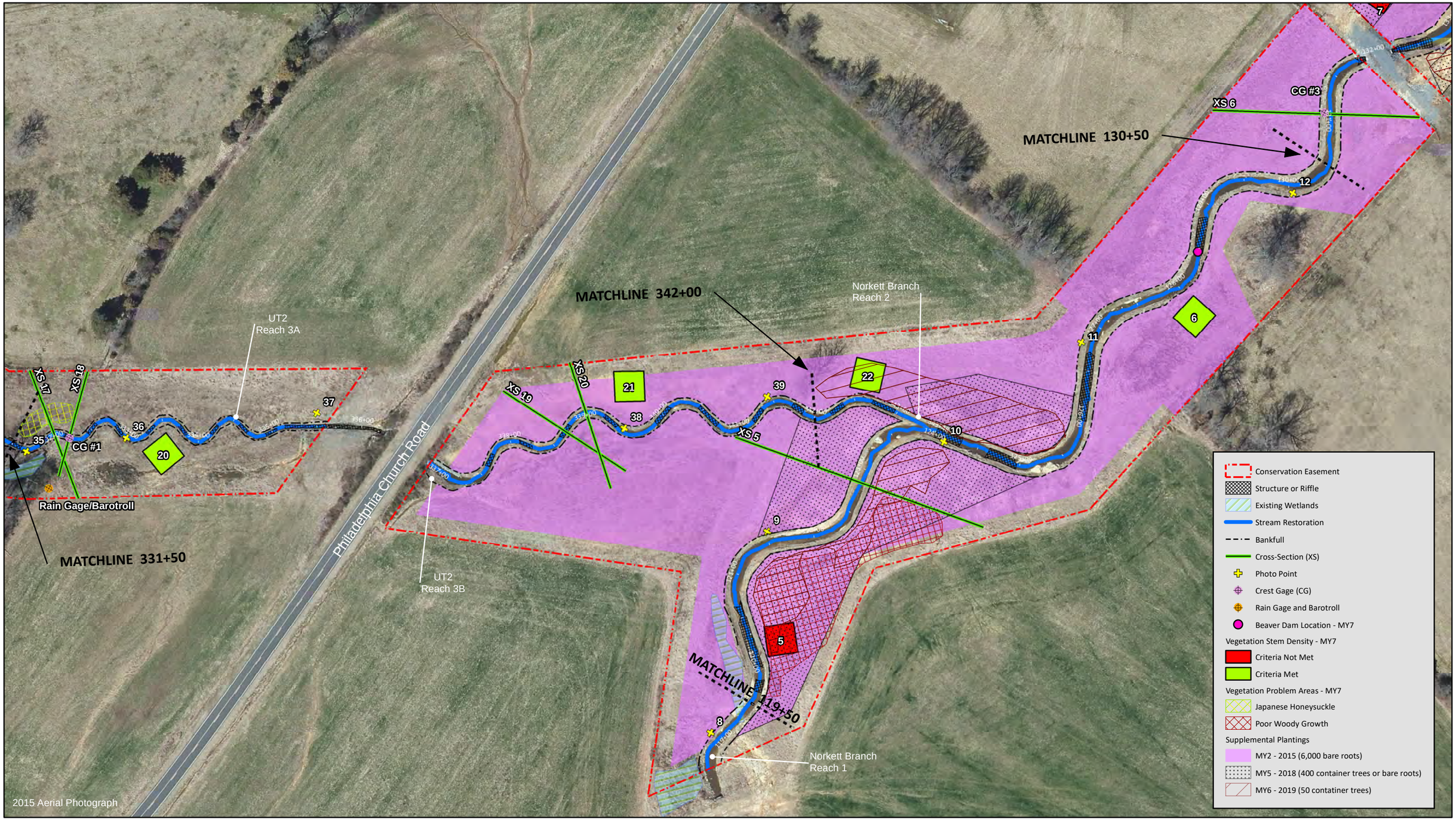
Figure 3.1 Integrated Current Condition Plan View (Sheet 1 of 6)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Union County, NC

WILDLANDS ENGINEERING

0 100 200 Feet

Figure 3.2 Integrated Current Condition Plan View (Sheet 2 of 6)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020
Union County, NC



WILDLANDS ENGINEERING

0 100 200 Feet

Figure 3.3 Integrated Current Condition Plan View (Sheet 3 of 6)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Union County, NC

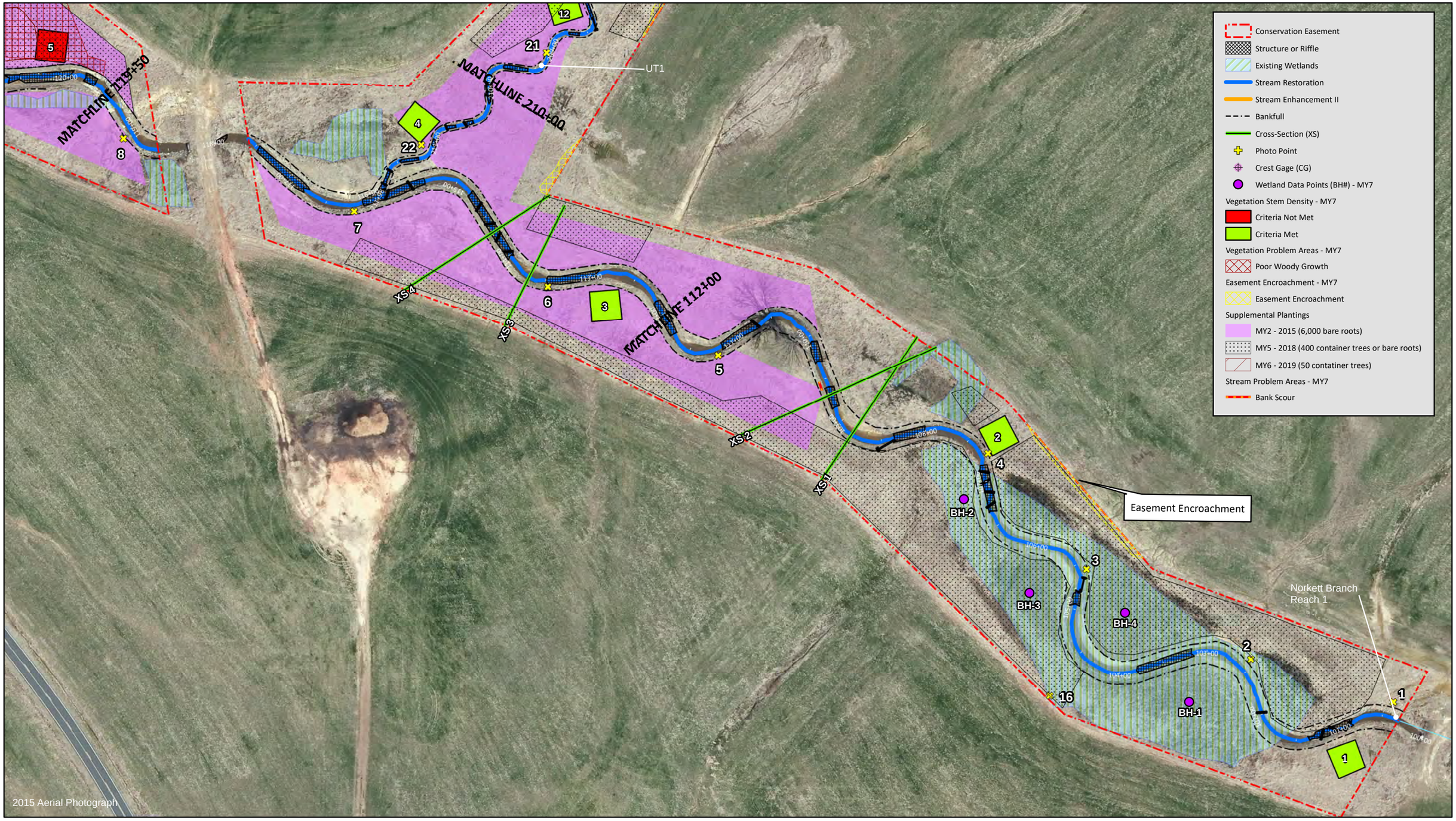


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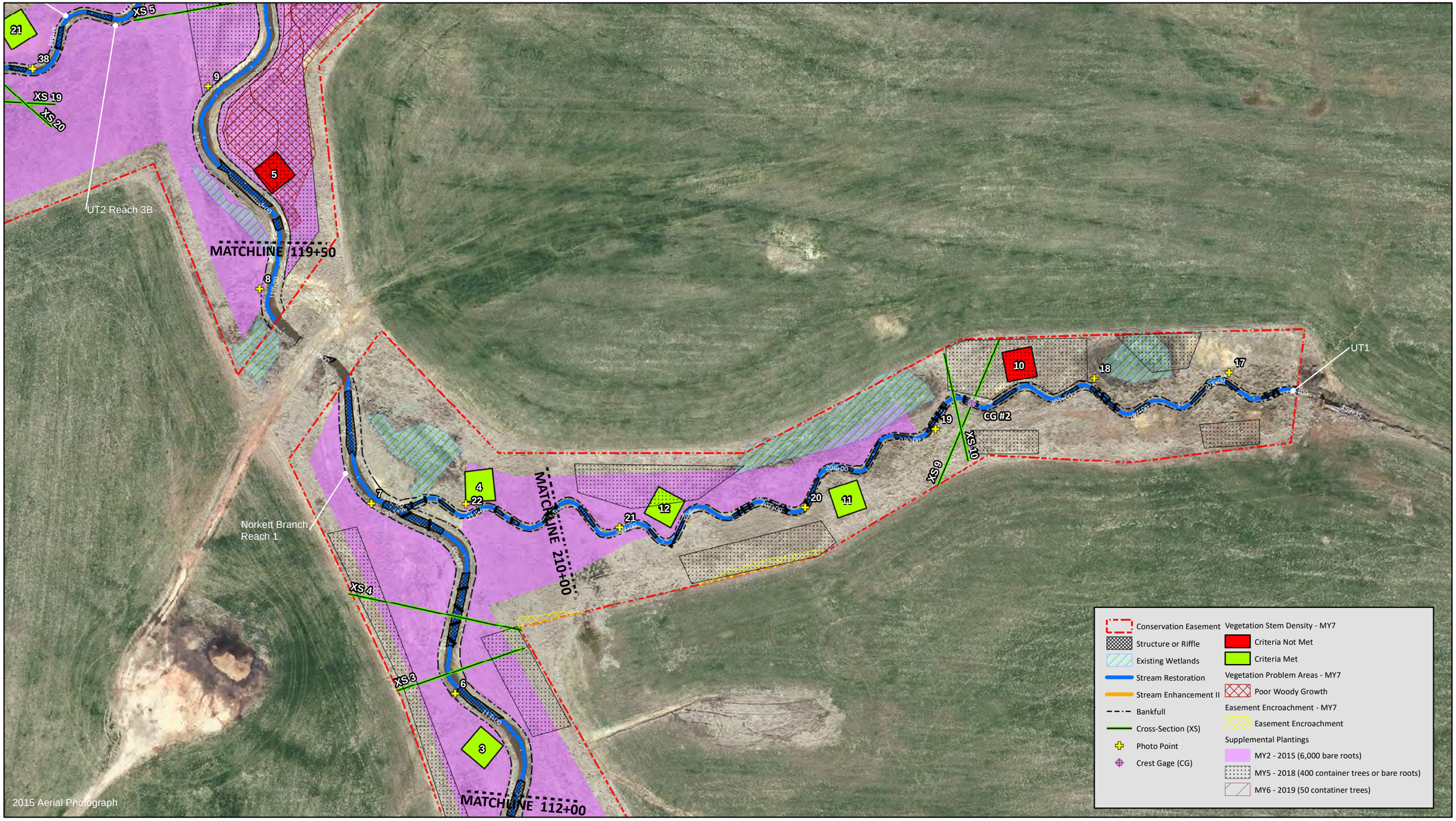
Figure 3.4 Integrated Current Condition Plan View (Sheet 4 of 6)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020
Union County, NC

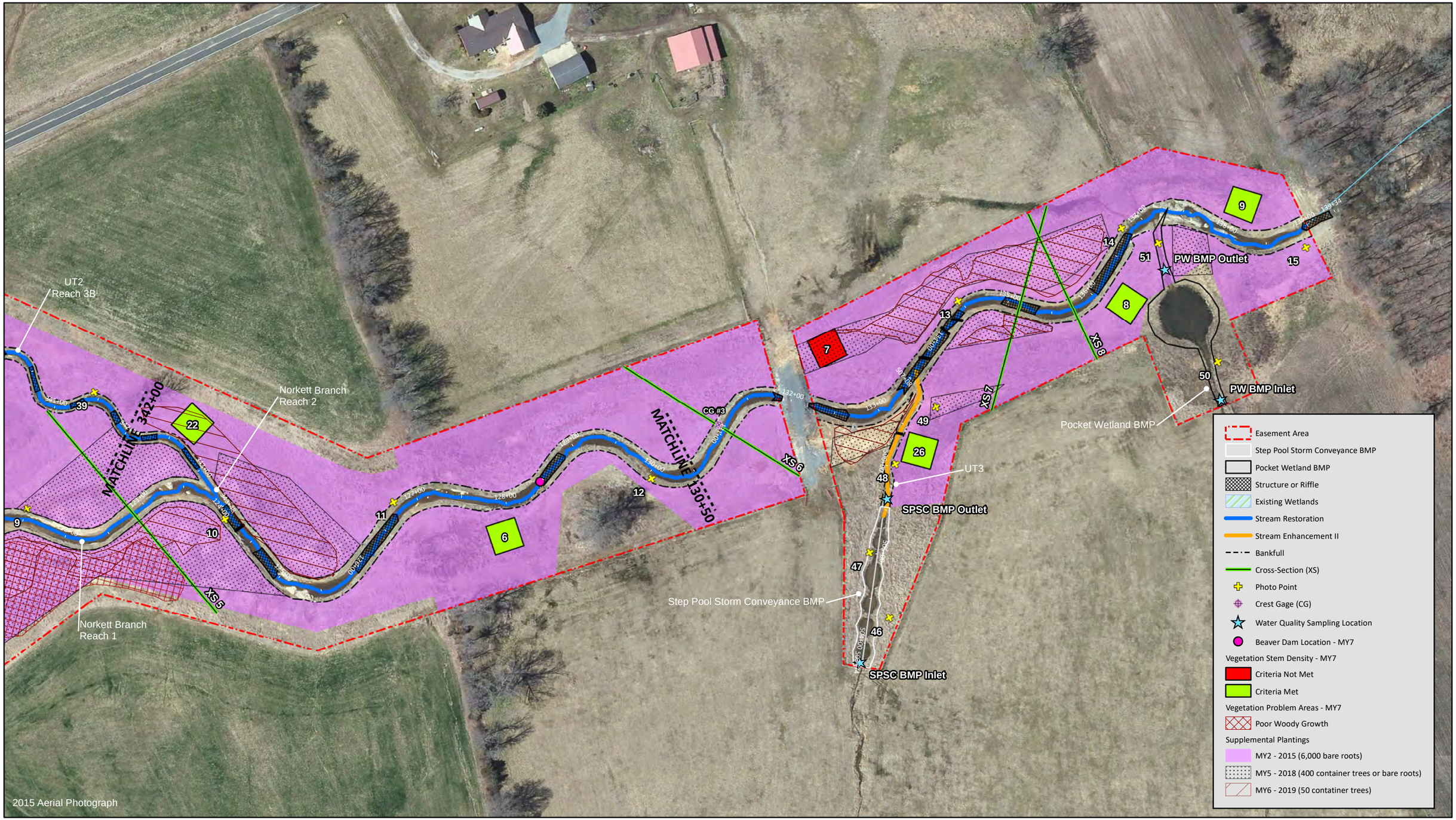


WILDLANDS ENGINEERING

0 100 200 Feet

N

Figure 3.5 Integrated Current Condition Plan View (Sheet 5 of 6)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020
Union County, NC



WILDLANDS ENGINEERING

0 100 200 Feet

Figure 3.6 Integrated Current Condition Plan View (Sheet 6 of 6)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Union County, NC

Table 6a. Visual Stream Morphology Stability Assessment Table

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

Norkett Branch Reach 1 - 2,313 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	17	17			100%			
	3. Meander Pool Condition	Depth Sufficient	16	16			100%			
		Length Appropriate	16	16			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	17	17			100%			
		Thalweg centering at downstream of meander bend (Glide)	17	17			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	10	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	10	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	2	2			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6b. Visual Stream Morphology Stability Assessment Table
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Norkett Branch Reach 2 - 1,513 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	10	10			100%			
	3. Meander Pool Condition	Depth Sufficient	11	11			100%			
		Length Appropriate	11	11			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	12	12			100%			
		Thalweg centering at downstream of meander bend (Glide)	12	12			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	1	1			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6c. Visual Stream Morphology Stability Assessment Table

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

UT1 - 1,212 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	27	27			100%			
	3. Meander Pool Condition	Depth Sufficient	26	26			100%			
		Length Appropriate	27	27			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	27	27			100%			
		Thalweg centering at downstream of meander bend (Glide)	27	27			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	1	1			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6d. Visual Stream Morphology Stability Assessment Table
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 1 - 1,033 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	24	24			100%			
	3. Meander Pool Condition	Depth Sufficient	24	24			100%			
		Length Appropriate	24	24			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	25	25			100%			
		Thalweg centering at downstream of meander bend (Glide)	25	25			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	2	2			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6e. Visual Stream Morphology Stability Assessment Table

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

UT2 Reach 2 - 1,416 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	31	31			100%			
	3. Meander Pool Condition	Depth Sufficient	31	31			100%			
		Length Appropriate	33	33			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	34	34			100%			
		Thalweg centering at downstream of meander bend (Glide)	34	34			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	4	4			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	4	4			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	4	4			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	4	4			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	4	4			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6f. Visual Stream Morphology Stability Assessment Table
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 3A - 1,041 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	25	25			100%			
	3. Meander Pool Condition	Depth Sufficient	24	24			100%			
		Length Appropriate	24	24			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	25	25			100%			
		Thalweg centering at downstream of meander bend (Glide)	25	25			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	1	1			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6g. Visual Stream Morphology Stability Assessment Table
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 3B - 668 LF

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	10	10			100%			
	3. Meander Pool Condition	Depth Sufficient	10	10			100%			
		Length Appropriate	10	10			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	11	11			100%			
		Thalweg centering at downstream of meander bend (Glide)	11	11			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	2	2			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 7. Vegetation Condition Assessment Table
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Planted Acreage **29.9**

Vegetation Category	Definitions	Mapping Threshold (acres)	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	0	0.0	0%
Low Stem Density Areas[1]	Woody stem densities clearly below target levels based on MY3, 4, 5, or 7 stem count criteria.	0.1	3	0.1	0%
		Total	**3**	**0.1**	**0%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25	1	0.3	1%
		Cumulative Total	**4**	**0.4**	**1%**

Easement Acreage **31.6**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1000	1	< 0.1	0%
Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	3	0.1	0%

[1]Acreage calculated from vegetation plots monitored for site.

Stream Photographs

Norkett Branch Reach 1
Monitoring Year 7

	
Photo Point 1 – looking upstream *(04/08/2020)*	**Photo Point 1** – looking downstream *(04/08/2020)*
	
Photo Point 2 – looking upstream *(04/08/2020)*	**Photo Point 2** – looking downstream *(04/08/2020)*
	
Photo Point 3 – looking upstream *(04/08/2020)*	**Photo Point 3** – looking downstream *(04/08/2020)*

	
Photo Point 4 – looking upstream *(04/08/2020)*	**Photo Point 4** – looking downstream *(04/08/2020)*
	
Photo Point 5 – looking upstream *(04/08/2020)*	**Photo Point 5** – looking downstream *(04/08/2020)*
	
Photo Point 6 – looking upstream *(04/08/2020)*	**Photo Point 6** – looking downstream *(04/08/2020)*

	
Photo Point 7 – looking upstream *(04/08/2020)*	**Photo Point 7** – looking downstream *(04/08/2020)*
	
Photo Point 8 – looking upstream *(04/08/2020)*	**Photo Point 8** – looking downstream *(04/08/2020)*
	
Photo Point 9 – looking upstream *(04/08/2020)*	**Photo Point 9** – looking downstream *(04/08/2020)*

	
Photo Point 10 – looking upstream *(04/08/2020)*	**Photo Point 10** – looking downstream *(04/08/2020)*

Stream Photographs

Norkett Branch Reach 2
Monitoring Year 7

	
Photo Point 11 – looking upstream *(04/08/2020)*	**Photo Point 11** – looking downstream *(04/08/2020)*
	
Photo Point 12 – looking upstream *(04/08/2020)*	**Photo Point 12** – looking downstream *(04/08/2020)*
	
Photo Point 13 – looking upstream *(04/08/2020)*	**Photo Point 13** – looking downstream *(04/08/2020)*

	
Photo Point 14 – looking upstream *(04/08/2020)*	**Photo Point 14** – looking downstream *(04/08/2020)*
	
Photo Point 15 – looking upstream *(04/08/2020)*	**Photo Point 15** – looking downstream *(04/08/2020)*
	
Photo Point 16 –Wetland looking upstream *(04/13/2020)*	**Photo Point 16** – Wetland looking downstream *(04/13/2020)*

Stream Photographs

UT1
Monitoring Year 7

	
Photo Point 17 – looking upstream *(04/08/2020)*	**Photo Point 17** – looking downstream *(04/08/2020)*
	
Photo Point 18 – looking upstream *(04/08/2020)*	**Photo Point 18** – looking downstream *(04/08/2020)*
	
Photo Point 19 – looking upstream *(04/08/2020)*	**Photo Point 19** – looking downstream *(04/08/2020)*

	
Photo Point 20 – looking upstream *(04/08/2020)*	**Photo Point 20** – looking downstream *(04/08/2020)*
	
Photo Point 21 – looking upstream *(04/08/2020)*	**Photo Point 21** – looking downstream *(04/08/2020)*
	
Photo Point 22 – looking upstream *(04/08/2020)*	**Photo Point 22** – looking downstream *(04/08/2020)*

Stream Photographs

UT2 Reach 1
Monitoring Year 7

	
Photo Point 23 – looking upstream *(04/09/2020)*	**Photo Point 23** – looking downstream *(04/09/2020)*
	
Photo Point 24 – looking upstream *(04/09/2020)*	**Photo Point 24** – looking downstream *(04/09/2020)*
	
Photo Point 25 – looking upstream *(04/09/2020)*	**Photo Point 25** – looking downstream *(04/09/2020)*

	
Photo Point 26 – looking upstream *(04/09/2020)*	**Photo Point 26** – looking downstream *(04/09/2020)*

Stream Photographs

UT2 Reach 2
Monitoring Year 7

	
Photo Point 27 – looking upstream *(04/09/2020)*	**Photo Point 27** – looking downstream *(04/09/2020)*
	
Photo Point 28 – looking upstream *(04/09/2020)*	**Photo Point 28** – looking downstream *(04/09/2020)*
	
Photo Point 29 – looking upstream *(04/09/2020)*	**Photo Point 29** – looking downstream *(04/09/2020)*

	
Photo Point 30 – looking upstream *(04/09/2020)*	**Photo Point 30** – looking downstream *(04/09/2020)*
	
Photo Point 31 – looking upstream (11/04/2020)	**Photo Point 31** – looking downstream (11/04/2020)

Stream Photographs

UT2 Reach 3A & UT2 Reach 3B
Monitoring Year 7

	
Photo Point 32 – looking upstream *(04/09/2020)*	**Photo Point 32** – looking downstream *(04/09/2020)*
	
Photo Point 33 – looking upstream *(04/09/2020)*	**Photo Point 33** – looking downstream *(04/09/2020)*
	
Photo Point 34 – looking upstream *(04/09/2020)*	**Photo Point 34** – looking downstream *(04/09/2020)*

	
Photo Point 35 – looking upstream *(04/09/2020)*	**Photo Point 35** – looking downstream *(04/09/2020)*
	
Photo Point 36 – looking upstream *(04/09/2020)*	**Photo Point 36** – looking downstream *(04/09/2020)*
	
Photo Point 37 – looking upstream *(04/09/2020)*	**Photo Point 37** – looking downstream *(04/09/2020)*

	
Photo Point 38 – looking upstream *(04/08/2020)*	**Photo Point 38** – looking downstream *(04/08/2020)*
	
Photo Point 39 – looking upstream *(04/08/2020)*	**Photo Point 39** – looking downstream *(04/08/2020)*

Stream Photographs

UT2A
Monitoring Year 7

	
Photo Point 40 – looking upstream *(04/09/2020)*	**Photo Point 40** – looking downstream *(04/09/2020)*
	
Photo Point 41 – looking upstream *(04/09/2020)*	**Photo Point 41** – looking downstream *(04/09/2020)*
	
Photo Point 42 – looking upstream *(04/09/2020)*	**Photo Point 42** – looking downstream *(04/09/2020)*

	
Photo Point 43 – looking upstream *(04/09/2020)*	**Photo Point 43** – looking downstream *(04/09/2020)*
	
Photo Point 44 – looking upstream *(04/09/2020)*	**Photo Point 44** – looking downstream *(04/09/2020)*
	
Photo Point 45 – looking upstream *(04/09/2020)*	**Photo Point 45** – looking downstream *(04/09/2020)*

Stream Photographs

UT3
Monitoring Year 7

	
Photo Point 46 – looking upstream *(04/08/2020)*	**Photo Point 46** – looking downstream *(04/08/2020)*
	
Photo Point 47 – looking upstream *(04/08/2020)*	**Photo Point 47** – looking downstream *(04/08/2020)*
	
Photo Point 48 – looking upstream *(04/08/2020)*	**Photo Point 48** – looking downstream *(04/08/2020)*

	
Photo Point 49 – looking upstream *(11/03/2020)*	**Photo Point 49** – looking downstream *(11/03/2020)*

Stream Photographs

BMP Inlet & BMP Outlet
Monitoring Year 7

	
Photo Point 50 – looking downstream *(04/08/2020)*	**Photo Point 51** – looking upstream *(04/08/2020)*

Vegetation Photographs
Monitoring Year 7

	
Vegetation Plot 1 – (10/06/2020)	Vegetation Plot 2 – (10/06/2020)
	
Vegetation Plot 3 – (10/06/2020)	Vegetation Plot 4 – (10/06/2020)
	
Vegetation Plot 5 – (10/06/2020)	Vegetation Plot 6 – (10/06/2020)

Vegetation Plot 7 – (10/06/2020)

Vegetation Plot 8 – (10/06/2020)

Vegetation Plot 9 – (10/06/2020)

Vegetation Plot 10 – (10/06/2020)

Vegetation Plot 11 – (10/06/2020)

Vegetation Plot 12 – (10/06/2020)

	
Vegetation Plot 13 – (10/06/2020)	Vegetation Plot 14 – (10/06/2020)
	
Vegetation Plot 15 – (10/06/2020)	Vegetation Plot 16 – (10/06/2020)
	
Vegetation Plot 17 – (10/06/2020)	Vegetation Plot 18 – (10/06/2020)

	
Vegetation Plot 19 – (10/06/2020)	Vegetation Plot 20 – (10/06/2020)
	
Vegetation Plot 21 – (10/06/2020)	Vegetation Plot 22 – (10/06/2020)
	
Vegetation Plot 23 – (10/06/2020)	Vegetation Plot 24 – (10/06/2020)

	
Vegetation Plot 25 – (10/06/2020)	Vegetation Plot 26 – (10/06/2020)

Areas of Concern

	
Invasive Plant Population (Japanese Honeysuckle) – UT2 Reach 3A 11/3/2020	Poor Woody Growth – Norkett Branch Reach 1 11/3/2020
	
Bank Scour – Norkett Branch Reach 1 11/3/2020	Beaver Dam – Norkett Branch Reach 2 11/3/2020

APPENDIX 3. Vegetation Plot Data

Table 8. Vegetation Plot Criteria Attainment

Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Plot	MY7 Success Criteria Met (Y/N)	Tract Mean
1	Y	88%
2	Y	
3	Y	
4	Y	
5	N	
6	Y	
7	N	
8	Y	
9	Y	
10	N	
11	Y	
12	Y	
13	Y	
14	Y	
15	Y	
16	Y	
17	Y	
18	Y	
19	Y	
20	Y	
21	Y	
22	Y	
23	Y	
24	Y	
25	Y	
26	Y	

Table 9. CVS Vegetation Plot Metadata
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Report Prepared By	Henry Reed
Date Prepared	10/12/2020 11:07
database name	cvs-eep-entrytool-v2.3.1 MY7.mdb
database location	Q:\ActiveProjects\005-02134 Norkett Branch FDP\Monitoring\Monitoring Year 7 (2020)\Vegetation Assessment
computer name	HENRY
file size	46661632
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	95360
project Name	Norkett Branch Stream Mitigation Site
Description	
River Basin	
length(ft)	10706
stream-to-edge width (ft)	50
area (sq m)	127880.66
Required Plots (calculated)	22
Sampled Plots	26

Table 10. Planted and Total Stem Counts (Species by Plot with Annual Means)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Scientific Name	Common Name	Species Type	Current Plot Data (MY7 2020)																				
			95360-WEI-0001			95360-WEI-0002			95360-WEI-0003			95360-WEI-0004			95360-WEI-0005			95360-WEI-0006			95360-WEI-0007		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree				1	1	1	1	1	1	2	2	2									
Baccharis halimifolia	eastern baccharis	Shrub																					
Betula nigra	river birch	Tree	3	3	6	1	1	1	1	1	1				2	2	2	2	2	2	1	1	1
Carya illinoinensis	pecan	Tree																					
Celtis laevigata	sugarberry	Tree																					
Cephalanthus occidentalis	common buttonbush	Shrub																					
Cercis canadensis	eastern redbud	Tree																					
Cornus amomum	silky dogwood	Shrub																					
Cornus florida	flowering dogwood	Tree																					
Diospyros virginiana	common persimmon	Tree						6						1									
Fraxinus pennsylvanica	green ash	Tree	2	2	2	5	5	5			1							4	4	6	3	3	3
Hamamelis virginiana	American witchhazel	Tree																					
Juniperus virginiana	eastern redcedar	Tree																					
Liquidambar styraciflua	sweetgum	Tree																		2			
Liriodendron tulipifera	tuliptree	Tree																					
Pinus rigida	pitch pine	Tree																					
Pinus strobus	eastern white pine	Tree																					
Pinus taeda	loblolly pine	Tree																					
Platanus occidentalis	American sycamore	Tree	5	5	5	6	6	6	7	7	10	7	7	7	2	2	2	3	3	3	1	1	1
Populus deltoides	eastern cottonwood	Tree									1												
Quercus michauxii	swamp chestnut oak	Tree																					
Quercus phellos	willow oak	Tree						1							1	1	1	1	1	2			
Quercus rubra	northern red oak	Tree	2	2	2				3	3	3	1	1	1									
Salix nigra	black willow	Tree																		8			
Salix sericea	silky willow	Shrub																					
Sambucus canadensis	common elderberry	Shrub										1	1	1									
Sambucus nigra	European black elderberry	Shrub																					
Taxodium distichum	bald cypress	Tree																					
Ulmus alata	winged elm	Tree																					
Ulmus americana	American elm	Tree																					
Ulmus rubra	slippery elm	Tree																					
Unknown		Shrub or Tree																					
Stem count			12	12	15	13	13	20	12	12	17	11	11	12	5	5	5	10	10	23	5	5	5
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	4	4	4	6	4	4	6	4	4	5	3	3	3	4	4	6	3	3	3
Stems per ACRE			486	486	607	526	526	809	486	486	688	445	445	486	202	202	202	405	405	931	202	202	202

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Planted Stems excluding live stakes
P-all: All planted stems
T: Total stems including volunteers

Table 10. Planted and Total Stem Counts (Species by Plot with Annual Means)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Scientific Name	Common Name	Species Type	Current Plot Data (MY7 2020)																				
			95360-WEI-0008			95360-WEI-0009			95360-WEI-0010			95360-WEI-0011			95360-WEI-0012			95360-WEI-0013			95360-WEI-0014		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree																					
Baccharis halimifolia	eastern baccharis	Shrub																					
Betula nigra	river birch	Tree	3	3	3				1	1	1			2	1	1	2	1	1	1	1	1	1
Carya illinoinensis	pecan	Tree																					
Celtis laevigata	sugarberry	Tree																					
Cephalanthus occidentalis	common buttonbush	Shrub																					
Cercis canadensis	eastern redbud	Tree																					
Cornus amomum	silky dogwood	Shrub																					
Cornus florida	flowering dogwood	Tree																					
Diospyros virginiana	common persimmon	Tree			1						1			1						1			
Fraxinus pennsylvanica	green ash	Tree	5	5	6	2	2	14	2	2	2	6	6	6	1	1	1	2	2	2	3	3	3
Hamamelis virginiana	American witchhazel	Tree																					
Juniperus virginiana	eastern redcedar	Tree																					
Liquidambar styraciflua	sweetgum	Tree																					
Liriodendron tulipifera	tuliptree	Tree	1	1	1				1	1	1												
Pinus rigida	pitch pine	Tree																					
Pinus strobus	eastern white pine	Tree																					
Pinus taeda	loblolly pine	Tree																					
Platanus occidentalis	American sycamore	Tree	4	4	4	6	6	6	1	1	1	2	2	2	7	7	7	3	3	3	2	2	2
Populus deltoides	eastern cottonwood	Tree																					
Quercus michauxii	swamp chestnut oak	Tree	1	1	1																		
Quercus phellos	willow oak	Tree			2	2	2	2													1	1	1
Quercus rubra	northern red oak	Tree	1	1	1										1	1	1						
Salix nigra	black willow	Tree																		1			
Salix sericea	silky willow	Shrub																					
Sambucus canadensis	common elderberry	Shrub																					
Sambucus nigra	European black elderberry	Shrub																					
Taxodium distichum	bald cypress	Tree	2	2	2																		
Ulmus alata	winged elm	Tree						12															
Ulmus americana	American elm	Tree																					
Ulmus rubra	slippery elm	Tree																					
Unknown		Shrub or Tree																		4			
Stem count			17	17	21	10	10	34	5	5	6	8	8	11	10	10	11	6	6	12	7	7	7
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			7	7	9	3	3	4	4	4	5	2	2	4	4	4	4	3	3	6	4	4	4
Stems per ACRE			688	688	850	405	405	1376	202	202	243	324	324	445	405	405	445	243	243	486	283	283	283

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Planted Stems excluding live stakes
P-all: All planted stems
T: Total stems including volunteers

Table 10. Planted and Total Stem Counts (Species by Plot with Annual Means)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Scientific Name	Common Name	Species Type	Current Plot Data (MY7 2020)																				
			95360-WEI-0015			95360-WEI-0016			95360-WEI-0017			95360-WEI-0018			95360-WEI-0019			95360-WEI-0020			95360-WEI-0021		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree																					
Baccharis halimifolia	eastern baccharis	Shrub																					
Betula nigra	river birch	Tree	1	1	1				1	1	1				1	1	1	1	1	1			
Carya illinoinensis	pecan	Tree																					
Celtis laevigata	sugarberry	Tree																					
Cephalanthus occidentalis	common buttonbush	Shrub																					
Cercis canadensis	eastern redbud	Tree				1	1	1													3	3	3
Cornus amomum	silky dogwood	Shrub																					
Cornus florida	flowering dogwood	Tree																					
Diospyros virginiana	common persimmon	Tree									1												
Fraxinus pennsylvanica	green ash	Tree	4	4	4	3	3	3	4	4	4	3	3	3	3	3	6	3	3	3			
Hamamelis virginiana	American witchhazel	Tree																			2	2	2
Juniperus virginiana	eastern redcedar	Tree																					
Liquidambar styraciflua	sweetgum	Tree									4						3			1			
Liriodendron tulipifera	tuliptree	Tree													1	1	1						
Pinus rigida	pitch pine	Tree																					
Pinus strobus	eastern white pine	Tree																					
Pinus taeda	loblolly pine	Tree																					
Platanus occidentalis	American sycamore	Tree	3	3	3	1	1	1	4	4	4	4	4	4	4	4	4	4	4	4	6	6	6
Populus deltoides	eastern cottonwood	Tree															1						
Quercus michauxii	swamp chestnut oak	Tree													1	1	1	1	1	1			
Quercus phellos	willow oak	Tree	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	2	2	2	1	1	1
Quercus rubra	northern red oak	Tree	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1				1	1	1
Salix nigra	black willow	Tree																					
Salix sericea	silky willow	Shrub																					
Sambucus canadensis	common elderberry	Shrub																					
Sambucus nigra	European black elderberry	Shrub																					
Taxodium distichum	bald cypress	Tree																					
Ulmus alata	winged elm	Tree						6			19						4			5			
Ulmus americana	American elm	Tree																					
Ulmus rubra	slippery elm	Tree																					
Unknown		Shrub or Tree																					
Stem count			10	10	10	7	7	13	13	13	37	9	9	9	12	12	23	11	11	17	13	13	13
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			5	5	5	5	5	6	5	5	8	4	4	4	7	7	10	5	5	7	5	5	5
Stems per ACRE			405	405	405	283	283	526	526	526	1497	364	364	364	486	486	931	445	445	688	526	526	526

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Planted Stems excluding live stakes
P-all: All planted stems
T: Total stems including volunteers

Table 10. Planted and Total Stem Counts (Species by Plot with Annual Means)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Scientific Name	Common Name	Species Type	Current Plot Data (MY7 2020)															
			95360-WEI-0022			95360-WEI-0023			95360-WEI-0024			95360-WEI-0025			95360-WEI-0026		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree															
Baccharis halimifolia	eastern baccharis	Shrub															
Betula nigra	river birch	Tree	1	1	1	1	1	1	1	1	1	1	1	2			
Carya illinoinensis	pecan	Tree															
Celtis laevigata	sugarberry	Tree															
Cephalanthus occidentalis	common buttonbush	Shrub															
Cercis canadensis	eastern redbud	Tree															
Cornus amomum	silky dogwood	Shrub															
Cornus florida	flowering dogwood	Tree															
Diospyros virginiana	common persimmon	Tree															
Fraxinus pennsylvanica	green ash	Tree	6	6	10	3	3	3	3	3	3	3	3	3	4	4	4
Hamamelis virginiana	American witchhazel	Tree															
Juniperus virginiana	eastern redcedar	Tree															
Liquidambar styraciflua	sweetgum	Tree			2												
Liriodendron tulipifera	tuliptree	Tree										1	1	1			
Pinus rigida	pitch pine	Tree															
Pinus strobus	eastern white pine	Tree															
Pinus taeda	loblolly pine	Tree						3									
Platanus occidentalis	American sycamore	Tree	5	5	6	3	3	3	4	4	4	2	2	2	2	2	2
Populus deltoides	eastern cottonwood	Tree															
Quercus michauxii	swamp chestnut oak	Tree										1	1	1			
Quercus phellos	willow oak	Tree	2	2	2	2	2	2	1	1	1	1	1	1			
Quercus rubra	northern red oak	Tree				2	2	2	1	1	1	1	1	1	2	2	2
Salix nigra	black willow	Tree															
Salix sericea	silky willow	Shrub															
Sambucus canadensis	common elderberry	Shrub															
Sambucus nigra	European black elderberry	Shrub															
Taxodium distichum	bald cypress	Tree															
Ulmus alata	winged elm	Tree															1
Ulmus americana	American elm	Tree															
Ulmus rubra	slippery elm	Tree															
Unknown		Shrub or Tree															
Stem count			14	14	21	11	11	14	10	10	10	10	10	11	8	8	9
size (ares)			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	5	5	5	6	5	5	5	7	7	7	3	3	4
Stems per ACRE			567	567	850	445	445	567	405	405	405	405	405	445	324	324	364

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Planted Stems excluding live stakes
P-all: All planted stems
T: Total stems including volunteers

Table 10. Planted and Total Stem Counts (Species by Plot with Annual Means)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Scientific Name	Common Name	Species Type	Annual Summary																							
			MY7 (2020)			MY6 (2019)			MY5 (8/2018)			MY4 (8/2017)			MY3 (6/2016)			MY2 (9/2015)			MY1 (9/2014)			MY0 (4/2014)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree	4	4	4	4	4	7	4	4	5	4	4	7	4	4	6	4	4	4						
Baccharis halimifolia	eastern baccharis	Shrub									4															
Betula nigra	river birch	Tree	25	25	32	27	27	32	29	29	32	27	27	27	27	27	27	27	27	27	25	25	25	32	32	32
Carya illinoinensis	pecan	Tree						2									6									
Celtis laevigata	sugarberry	Tree												6							1	1	1	7	7	7
Cephalanthus occidentalis	common buttonbush	Shrub												2	1	1	1	1	1	2						
Cercis canadensis	eastern redbud	Tree	4	4	4	6	6	6	11	11	12	10	10	10	12	12	12	14	14	14	25	25	25	42	42	42
Cornus amomum	silky dogwood	Shrub						1																		
Cornus florida	flowering dogwood	Tree							1	1	1				8	8	8	10	10	10	48	48	48	75	75	75
Diospyros virginiana	common persimmon	Tree			12			5			5			3			2			3						
Fraxinus pennsylvanica	green ash	Tree	75	75	97	75	75	93	74	74	83	75	75	83	76	76	82	73	73	75	63	63	63	67	67	67
Hamamelis virginiana	American witchhazel	Tree	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	7	7	7	8	8	8
Juniperus virginiana	eastern redcedar	Tree						5																		
Liquidambar styraciflua	sweetgum	Tree			12			10			10			9						5						
Liriodendron tulipifera	tuliptree	Tree	4	4	4	4	4	4	7	7	7	6	6	6	9	9	16	11	11	11	24	24	24	59	59	59
Pinus rigida	pitch pine	Tree									7			2												
Pinus strobus	eastern white pine	Tree												1												
Pinus taeda	loblolly pine	Tree			3			9																		
Platanus occidentalis	American sycamore	Tree	98	98	102	99	99	102	105	105	107	102	102	102	105	105	106	106	106	106	67	67	67	57	57	57
Populus deltoides	eastern cottonwood	Tree			2			1						1			1			1						
Quercus michauxii	swamp chestnut oak	Tree	4	4	4	4	4	4	4	4	4	7	7	7	7	7	7	7	7	7	18	18	18	36	36	36
Quercus phellos	willow oak	Tree	20	20	24	19	19	24	20	20	20	17	17	17	19	19	19	20	20	20	34	34	34	27	27	27
Quercus rubra	northern red oak	Tree	21	21	21	20	20	20	23	23	23	19	19	19	20	20	20	23	23	23	24	24	24	24	24	24
Salix nigra	black willow	Tree			9			12			9			5			7			1						
Salix sericea	silky willow	Shrub						3																		
Sambucus canadensis	common elderberry	Shrub	1	1	1	1	1	1	1	1	3	1	1	1	2	2	3	2	2	2	10	10	11	13	13	13
Sambucus nigra	European black elderberry	Shrub						1																		
Taxodium distichum	bald cypress	Tree	2	2	2	2	2	2	2	2	3							1	1	1						
Ulmus alata	winged elm	Tree			47			42			19			15			17			6						
Ulmus americana	American elm	Tree						4			6															
Ulmus rubra	slippery elm	Tree						19																		
Unknown		Shrub or Tree			4									1												
Stem count			260	260	386	263	263	411	284	284	363	271	271	327	293	293	343	302	302	321	346	346	347	447	447	447
size (ares)			26			26			26			26			26			26			26			26		
size (ACRES)			0.64			0.64			0.64			0.64			0.64			0.64			0.64			0.64		
Species count			12	12	19	12	12	25	13	13	20	11	11	21	13	13	18	14	14	19	12	12	12	12	12	12
Stems per ACRE			405	405	601	409	409	640	442	442	565	422	422	509	456	456	534	470	470	500	539	539	540	696	696	696

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Planted Stems excluding live stakes
P-all: All planted stems
T: Total stems including volunteers

APPENDIX 4. Morphological Summary Data and Plots

Table 11a. Baseline Stream Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Norkett Branch Reaches 1 and 2

		PRE-RESTORATION CONDITION				REFERENCE REACHES						DESIGN				AS-BUILT/BASELINE			
Parameter	**Gage**	**Norkett Branch Reach 1**		**Norkett Branch Reach 2**		**Spencer Creek**		**UT to Spencer Creek**		**UT Richland Creek Reach 2**		**Norkett Branch Reach 1**		**Norkett Branch Reach 2**		**Norkett Branch Reach 1**		**Norkett Branch Reach 2**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																			
Bankfull Width (ft)		12.8	21.5	22.0	29.5	10.7	11.2	7.0		13.3	15.2	22.0		23.0		22.5	26.6	25.6	25.7
Floodprone Width (ft)		35	58	72	85	60	114+	>81		>50		48	>110	61	>115	>200	>200	>200	>200
Bankfull Mean Depth		1.7	1.8	1.4	2.4	1.6	1.8	2.0		1.1	1.3	1.8		1.9		1.6	1.8	1.8	2.0
Bankfull Max Depth		3.1	3.2	2.3	2.9	2.1	2.6	1.1		1.8	2.1	2.8		2.8		2.6	3.3	3.0	3.3
Bankfull Cross-sectional Area (ft^2)	n/a	28.1	35.6	40.6	52.8	17.8	19.7	7.7		16.5	17.5	40.6		43.2		38.8	44.6	46.7	50.8
Width/Depth Ratio		5.9	13.0	9.2	21.4	5.8	7.1	6.4		10.1	13.9	11.9		12.2		13.1	16.7	13.0	14.1
Entrenchment Ratio		2.1	4.5	2.9	3.3	5.5	10.2	>11.6		>2.5		2.2	>5.0	2.2	>5.0	>2.2		>2.2	
Bank Height Ratio		1.0	1.4	1.3	1.6	1.0		1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)		8.6		0.4								---		---		18.4	59.6	7.3	9.9
Profile																			
Riffle Length (ft)						---		---		---		---		---		14	84	19	111
Riffle Slope (ft/ft)		0.0036	0.0039	0.0032	0.0120	0.0130		0.0140		0.0183	0.0355	0.0018	0.0120	0.0023	0.0180	0.0000	0.0152	0.0009	0.0163
Pool Length (ft)						---		---		---		---		---		12	88	51	102
Pool Max Depth (ft)	n/a	4.0	4.0	2.9	4.0	3.3		2.5		1.8		2.8	7.8	2.8	7.9	3.3	5.1	3.5	4.8
Pool Spacing (ft)^		62	300	60	300	71.0		19	42	33.0	93.0	29	163	30	170	67	183	98	172
Pool Volume (ft^3)																			
Pattern																			
Channel Beltwidth (ft)		N/A		N/A		38	41	11	27	N/A		35	161	37	168	38	147	38	155
Radius of Curvature (ft)		N/A		N/A		11	15	6	16	N/A		40	66	41	69	38	65	40	64
Rc:Bankfull Width (ft/ft)	n/a	N/A		N/A		1.0	1.3	0.8	2.3	N/A		1.8	3.0	1.8	3.0	1.7	2.4	1.6	2.5
Meander Length (ft)		N/A		N/A		46	48	37.7	43	N/A		66	264	69	276	167	263	181	277
Meander Width Ratio		N/A		N/A		3.6	3.7	1.6	3.8	N/A		1.6	7.3	1.6	7.3	1.7	5.5	1.5	6.0
Substrate, Bed and Transport Parameters																			
Ri%/Ru%/P%/G%/S%																			
SC%/Sa%/G%/C%/B%/Be%																			
d16/d35/d50/d84/d95/d100	n/a	SC/4.6/8.7/28.5/64/2048		SC/SC/0.4/21.1/>2048/>2048		---		---		---						0.4/3.6/7.4/52.3/139.4/362		2.6/6.7/13.0/62.6/210.9/>2048	
Reach Shear Stress (Competency) lb/ft^2		0.41	0.44	0.17	0.38							0.28		0.40		0.27	0.29	0.30	0.32
Max part size (mm) mobilized at bankfull												15-25		20-35		15-25		20-35	
Stream Power (Capacity) W/m^2																			
Additional Reach Parameters																			
Drainage Area (SM)		2.3		3.2		0.96		0.01		0.28		2.3		3.2		2.3		3.2	
Watershed Impervious Cover Estimate (%)		<1% [1]		<1% [1]		---		---		---		<1% [1]		<1% [1]		<1% [1]		<1% [1]	
Rosgen Classification		E4		C/E5		E4		E5		C4/E4		C4		C5		C4		C4/E4	
Bankfull Velocity (fps)		3.5	4.0	2.5	3.5	4.9	5.4	3.2		3.5	4.1	2.8		3.3		2.6	2.8	2.8	2.9
Bankfull Discharge (cfs)		110		140		97		25		29	32	110		140		105	124	130	148
Q-NFF regression																			
Q-USGS extrapolation	n/a																		
Q-Mannings																			
Valley Length (ft)		---		---		---		---		---		1,910		1,249		1,910		1,249	
Channel Thalweg Length (ft^2)		1,980		1,505		---		---		---		2,369		1,499		2,369		1,499	
Sinuosity (ft^3)		1.10		1.10		2.30		2.50		1.00		1.24		1.20		1.24		1.20	
Water Surface Slope (ft/ft^2)		0.0039		0.0013	0.0046	---		---		---		0.0025		0.0036		0.0031		0.0033	
Bankfull Slope (ft/ft)		---		---		---		---		---		---		---		0.0029		0.0034	

[1] No impervious land use is present within the project watershed per the CGIA Land Use Classification data set.
[2] Channel Length represented does not include easement breaks.
(---): Data was not provided
N/A: Not Applicable
SC: Silt/Clay

Table 11b. Baseline Stream Data Summary

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

UT1 and UT2 Reaches 1 and 2

		PRE-RESTORATION CONDITION						REFERENCE REACHES	DESIGN						AS BUILT/ BASELINE					
Parameter	**Gage**	**UT1**		**UT2 Reach 1**		**UT2 Reach 2**		**See Table 11a**	**UT1**		**UT2 Reach 1**		**UT2 Reach 2**		**UT1**		**UT2 Reach 1**		**UT2 Reach 2**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																				
Bankfull Width (ft)		2.9	8.2	13.6		7.1			7.5		8.0		8.0		10.5		9.4		9.0	9.6
Floodprone Width (ft)		6	40	29		53			16.5	>38	>40		>40		136		144		>200	>200
Bankfull Mean Depth		0.9	1	0.6		0.7			0.6		0.6		0.7		0.4		0.5		0.5	0.6
Bankfull Max Depth		1.2	2	1		1.5			0.9		0.9		1.0		0.8		1.2		1.1	1.2
Bankfull Cross-sectional Area (ft^2)	n/a	2.6	8.6	7.9		5.1		See Table 11a	4.6		4.6		5.3		4.5		4.5		5.2	5.3
Width/Depth Ratio		2.6	8.6	23.4		9.8			12.2		13.9		12.1		24.5		19.8		15.3	17.6
Entrenchment Ratio		2.2	4.9	>7		>8			2.2	>5	>5		>5		>2.2		>2.2		>2.2	
Bank Height Ratio		1.5	2.4	1		1	1.7		1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)		SC		7.3		7.3									20.9		19.5		20.1	27.4
Profile																				
Riffle Length (ft)									---		---		---		7	39	7	34	6	27
Riffle Slope (ft/ft)		0.017	0.054	0.009	0.032	0.006			0.013	0.045	0.01	0.032	0.013	0.028	0.007	0.044	0.006	0.037	0.009	0.039
Pool Length (ft)								See Table 11a	---		---		---		12	69	11	35	11	45
Pool Max Depth (ft)	n/a	1.4	1.7	1.3		2.5			0.9	2.6	0.9	2.4	1.0	2.8	1.2	2.5	1.5	2.6	1.5	2.5
Pool Spacing (ft)^		61	295	190		51	130		10	56	10	56	10	56	30	58	21	64	22	71
Pool Volume (ft^3)																				
Pattern																				
Channel Beltwidth (ft)		N/A		N/A	N/A	26.9	49.5		12	55	13	44	13	44	13	49	10	42	12	52
Radius of Curvature (ft)		N/A		N/A	N/A	6.92	33.39		12	23	13.0	24.0	13	24	14	23	15	21	14	22
Rc:Bankfull Width (ft/ft)	n/a	N/A		N/A	N/A	0.98	4.73	See Table 11a	1.6	3	1.6	3.0	1.6	3	1.3	2.2	1.6	2.2	1.6	2.3
Meander Length (ft)		N/A		N/A	N/A	83.5	141.4		23	90	24.0	96.0	24	96	61	88	45	92	44	83
Meander Width Ratio		N/A		N/A	N/A	3.8	7.01		1.6	7.3	1.6	5.5	1.6	5.5	1.2	4.7	1.0	4.4	1.3	5.4
Substrate, Bed and Transport Parameters																				
Ri%/Ru%/P%/G%/S%																				
SC%/Sa%/G%/C%/B%/Be%																				
d16/d35/d50/d84/d95/d100	n/a	SC/SC/SC/SC/0.77/9.38/>2048		SC/SC/7.3/47.7/85.7/>2048		SC/SC/7.3/47.7/85.7/>2048		See Table 11a							SC/1.0/12.7/55.3/90/256		SC/7.1/12.2/28.5/42.9/90		2.4/11.6/20.7/56.1/86.7/180	
Reach Shear Stress (Competency) lb/ft^2		0.57	0.82	0.14		0.42			0.38		0.18		0.27		0.27		0.16		0.21	0.23
Max part size (mm) mobilized at bankfull									20-35		10-20		15-25		15-25		10-20		15-25	
Stream Power (Capacity) W/m^2																				
Additional Reach Parameters																				
Drainage Area (SM)		0.08		0.40		0.48			0.08		0.15		0.22		0.08		0.15		0.22	
Watershed Impervious Cover Estimate (%)		<1% [1]		<1% [1]		<1% [1]			<1% [1]		<1% [1]		<1% [1]		<1% [1]		<1% [1]		<1% [1]	
Rosgen Classification		E6		C/E4		E4		See Table 5a	C/E6		C/E4		C/E4		C4		C4		C4	
Bankfull Velocity (fps)		3.3	4.2	1.4		3.4			2.6		2.4		3.2		2.1		1.6		1.9	2.0
Bankfull Discharge (cfs)		12		11		17			12		11		17		10		7		10	11
Q-NFF regression																				
Q-USGS extrapolation	n/a																			
Q-Mannings																				
Valley Length (ft)		840		820		1156			998		866		1108		998		866		1108	
Channel Thalweg Length (ft)[2]		840		820		1,272			1,198		1,039		1,440		1,198		1,039		1,440	
Sinuosity (ft)[3]		1.0		1.0		1.1		See Table 5a	1.20		1.20		1.30		1.20		1.20		1.30	
Water Surface Slope (ft/ft)[2]		0.15		0.004		0.012			0.010		0.005		0.007		0.011		0.006		0.007	
Bankfull Slope (ft/ft)									---		---		---		0.011		0.006		0.007	

[1] No impervious land use is present within the project watershed per the CGIA Land Use Classification data set.

[2] Channel Length represented does not include easement breaks.

(---): Data was not provided

N/A: Not Applicable

SC: Silt/Clay

Table 11c. Baseline Stream Data Summary

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020

UT2 Reaches 3A and 3B

		RE-RESTORATION CONDITION		REFERENCE REACHES		DESIGN				AS BUILT/BASELINE			
Parameter	**Gage**	**UT2 Reach 3**		**See Table 11a**		**UT2 Reach 3A**		**UT2 Reach 3B**		**UT2 Reach 3A**		**UT2 Reach 3B**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle													
Bankfull Width (ft)	n/a	7.5		See Table 11a		9.0		11.0		10.5		13.9	
Floodprone Width (ft)		24				45+		55+		>200		130	
Bankfull Mean Depth		1.1				0.8		1.0		0.7		0.8	
Bankfull Max Depth		1.6				1.2		1.5		1.2		1.6	
Bankfull Cross-sectional Area (ft^2)		8.3				6.9		10.8		7.2		11.8	
Width/Depth Ratio		6.7				11.7		11.2		15.3		16.5	
Entrenchment Ratio		3.2				5.0+		5.0+		>2.2		>2.2	
Bank Height Ratio		1.3	1.8			1.0		1.0		1.0		1.0	
D50 (mm)		7.32								32.0		33.4	
Profile													
Riffle Length (ft)	n/a			See Table 11a		---		---		8	25	13	28
Riffle Slope (ft/ft)		0.014	0.025			0.011	0.032	0.008	0.017	0.010	0.046	0.001	0.024
Pool Length (ft)						---		---		10	42	32	45
Pool Max Depth (ft)		2				1.20	3.20	1.50	4.10	1.77	2.98	2.45	3.32
Pool Spacing (ft)^		26	53			12	63	14	77	26	66	38	72
Pool Volume (ft^3)													
Pattern													
Channel Beltwidth (ft)	n/a	N/A	N/A	See Table 11a		14	50	18	61	8	37	20	61
Radius of Curvature (ft)		15	63.4			14	27	20	33	14	27	24	31
Rc:Bankfull Width (ft/ft)		2	8.45			1.6	3.0	1.8	3.0	1.3	2.6	1.7	2.2
Meander Length (ft)		N/A	N/A			27	108	33	132	58	88	87	105
Meander Width Ratio		N/A	N/A			1.6	5.5	1.6	5.5	0.8	3.5	1.4	4.4
Substrate, Bed and Transport Parameters													
Ri%/Ru%/P%/G%/S%	n/a												
SC%/Sa%/G%/C%/B%/Be%													
d16/d35/d50/d84/d95/d100		SC/SC/7.3/47.7/85.7/>2048		See Table 11a						22.6/27.4/32/53.7/69.7/128		SC/4.9/13.3/67.2/89.9/128	
Reach Shear Stress (Competency) lb/ft^2						0.29		0.23		0.23		0.14	
Max part size (mm) mobilized at bankfull						15	25	12	20	17		10	
Stream Power (Capacity) W/m^2													
Additional Reach Parameters													
Drainage Area (SM)	n/a	0.71		See Table 5a		0.46		0.46		0.46		0.46	
Watershed Impervious Cover Estimate (%)		<1% [1]				<1% [1]		<1% [1]		<1% [1]		<1% [1]	
Rosgen Classification		E4				C/E4		C/E4		E4		C4	
Bankfull Velocity (fps)		3.7				3.7		3.0		2.1		1.7	
Bankfull Discharge (cfs)		26	33			26		33		15		20	
Q-NFF regression													
Q-USGS extrapolation													
Q-Mannings													
Valley Length (ft)		1184		See Table 5a		830		548		830		548	
Channel Thalweg Length (ft^2)		1,303				1,038		658		1,038		658	
Sinuosity (ft^3)		1.1				1.25		1.20		1.25		1.20	
Water Surface Slope (ft/ft^2)		0.009				0.006		0.004		0.006		0.003	
Bankfull Slope (ft/ft)						---		---		0.007		0.002	

[1] No impervious land use is present within the project watershed per the CGIA Land Use Classification data set.

[2] Channel Length represented does not include easement breaks.

(---): Data was not provided

N/A: Not Applicable

SC: Silt/Clay

Table 12a. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Norkett Branch Reach 1 and 2

	Cross-Section 1, Norkett Branch Reach 1 (Pool)								Cross-Section 2, Norkett Branch Reach 1, (Riffle)								Cross-Section 3, Norkett Branch Reach 1, (Pool)								Cross-Section 4, Norkett Branch Reach 1, (Riffle)							
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)	466.1	466.1	466.1	466.1	466.1	466.0	465.7	465.9	465.8	465.8	465.8	465.8	465.8	465.6	465.6	465.9	464.2	464.2	464.2	464.2	464.2	463.9	464.0	464.2	464.3	464.3	464.3	464.3	464.3	464.3	464.1	464.4
Low Bank Elevation (ft)	466.1	466.1	466.1	466.1	466.1	466.0	465.7	465.9	465.8	465.8	465.8	465.8	465.8	465.6	465.6	465.6	464.2	464.2	464.2	464.2	464.2	463.9	464.0	464.2	464.3	464.3	464.3	464.3	464.3	464.3	464.1	464.0
Bankfull Width (ft)	33.2	34.1	34.3	29.1	31.3	28.5	27.4	31.3	26.6	23.2	23.4	22.8	21.8	21.7	23.1	22.6	26.7	29.2	25.8	24.3	24.8	24.0	26.8	27.6	25.1	23.1	26.2	22.4	23.4	23.1	23.5	21.0
Floodprone Width (ft)	---	---	---	---	---	---	---	---	>200	>200	>200	>200	>200	>200	>200	>200	---	---	---	---	---	---	---	---	>200	>200	>200	>200	>200	>183	>173	>159
Bankfull Mean Depth (ft)	1.8	2.0	2.0	2.2	2.0	2.0	1.8	1.8	1.6	2.0	2.0	1.9	2.0	1.7	1.7	1.6	2.3	2.3	2.4	2.7	3.0	2.5	2.6	2.7	1.8	2.1	1.9	2.0	1.9	2.0	1.7	1.7
Bankfull Max Depth (ft)	3.6	3.7	3.8	3.7	3.6	3.6	3.3	3.4	2.9	3.0	3.0	2.9	2.9	2.7	2.7	2.7	3.9	4.4	4.6	5.0	5.6	4.8	5.2	5.3	3.3	3.4	3.4	3.3	3.3	3.2	3.1	2.9
Bankfull Cross-Sectional Area (ft^2)	58.4	68.3	68.7	64.3	61.7	58.4	49.1	55.8	42.6	45.5	48.0	44.1	42.6	36.7	38.6	36.4	60.3	67.5	62.9	64.9	74.4	60.3	69.4	74.7	44.6	47.7	48.8	44.0	45.2	45.0	41.0	36.0
Bankfull Width/Depth Ratio	18.9	17.1	17.1	13.2	15.9	13.9	15.3	17.5	16.7	11.9	11.4	11.8	11.1	12.8	13.8	14.1	11.8	12.7	10.6	9.1	8.2	9.5	10.3	10.2	14.1	11.1	14.1	11.4	12.1	11.8	13.4	12.2
Bankfull Entrenchment Ratio	---	---	---	---	---	---	---	---	>8	>12	>9	>9	>12	>9	>9	>9	---	---	---	---	---	---	---	---	>8	>9	>8	>9	>9	>8	>7	>8
Bankfull Bank Height Ratio[1,2]	---	---	---	---	---	---	---	---	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	---	---	---	---	---	---	---	---	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
	Cross-Section 5, Norkett Branch Reach 1 (Riffle)								**Cross-Section 6, Norkett Branch Reach 2, (Riffle)**								**Cross-Section 7, Norkett Branch Reach 2, (Riffle)**								**Cross-Section 8, Norkett Branch Reach 2, (Pool)**							
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3[3]**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)	461.5	461.5	461.5	461.5	461.5	461.5	461.6	461.6	459.9	459.9	459.9	459.9	459.9	459.9	459.9	459.9	458.1	458.1	458.1	458.1	458.1	458.1	458.1	458.3	457.7	457.7	457.7	457.7	457.7	457.9	457.9	457.7
Low Bank Elevation (ft)	461.5	461.5	461.5	461.5	461.5	461.5	461.6	461.4	459.9	459.9	459.9	459.9	459.9	459.9	459.9	459.8	458.1	458.1	458.1	458.1	458.1	458.1	458.1	458.0	457.7	457.7	457.7	457.7	457.7	457.7	457.9	457.7
Bankfull Width (ft)	22.5	23.5	23.3	22.3	24.1	22.8	26.8	21.5	25.7	26.0	25.6	25.0	24.3	26.5	25.9	25.3	25.6	24.9	25.6	23.2	23.0	24.0	23.8	24.0	30.1	26.8	29.1	28.7	30.1	30.8	33.1	32.0
Floodprone Width (ft)	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	---	---	---	---	---	---	---	---
Bankfull Mean Depth (ft)	1.7	1.8	1.7	1.7	1.6	1.6	1.4	1.6	2.0	2.0	2.1	2.0	2.0	1.8	1.8	1.9	1.8	2.0	1.9	1.9	1.9	1.7	1.7	1.7	2.4	2.7	2.5	2.5	2.4	2.4	2.2	2.2
Bankfull Max Depth (ft)	2.6	3.0	2.9	2.7	2.9	2.7	2.8	2.7	3.3	3.3	3.6	3.2	3.1	3.2	3.0	4.1	3.0	3.2	3.1	3.1	3.1	3.1	2.9	3.0	4.5	4.4	4.5	4.6	4.7	4.8	4.6	4.7
Bankfull Cross-Sectional Area (ft^2)	38.8	42.3	40.5	37.4	39.5	36.5	38.4	33.7	50.8	52.0	53.4	49.6	48.5	48.5	46.0	47.6	46.7	48.7	48.5	44.6	43.3	40.6	40.3	40.9	72.5	71.0	73.2	71.5	71.9	72.5	73.3	72.0
Bankfull Width/Depth Ratio	13.1	13.1	13.3	13.2	14.7	14.2	18.7	13.7	13.0	13.0	12.3	12.6	12.2	14.5	14.6	13.4	14.1	12.7	13.6	12.1	12.3	14.2	14.1	14.1	12.5	10.1	11.6	11.5	12.6	13.1	15.0	14.2
Bankfull Entrenchment Ratio	>9	>9	>9	>9	>8	>9	>8	>9	>8	>8	>8	>8	>9	>8	>8	>8	>8	>8	>8	>9	>9	>8	>8	>8	---	---	---	---	---	---	---	---
Bankfull Bank Height Ratio[1,2]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	---	---	---	---	---	---	---	---

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.
[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.
[3] MY3 calculations were adjusted on Cross-section 8 because they were found to omit a portion of the bankfull area.
--- : Not Applicable

Table 12b. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT1 and UT2 Reaches 1 and 2

	Cross-Section 9, UT1, (Riffle)								Cross-Section 10, UT1, (Pool)								Cross-Section 11, UT2 Reach 1, (Pool)								Cross-Section 12, UT2 Reach 1, (Riffle)							
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)	472.0	472.0	472.0	472.0	472.0	472.0	471.9	471.8	471.7	471.7	471.7	471.7	471.7	471.5	471.1	471.3	484.1	484.1	484.1	484.1	484.1	484.0	484.0	484.0	484.0	484.0	484.0	484.0	484.0	483.7	483.8	483.9
Low Bank Elevation (ft)	472.0	472.0	472.0	472.0	472.0	472.0	471.9	471.8	471.7	471.7	471.7	471.7	471.7	471.7	471.1	471.3	484.1	484.1	484.1	484.1	484.1	484.1	484.0	484.0	484.0	484.0	484.0	484.0	484.0	483.7	483.8	483.8
Bankfull Width (ft)	10.5	11.6	11.1	10.2	10.2	9.3	10.9	8.4	18.1	15.9	17.3	13.5	11.7	10.4	5.0	9.7	10.6	11.1	11.3	12.1	9.1	9.5	7.4	8.3	9.4	11.1	9.5	10.8	9.9	7.1	8.4	7.2
Floodprone Width (ft)	136	136	138	131	107	130	126	121	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	144	151	155	147	153	145	147	134
Bankfull Mean Depth (ft)	0.4	0.5	0.6	0.4	0.4	0.5	0.4	0.5	0.5	0.9	0.9	0.8	1.0	0.9	0.9	0.8	0.7	0.8	0.8	0.6	1.0	0.8	0.9	0.8	0.5	0.5	0.6	0.4	0.6	0.4	0.4	0.5
Bankfull Max Depth (ft)	0.8	1.1	0.9	0.6	0.9	0.8	0.9	0.9	1.8	2.0	2.1	1.9	2.1	1.9	1.5	1.9	1.9	2.0	0.8	1.7	1.9	1.7	1.6	1.7	1.2	1.1	1.2	1.0	1.1	0.9	0.9	1.1
Bankfull Cross-Sectional Area (ft^2)	4.5	6.2	6.7	4.0	4.4	4.5	4.6	4.1	9.8	14.0	12.7	10.3	12.2	9.8	4.4	7.5	7.5	9.4	8.8	6.7	9.1	7.5	6.4	6.9	4.5	5.6	5.5	3.9	5.8	2.9	3.4	3.5
Bankfull Width/Depth Ratio	24.5	21.7	18.5	25.7	23.6	19.1	25.9	17.3	33.3	18.0	23.5	17.7	11.2	11.0	5.8	12.4	15.2	13.2	14.6	21.9	9.0	12.0	8.4	10.0	19.8	22.0	16.4	29.6	17.1	17.6	20.4	14.9
Bankfull Entrenchment Ratio	13.0	11.7	12.4	12.9	10.6	14.0	11.5	14.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	15.2	13.6	16.3	13.6	15.4	20.3	17.5	18.6
Bankfull Bank Height Ratio[1,2]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	1.0	1.0	1.0	1.0	0.8	0.9	0.9
	Cross-Section 13, UT2 Reach 2, (Riffle)								**Cross-Section 14, UT2 Reach 2, (Pool)**								**Cross-Section 15, UT2 Reach 2, (Riffle)**								**Cross-Section 16, UT2 Reach 2, (Pool)**							
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)	477.6	477.6	477.6	477.6	477.6	477.6	477.6	477.6	477.5	477.5	477.5	477.5	477.5	477.6	477.4	477.4	472.3	472.3	472.3	472.3	472.3	471.9	471.9	471.9	472.1	472.1	472.1	472.1	472.1	471.9	471.9	472.0
Low Bank Elevation (ft)	477.6	477.6	477.6	477.6	477.6	477.6	477.6	477.7	477.5	477.5	477.5	477.5	477.5	477.6	477.4	477.4	472.3	472.3	472.3	472.3	472.3	471.9	471.9	472.1	472.1	472.1	472.1	472.1	472.1	472.1	471.9	472.0
Bankfull Width (ft)	9.0	9.5	9.1	8.9	8.2	8.0	8.8	9.3	13.9	13.7	14.8	12.9	15.3	12.5	10.3	9.5	9.6	10.5	11.5	11.9	11.2	7.6	8.1	9.1	9.6	9.4	7.9	9.6	8.6	8.1	9.0	9.8
Floodprone Width (ft)	>200	>200	>200	>200	>200	>200	>200	>200	---	---	---	---	---	---	---	---	>200	>200	>200	>200	>200	>103[3]	>108[3]	>72	---	---	---	---	---	---	---	---
Bankfull Mean Depth (ft)	0.6	0.7	0.7	0.6	0.7	0.6	0.6	0.6	0.8	1.0	0.8	0.9	0.8	0.9	1.0	0.9	0.5	0.7	0.8	0.7	0.8	0.7	0.8	0.8	0.7	0.9	1.0	1.0	1.0	0.9	0.8	0.8
Bankfull Max Depth (ft)	1.2	1.2	1.2	1.1	1.0	0.9	1.2	1.1	2.1	2.2	2.0	2.0	1.9	2.0	1.8	1.5	1.1	1.4	1.3	1.6	1.5	1.1	1.3	1.2	1.8	1.9	1.9	2.0	1.9	1.8	1.8	1.8
Bankfull Cross-Sectional Area (ft^2)	5.3	7.1	6.4	5.6	5.5	4.8	5.6	5.6	11.7	14.1	12.0	11.3	11.6	11.7	9.9	8.7	5.2	7.6	8.7	8.8	8.7	5.2	6.4	6.9	7.0	8.1	8.1	9.2	8.8	7.0	7.5	7.5
Bankfull Width/Depth Ratio	15.3	12.8	13.0	14.1	12.4	13.3	13.8	15.5	16.4	13.2	18.2	14.7	20.1	13.4	10.8	10.4	17.6	14.5	15.4	15.9	14.5	11.0	10.2	11.9	13.3	10.9	7.7	10.1	8.4	8.6	10.7	12.8
Bankfull Entrenchment Ratio	>22	>21	>22	>23	>24	>25	>22	>22	---	---	---	---	---	---	---	---	>15	>19	>17	>17	>18	>14	>13	>8	---	---	---	---	---	---	---	---
Bankfull Bank Height Ratio[1,2]	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	---	---	---	---	---	---	---	---	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.2	---	---	---	---	---	---	---	---

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.
[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.
---: Not Applicable

Table 12c. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reaches 3A and 3B

	Cross-Section 17, UT2 Reach 3A, (Pool)								Cross-Section 18, UT2 Reach 3A, (Riffle)								Cross-Section 19, UT2 Reach 3B, (Riffle)								Cross-Section 20, UT2 Reach 3B, (Pool)							
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)	466.9	466.9	466.9	466.9	466.9	466.6	466.9	466.7	466.8	466.8	466.8	466.8	466.8	466.4	466.5	466.5	461.2	461.2	461.2	461.2	461.2	461.0	461.0	461.2	461.2	461.2	461.2	461.2	461.2	461.2	461.0	461.0
Low Bank Elevation (ft)	466.9	466.9	466.9	466.9	466.9	466.9	466.9	466.7	466.8	466.8	466.8	466.8	466.8	466.4	466.5	466.5	461.2	461.2	461.2	461.2	461.2	461.0	461.0	461.0	461.2	461.2	461.2	461.2	461.2	461.2	461.0	461.0
Bankfull Width (ft)	10.5	10.9	11.3	10.1	10.2	10.1	11.7	11.5	10.5	11.1	10.1	10.5	10.2	9.1	9.5	11.2	13.9	12.6	14.3	13.6	13.2	12.9	11.4	10.9	14.7	15.0	15.5	14.5	14.5	14.5	13.9	14.1
Floodprone Width (ft)	---	---	---	---	---	---	---	---	>200	>200	>200	>200	>200	>200	>200	>200	130	130	146	132	135	143	132	127	---	---	---	---	---	---	---	---
Bankfull Mean Depth (ft)	1.0	1.2	1.1	1.3	1.3	1.1	1.1	1.0	0.7	0.7	0.7	0.9	0.9	0.6	0.7	0.6	0.8	1.2	1.0	0.9	1.0	0.9	1.0	0.9	1.4	1.5	1.5	1.5	1.5	1.5	1.2	1.2
Bankfull Max Depth (ft)	2.0	2.0	2.2	2.1	2.3	1.9	2.1	2.0	1.2	1.3	1.4	1.5	1.5	1.1	1.2	1.2	1.6	1.8	1.8	1.7	1.6	1.7	1.6	1.5	2.6	2.7	2.7	2.8	2.6	2.6	2.4	2.3
Bankfull Cross-Sectional Area (ft^2)	10.7	12.9	12.1	13.0	13.7	10.7	13.4	11.9	7.2	7.6	7.6	9.3	9.5	5.7	6.5	6.8	11.8	14.9	14.3	12.6	12.6	11.4	10.9	10.0	21.2	22.7	23.0	21.3	21.5	21.2	17.2	16.4
Bankfull Width/Depth Ratio	10.2	9.2	10.5	7.8	7.6	9.5	10.2	11.1	15.3	16.2	13.6	11.9	11.1	14.7	13.9	18.4	16.5	10.6	14.4	14.7	13.7	14.6	11.8	12.0	10.2	9.9	10.4	9.8	9.8	10.0	11.3	12.1
Bankfull Entrenchment Ratio	---	---	---	---	---	---	---	---	>19	>18	>9	>19	>16	>22	>21	>18	9.3	10.3	10.2	9.7	10.3	11.0	11.6	11.7	---	---	---	---	---	---	---	---
Bankfull Bank Height Ratio[1,2]	---	---	---	---	---	---	---	---	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	---	---	---	---	---	---	---	---

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

---: Not Applicable

Table 13a. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Norkett Branch Reach 1

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	22.5	26.6	23.1	23.5	23.3	26.2	22.3	22.8	21.8	24.1	21.7	23.1	23.1	26.8	21.0	22.6
Floodprone Width (ft)	>200		>200		>200		>200		>200		>183	>200	>173	>200	>159	>200
Bankfull Mean Depth	1.6	1.8	1.8	2.1	1.7	2.0	1.7	2.0	1.6	2.0	1.6	2.0	1.4	1.7	1.6	1.7
Bankfull Max Depth	2.6	3.3	3.0	3.4	2.9	3.4	2.7	3.3	2.9	3.3	2.7	3.2	2.7	3.1	2.7	2.9
Bankfull Cross-sectional Area (ft^2)	38.8	44.6	42.3	47.7	40.5	48.8	37.4	44.1	39.5	45.2	36.5	45.0	38.4	41.0	33.7	36.4
Width/Depth Ratio	13.1	16.7	11.1	13.1	11.4	14.1	11.4	13.2	11.1	14.7	11.8	14.2	13.4	18.7	12.2	14.1
Entrenchment Ratio	>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		0.9	1.0	0.9	1.0	0.9	
D50 (mm)	18.4	59.6	13.3	26.9	24.7	90.0	20.9	51.8	4.0	34.3	Silt/Clay	68.0	9.7	37.9	9.9	27.3
Profile																
Riffle Length (ft)	14	84														
Riffle Slope (ft/ft)	0.0000	0.0152														
Pool Length (ft)	12	88														
Pool Max Depth (ft)	3.3	5.1														
Pool Spacing (ft)	67	183														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	38	147														
Radius of Curvature (ft)	38	65														
Rc:Bankfull Width (ft/ft)	1.7	2.4														
Meander Wave Length (ft)	167	263														
Meander Width Ratio	1.7	5.5														
Additional Reach Parameters																
Rosgen Classification	C4		C4		C4		C4		C4		C5		C4		C4	
Channel Thalweg Length (ft)	2,369															
Sinuosity (ft)	1.24															
Water Surface Slope (ft/ft)	0.003															
Bankfull Slope (ft/ft)	0.003															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	0.4/3.6/7.4/52.3/139.4/362		1.0/8.0/16.7/50.6/90/1024		0.3/11.0/29.3/121.7/180/1024		SC/0.79/18.4/132.0/214.7/>2048		SC/6.40/11.8/39.8/89.6/180		SC/SC/1.0/56.9/119.3/180		0.3/5.7/9.7/44.7/95.2/128.0		SC/0.8/8.9/64.0/151.8/256.0	
% of Reach with Eroding Banks			6%		0%		6%		3%		2%		0%		0%	

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.
[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

Table 13b. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Norkett Branch Reach 2

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	25.6	25.7	24.9	26.0	25.6	25.6	23.2	25.0	23.0	24.3	24.0	26.5	23.8	25.9	24.0	25.3
Floodprone Width (ft)	>200		>200		>200		>200		>200		>200		>200		>200	
Bankfull Mean Depth	1.8	2.0	2.0	2.0	1.9	2.1	1.9	2.0	1.9	2.0	1.7	1.8	1.7	1.8	1.7	1.9
Bankfull Max Depth	3.0	3.3	3.2	3.3	3.1	3.6	3.1	3.2	3.1	3.1	3.2		2.9	3.0	3.0	4.1
Bankfull Cross-sectional Area (ft^2)	46.7	50.8	48.7	52.0	48.5	53.4	44.6	49.6	43.3	48.5	40.6	48.5	40.3	46.0	40.9	47.6
Width/Depth Ratio	13.0	14.1	12.7	13.0	12.3	13.6	12.1	12.6	12.2	12.3	14.2	14.5	14.1	14.6	13.4	14.1
Entrenchment Ratio	>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		0.9	1.0	0.9		0.9	1.0
D50 (mm)	7.3	9.9	3.6	12.1	1.0	27.8	4.4	11.0	1.7	5.6	1.7	16.0	11.2	20.0	12.7	13.8
Profile																
Riffle Length (ft)	19	111														
Riffle Slope (ft/ft)	0.0009	0.0163														
Pool Length (ft)	51	102														
Pool Max Depth (ft)	3.5	4.8														
Pool Spacing (ft)	98	172														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	38	155														
Radius of Curvature (ft)	40	64														
Rc:Bankfull Width (ft/ft)	1.6	2.5														
Meander Wave Length (ft)	181	277														
Meander Width Ratio	1.5	6.0														
Additional Reach Parameters																
Rosgen Classification	C4/E4		C4/E4		C4/E4		C4/E4		C4/E4		C5/E5		C4/E4		C4/E4	
Channel Thalweg Length (ft)	1,499															
Sinuosity (ft)	1.20															
Water Surface Slope (ft/ft)	0.003															
Bankfull Slope (ft/ft)	0.003															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	2.6/6.7/13.0/62.6/210.9/>2048		0.3/10.4/15.3/49.1/90/362		4.2/16/24.9/83.4/151.8/362		SC/6.7/17.6/52.6/101.2/256.0		SC/2.95/11.9/56.9/90.8/180		SC/SC/0.6/64/151.8/>2048		SC/6.7/14.9/49.1/81.6/362		SC/0.5/8.9/64.0/113.8/1024.0	
% of Reach with Eroding Banks			7%		5%		12%		2%		1%		0%		0%	

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

Table 13c. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT1

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	10.5		11.6		11.1		10.2		10.2		9.3		10.9		8.4	
Floodprone Width (ft)	136		136		138		131		107		130		126		121	
Bankfull Mean Depth	0.4		0.5		0.6		0.4		0.4		0.5		0.4		0.5	
Bankfull Max Depth	0.8		1.1		0.9		0.6		0.9		0.8		0.9		0.9	
Bankfull Cross-sectional Area (ft^2)	4.5		6.2		6.7		4.0		4.4		4.5		4.6		4.1	
Width/Depth Ratio	24.5		21.7		18.5		20.8		23.6		19.1		25.9		17.3	
Entrenchment Ratio	13.0		11.7		12.4		14.4		10.6		14		11.5		14.3	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)	20.9		48.3		21.9		68.2		8.3		34.5		19.3		31.3	
Profile																
Riffle Length (ft)	7	39														
Riffle Slope (ft/ft)	0.007	0.044														
Pool Length (ft)	12	69														
Pool Max Depth (ft)	1.2	2.5														
Pool Spacing (ft)	30	58														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	13	49														
Radius of Curvature (ft)	14	23														
Rc:Bankfull Width (ft/ft)	1.3	2.2														
Meander Wave Length (ft)	61	88														
Meander Width Ratio	1.2	4.7														
Additional Reach Parameters																
Rosgen Classification	C4		C4		C4		C4		C4		C6		C4		C5	
Channel Thalweg Length (ft)	1,198															
Sinuosity (ft)	1.20															
Water Surface Slope (ft/ft)	0.011															
Bankfull Slope (ft/ft)	0.011															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	SC/1.0/12.7/55.3/90/256		SC/2.4/9.4/61.2/139.4/256.0		SC/0.1/8.6/82.6/139.4/256		SC/SC/5.6/49.8/107.3/>2048		SC/1.04/8.3/69.2/143/256		SC/SC/SC/61.5/101.2/180		SC/0.5/12.2/43.6/90.0/256.0		SC/SC/1.0/52.9/90.0/180.0	
% of Reach with Eroding Banks			0%		0%		0%		0%		0%		0%		0%	

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

Table 13d. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 1

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	9.4		11.1		9.5		10.8		9.9		7.1		8.4		7.2	
Floodprone Width (ft)	144		151		155		147		152.9		144.7		147.3		134	
Bankfull Mean Depth	0.5		0.5		0.6		0.4		0.6		0.4		0.4		0.5	
Bankfull Max Depth	1.2		1.1		1.2		1.0		1.1		0.9		0.9		1.1	
Bankfull Cross-sectional Area (ft^2)	4.5		5.6		5.5		3.9		5.8		2.9		3.4		3.5	
Width/Depth Ratio	19.8		22.0		16.4		29.6		17.1		17.6		20.4		14.9	
Entrenchment Ratio	15.2		13.6		16.3		13.6		15.4		20.3		17.5		18.6	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		0.8		0.9		0.9	
D50 (mm)	19.5		32.0		37.9		49.8		53.7		39.4		42.9		25.0	
Profile																
Riffle Length (ft)	7	34														
Riffle Slope (ft/ft)	0.006	0.037														
Pool Length (ft)	11	35														
Pool Max Depth (ft)	1.5	2.6														
Pool Spacing (ft)	21	64														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	10	42														
Radius of Curvature (ft)	15	21														
Rc:Bankfull Width (ft/ft)	1.6	2.2														
Meander Wave Length (ft)	45	92														
Meander Width Ratio	1.0	4.4														
Additional Reach Parameters																
Rosgen Classification	C4		C4		C4		C4		C4		C6		C5		C4	
Channel Thalweg Length (ft)	1,039															
Sinuosity (ft)	1.20															
Water Surface Slope (ft/ft)	0.006															
Bankfull Slope (ft/ft)	0.006															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	SC/7.1/12.2/28.5/42.9/90		SC/12/20.6/58.1/111.2/256		SC/5.6/16.7/57.4/107.3/362		SC/0.25/12.9/69.7/120.7/362.0		SC/SC/SC/52.8/96.6/180		SC/SC/SC/45/103.6/180		SC/SC/1.3/62.0/95.4/128.0		SC/0.07/3.1/37.9/80.3/128.0	
% of Reach with Eroding Banks			0%		0%		0%		0%		0%		0%		0%	

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

Table 13e. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 2

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	9.0	9.6	9.5	10.5	9.1	11.5	8.9	11.9	8.2	11.2	7.6	8.0	8.1	8.8	9.1	9.3
Floodprone Width (ft)	>200		>200		>200		>200		>200		>103[3]	>200	>108[3]	>200	>72[3]	>200
Bankfull Mean Depth	0.5	0.6	0.7	0.7	0.7	0.8	0.6	0.7	0.7	0.8	0.6	0.7	0.6	0.8	0.6	0.8
Bankfull Max Depth	1.1	1.2	1.2	1.4	1.2	1.3	1.1	1.6	1.0	1.5	0.9	1.1	1.2	1.3	1.1	1.2
Bankfull Cross-sectional Area (ft^2)	5.2	5.3	7.1	7.6	6.4	8.7	5.6	8.8	5.5	8.7	4.8	5.2	5.6	6.4	5.6	6.9
Width/Depth Ratio	15.3	17.6	12.8	14.5	13.0	15.4	14.1	15.9	12.4	14.5	11.0	13.3	10.2	13.8	11.9	15.5
Entrenchment Ratio	>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		0.9	1.1	1.0		1.0	1.2
D50 (mm)	20.1	27.4	41.3	50.6	39.0	39.3	35.4	51.4	53.7	68.5	49.3	69.0	54.1	68.0	30.4	45.0
Profile																
Riffle Length (ft)	6	27														
Riffle Slope (ft/ft)	0.009	0.039														
Pool Length (ft)	11	45														
Pool Max Depth (ft)	1.5	2.5														
Pool Spacing (ft)	22	71														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	12	52														
Radius of Curvature (ft)	14	22														
Rc:Bankfull Width (ft/ft)	1.6	2.3														
Meander Wave Length (ft)	44	83														
Meander Width Ratio	1.3	5.4														
Additional Reach Parameters																
Rosgen Classification	C4		C4		C4		C4		C4		C4		C4		C4	
Channel Thalweg Length (ft)	1,440															
Sinuosity (ft)	1.30															
Water Surface Slope (ft/ft)	0.007															
Bankfull Slope (ft/ft)	0.007															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	2.4/11.6/20.7/56.1/86.7/180		8.5/20.1/32/90/160.7/512		0.3/18.4/45/119.3/196.6/1024		SC/SC/SC/73.4/118.9/180.0		SC/SC/12.5/71.7/112.2/180		SC/SC/13.3/67.2/120.7/180		SC/0.56/10.6/66.6/99.8/128.0		SC/4.1/19.3/81.8/121.7/256.0	
% of Reach with Eroding Banks			0%		0%		0%		0%		0%		0%		0%	

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

[3] Entrenchment Ratio (ER) is the floodprone width divided by the bankfull width. ER in MY5 - MY7 is based on the width of the cross-section, in leiu of assuming the width across the floodplain as was done in MY0 - MY4.

Table 13f. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 3A

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	10.5		11.1		10.1		10.5		10.2		9.1		9.5		11.2	
Floodprone Width (ft)	>200		>200		>200		>200		>200		>200		>200		>200	
Bankfull Mean Depth	0.7		0.7		0.7		0.9		0.9		0.6		0.7		0.6	
Bankfull Max Depth	1.2		1.3		1.4		1.5		1.5		1.1		1.2		1.2	
Bankfull Cross-sectional Area (ft^2)	7.2		7.6		7.6		9.3		9.5		5.7		6.5		6.8	
Width/Depth Ratio	15.3		16.2		13.6		11.9		11.1		14.7		13.9		18.4	
Entrenchment Ratio	>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2		>2.2	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		0.9		0.9		1.0	
D50 (mm)	32.0		45.0		25.7		40.8		53.7		28.6		41.0		39.5	
Profile																
Riffle Length (ft)	8	25														
Riffle Slope (ft/ft)	0.010	0.046														
Pool Length (ft)	10	42														
Pool Max Depth (ft)	1.77	2.98														
Pool Spacing (ft)	26	66														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	8	37														
Radius of Curvature (ft)	14	27														
Rc:Bankfull Width (ft/ft)	1.3	2.6														
Meander Wave Length (ft)	58	88														
Meander Width Ratio	0.8	3.5														
Additional Reach Parameters																
Rosgen Classification	C4		C4		C4		C4		C4		C4		C4		C4	
Channel Thalweg Length (ft)	658															
Sinuosity (ft)	1.20															
Water Surface Slope (ft/ft)	0.003															
Bankfull Slope (ft/ft)	0.002															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	22.6/27.4/32/53.7/69.7/128		16.0/30.3/41.5/87.0/202.4/362.0		6.7/24.8/40.6/116.3/173.3/1024		12.8/27.8/41.3/85.7/128.0/180.0		SC/11/42.5/112.6/>2048/>2048		SC/14.9/28.6/62.6/90/180		2.0/30.4/43.1/96.6/90.0/180		0.3/26.4/42.5/107.3/90.0/>2048	
% of Reach with Eroding Banks			0%		0%		0%		0%		0%		0%		0%	

[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

Table 13g. Monitoring Data - Stream Reach Data Summary
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 3B

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	13.9		12.6		14.3		13.6		13.2		12.9		11.4		10.9	
Floodprone Width (ft)	130		130		146		132		135		143		132		127	
Bankfull Mean Depth	0.8		1.2		1.0		0.9		1		0.9		1.0		0.9	
Bankfull Max Depth	1.6		1.8		1.8		1.7		1.6		1.7		1.6		1.5	
Bankfull Cross-sectional Area (ft^2)	11.8		14.9		14.3		12.6		13.2		11.4		10.9		10.0	
Width/Depth Ratio	16.5		10.6		14.4		14.7		13.7		14.6		11.8		12.0	
Entrenchment Ratio	9.3		10.3		10.2		9.7		10.3		11		11.6		11.7	
Bank Height Ratio[1,2]	1.0		1.0		1.0		1.0		1.0		1.0		1.0		0.9	
D50 (mm)	33.4		30.6		68.5		48.3		45		24.2		36		38.8	
Profile																
Riffle Length (ft)	13	28														
Riffle Slope (ft/ft)	0.001	0.024														
Pool Length (ft)	32	45														
Pool Max Depth (ft)	2.45	3.32														
Pool Spacing (ft)	38	72														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	20	61														
Radius of Curvature (ft)	24	31														
Rc:Bankfull Width (ft/ft)	1.7	2.2														
Meander Wave Length (ft)	87	105														
Meander Width Ratio	1.4	4.4														
Additional Reach Parameters																
Rosgen Classification	C4		C4		C4		C4		C4		C6		C4		C6	
Channel Thalweg Length (ft)	658															
Sinuosity (ft)	1.20															
Water Surface Slope (ft/ft)	0.003															
Bankfull Slope (ft/ft)	0.002															
Ri%/Ru%/P%/G%/S%																
SC%/Sa%/G%/C%/B%/Be%																
d16/d35/d50/d84/d95/d100	SC/4.9/13.3/67.2/89.9/128		SC/4.5/14.8/60.0/98.3/180		SC/0.7/12.7/71.7/128/362		SC/SC/SC/60.4/107.3/180		SC/6.12/19/82.6/151.8/>2048		SC/SC/SC/90/151.8/>2048		SC/11.9/24.9/53.7/107.3/180		SC/SC/SC/84.2/127.7/180.0	
% of Reach with Eroding Banks			3%		0%		0%		0%		0%		0%		0%	

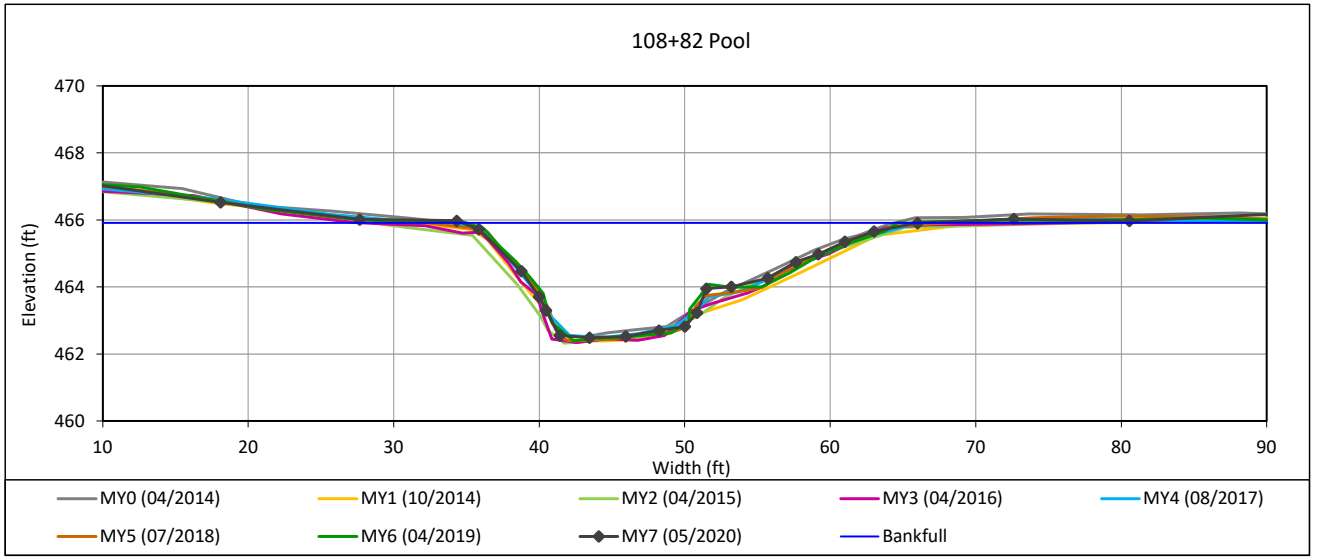
[1] Prior to MY5, bankfull dimensions were calculated using a fixed bankfull elevation.

[2] MY5– MY7 Bank Height Ratio are calculated based on the As-built (MY0) cross-sectional area as described in the Standard Measurement of the BHR Monitoring Parameter document provided by the NCIRT and NCDMS (9/2018). The remainder of the cross-section dimension parameters were calculated based on the current year's low bank height.

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 1-Norkett Branch Reach 1



Bankfull Dimensions

55.8	x-section area (ft.sq.)
31.3	width (ft)
1.8	mean depth (ft)
3.4	max depth (ft)
32.8	wetted parimeter (ft)
1.7	hyd radi (ft)
17.5	width-depth ratio

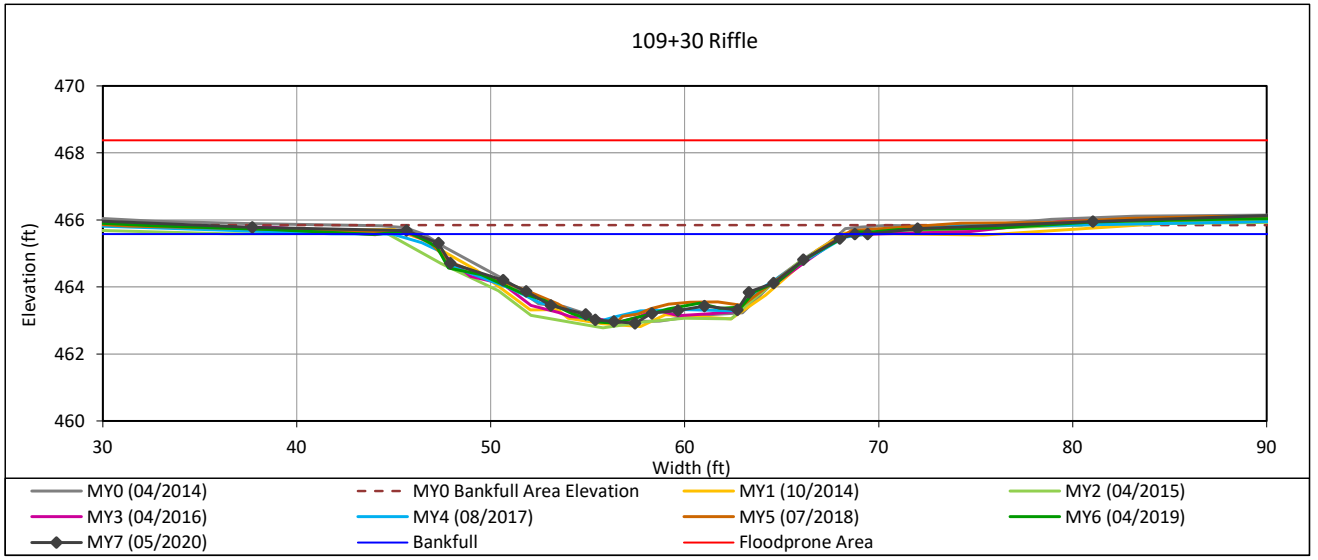
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 2-Norkett Branch Reach 1



Bankfull Dimensions

36.4	x-section area (ft.sq.)
22.6	width (ft)
1.6	mean depth (ft)
2.7	max depth (ft)
23.7	wetted parimeter (ft)
1.5	hyd radi (ft)
14.1	width-depth ratio
>200	W flood prone area (ft)
>8.8	entrenchment ratio
0.9	low bank height ratio

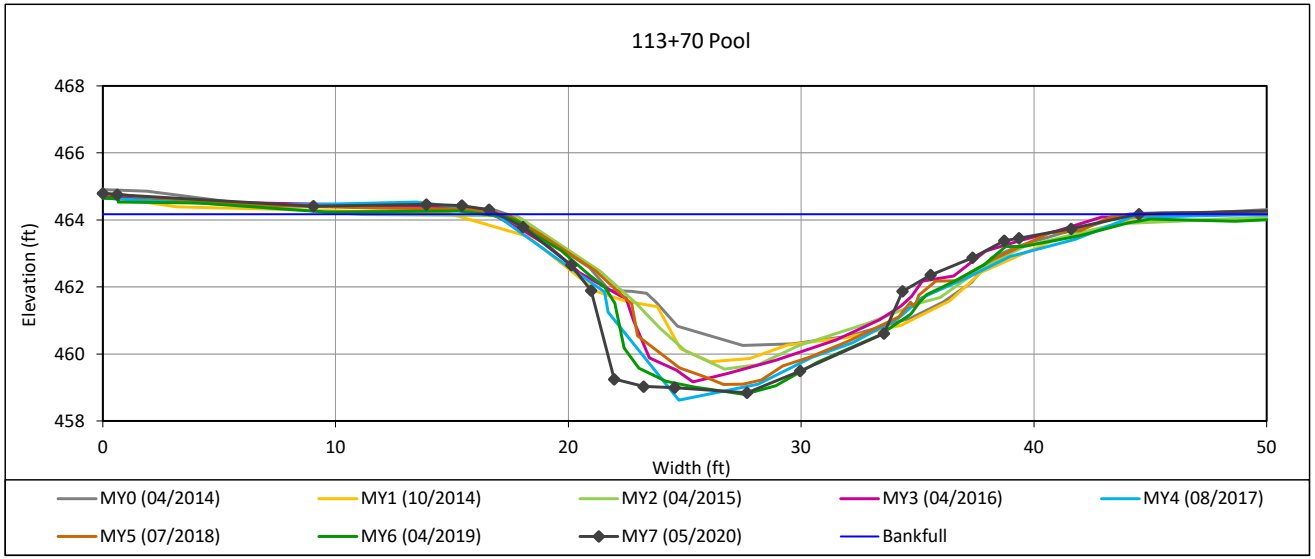
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 3-Norkett Branch Reach 1



Bankfull Dimensions

74.7	x-section area (ft.sq.)
27.6	width (ft)
2.7	mean depth (ft)
5.3	max depth (ft)
31.3	wetted parimeter (ft)
2.4	hyd radi (ft)
10.2	width-depth ratio

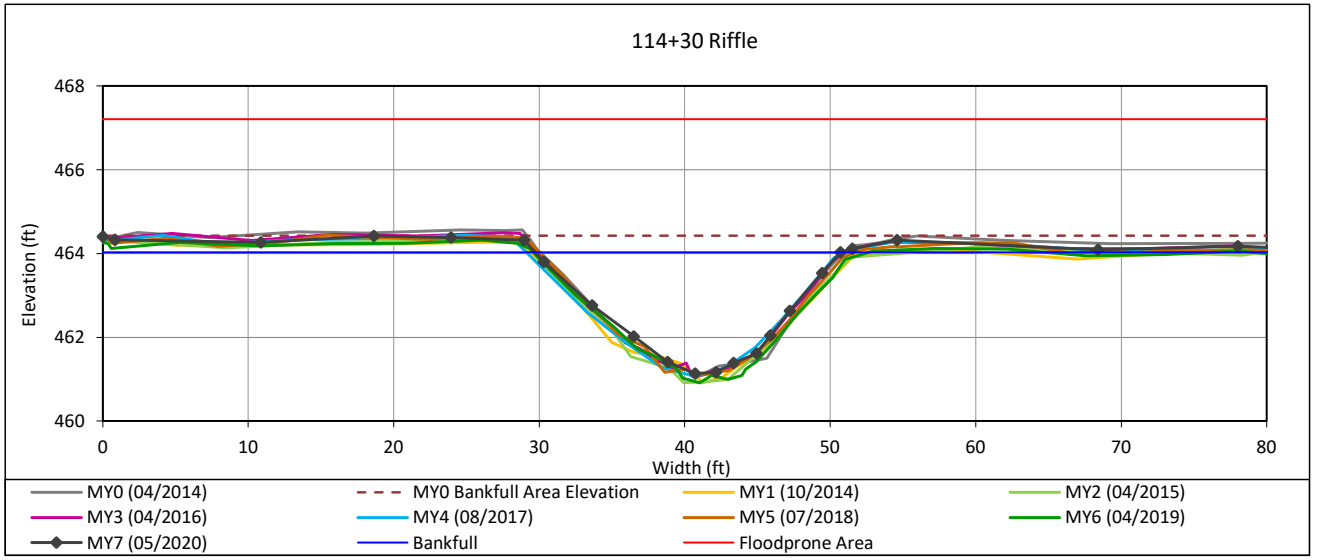
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 4-Norkett Branch Reach 1



Bankfull Dimensions

36.0	x-section area (ft.sq.)
21.0	width (ft)
1.7	mean depth (ft)
2.9	max depth (ft)
21.9	wetted parimeter (ft)
1.6	hyd radi (ft)
12.2	width-depth ratio
>159	W flood prone area (ft)
>7.6	entrenchment ratio
0.9	low bank height ratio

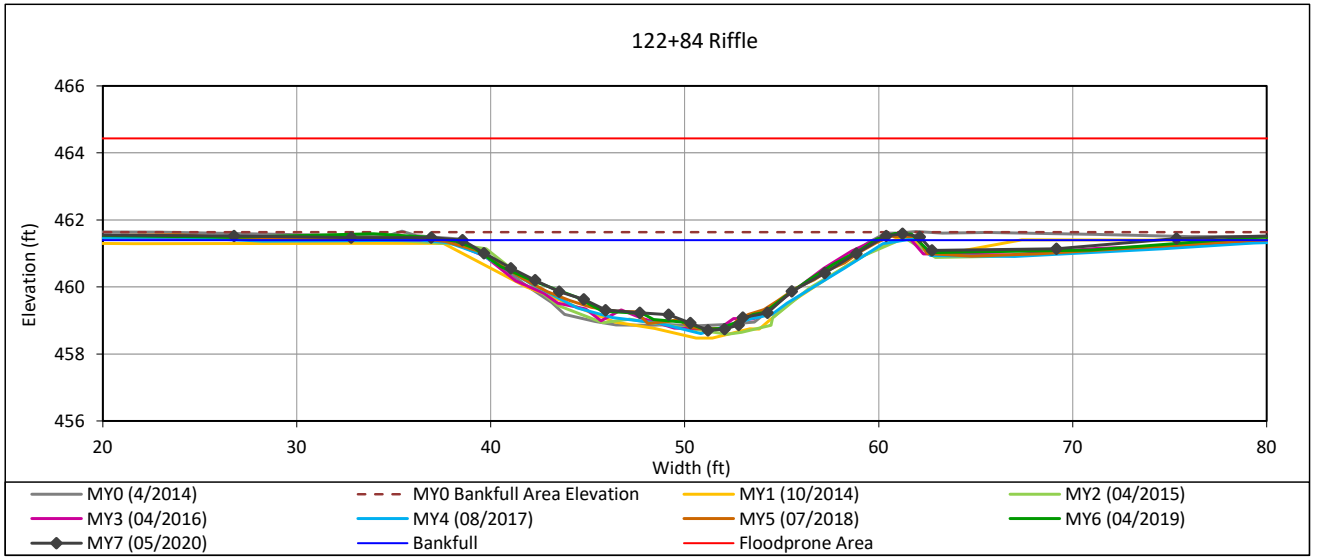
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 5-Norkett Branch Reach 1



Bankfull Dimensions

33.7	x-section area (ft.sq.)
21.5	width (ft)
1.6	mean depth (ft)
2.7	max depth (ft)
22.4	wetted parimeter (ft)
1.5	hyd radi (ft)
13.7	width-depth ratio
>200	W flood prone area (ft)
>9	entrenchment ratio
0.9	low bank height ratio

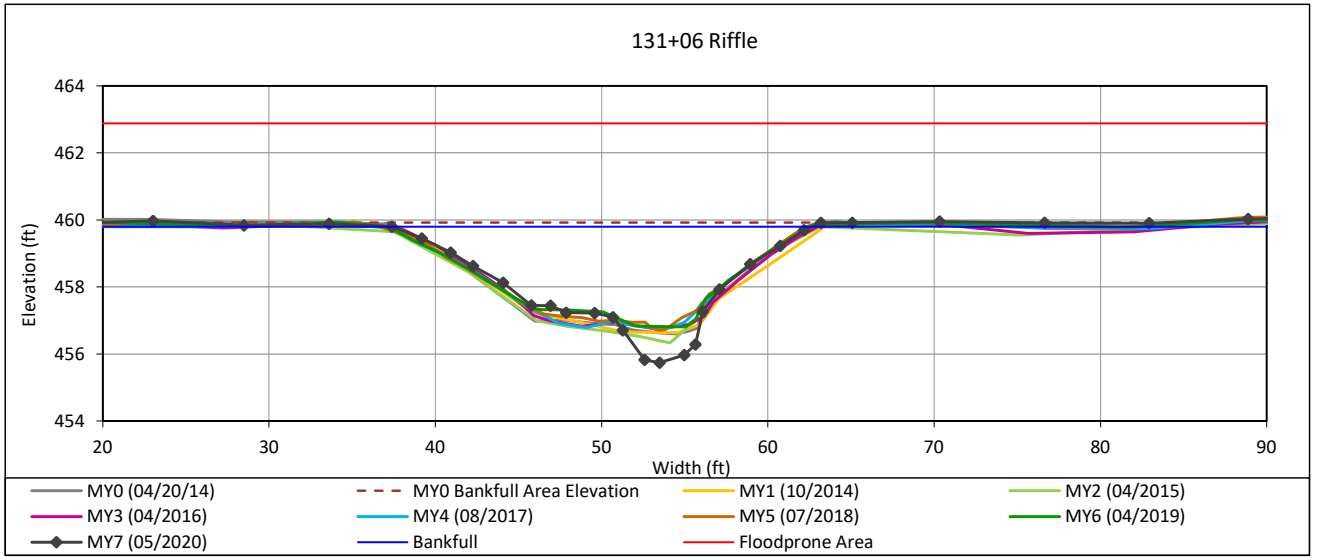
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 6-Norkett Branch Reach 2



Bankfull Dimensions

47.6	x-section area (ft.sq.)
25.3	width (ft)
1.9	mean depth (ft)
4.1	max depth (ft)
27.3	wetted parimeter (ft)
1.7	hyd radi (ft)
13.4	width-depth ratio
>200	W flood prone area (ft)
>8	entrenchment ratio
1.0	low bank height ratio

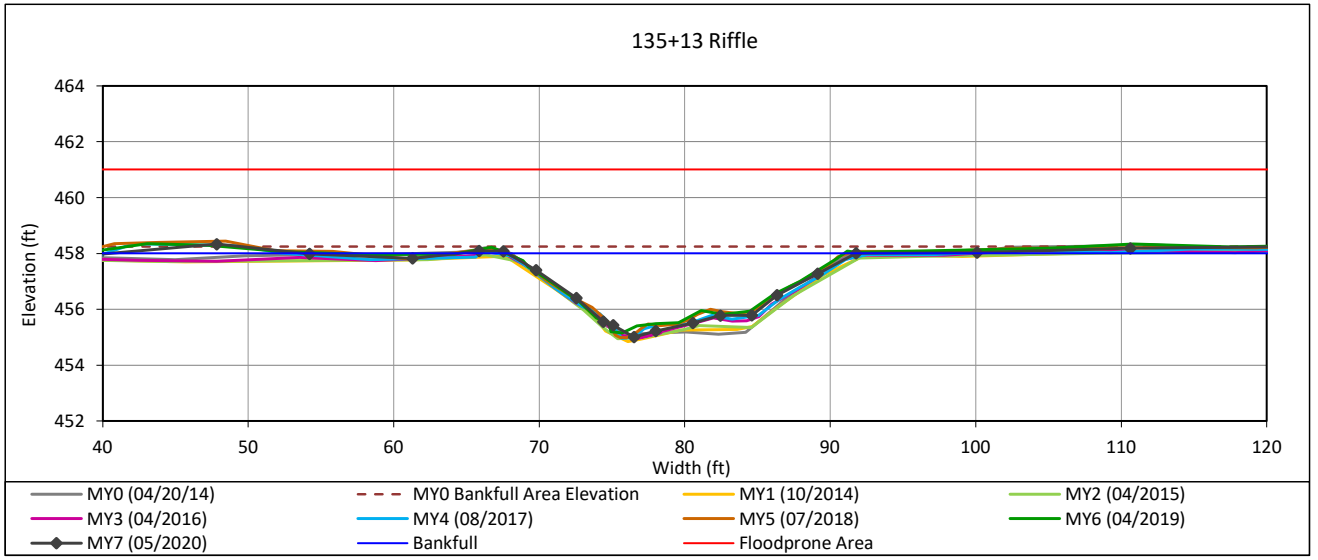
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 7-Norkett Branch Reach 2



Bankfull Dimensions

40.9	x-section area (ft.sq.)
24.0	width (ft)
1.7	mean depth (ft)
3.0	max depth (ft)
24.9	wetted parimeter (ft)
1.6	hyd radi (ft)
14.1	width-depth ratio
>200	W flood prone area (ft)
>8	entrenchment ratio
0.9	low bank height ratio

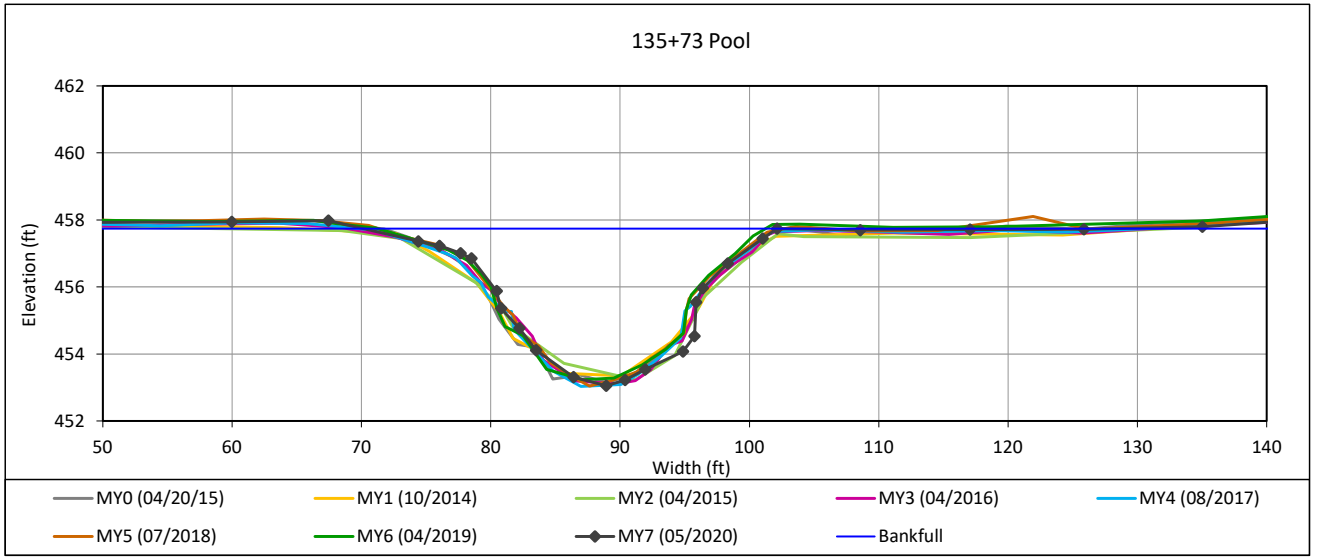
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 8-Norkett Branch Reach 2



Bankfull Dimensions

72.0	x-section area (ft.sq.)
32.0	width (ft)
2.2	mean depth (ft)
4.7	max depth (ft)
34.5	wetted parimeter (ft)
2.1	hyd radi (ft)
14.2	width-depth ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

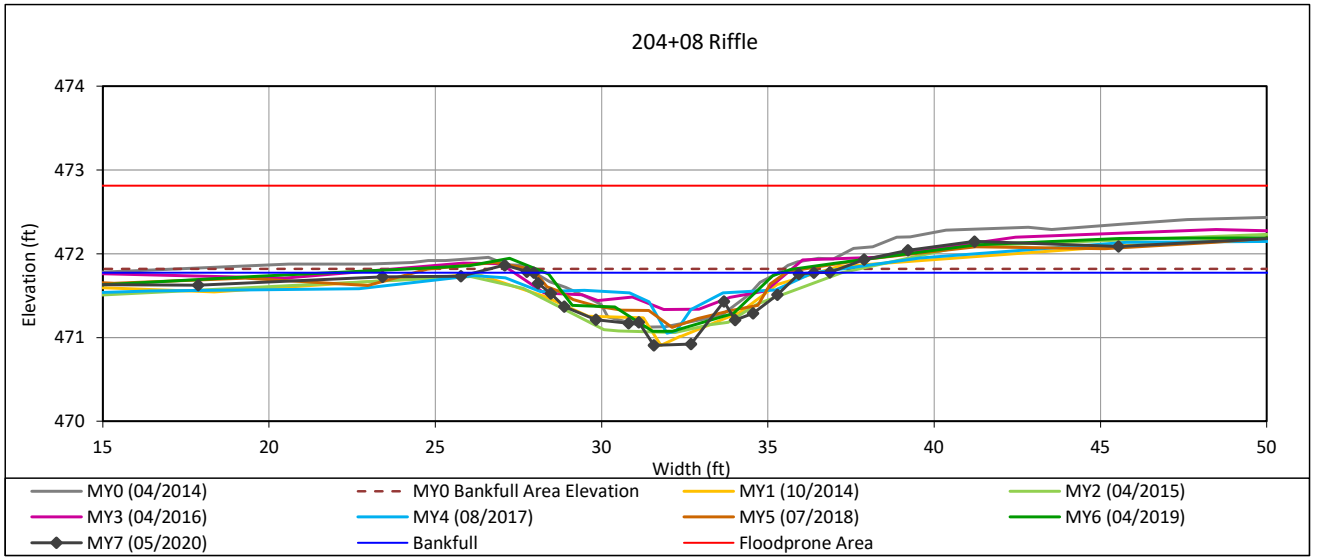
View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360

Monitoring Year 7 - 2020

Cross Section 9-UT1



Bankfull Dimensions

4.1	x-section area (ft.sq.)
8.4	width (ft)
0.5	mean depth (ft)
0.9	max depth (ft)
8.9	wetted parimeter (ft)
0.5	hyd radi (ft)
17.3	width-depth ratio
120.6	W flood prone area (ft)
14.3	entrenchment ratio
1.0	low bank height ratio

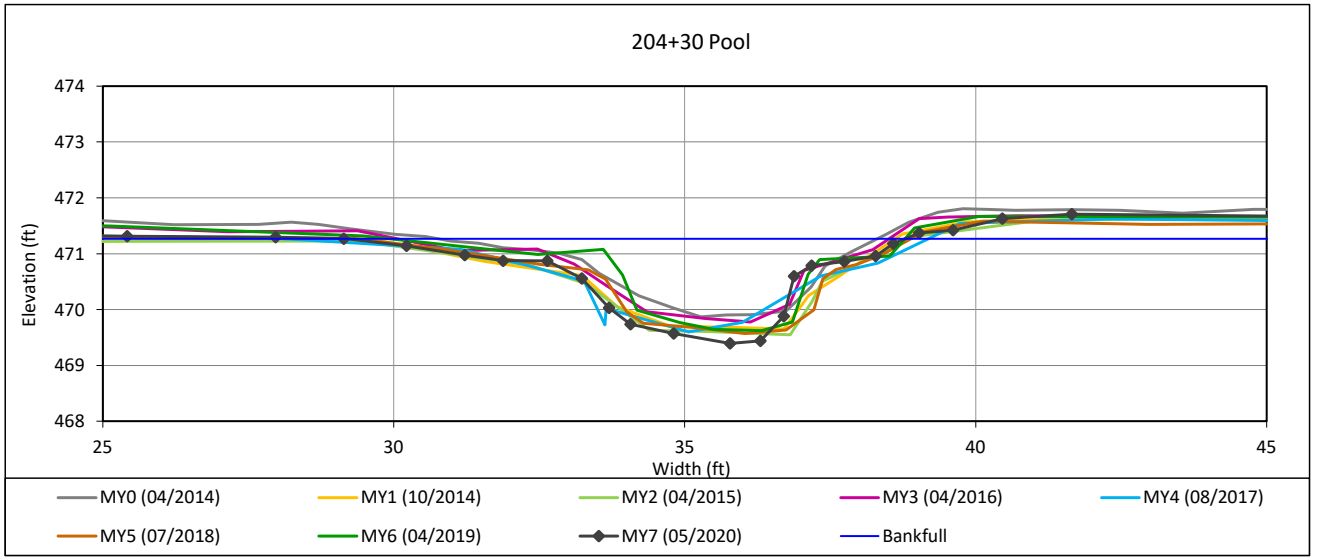
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross Section 10-UT1



Bankfull Dimensions

7.5	x-section area (ft.sq.)
9.7	width (ft)
0.8	mean depth (ft)
1.9	max depth (ft)
11.0	wetted parimeter (ft)
0.7	hyd radi (ft)
12.4	width-depth ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

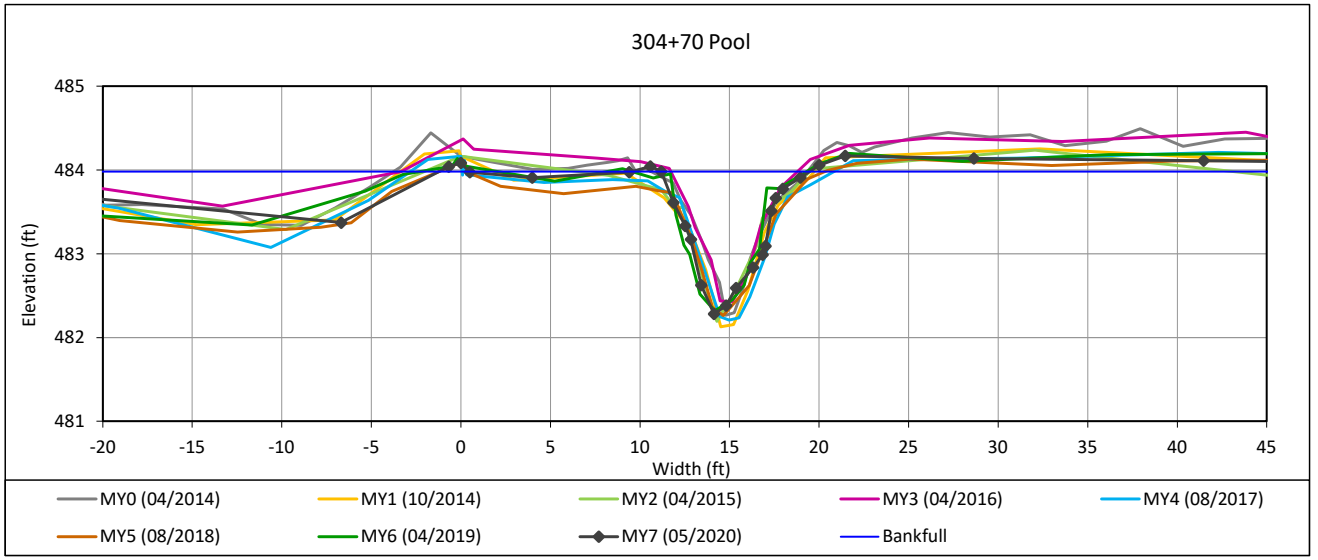
View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360

Monitoring Year 7 - 2020

Cross Section 11-UT2 Reach 1



Bankfull Dimensions

6.9	x-section area (ft.sq.)
8.3	width (ft)
0.8	mean depth (ft)
1.7	max depth (ft)
9.2	wetted parimeter (ft)
0.7	hyd radi (ft)
10.0	width-depth ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

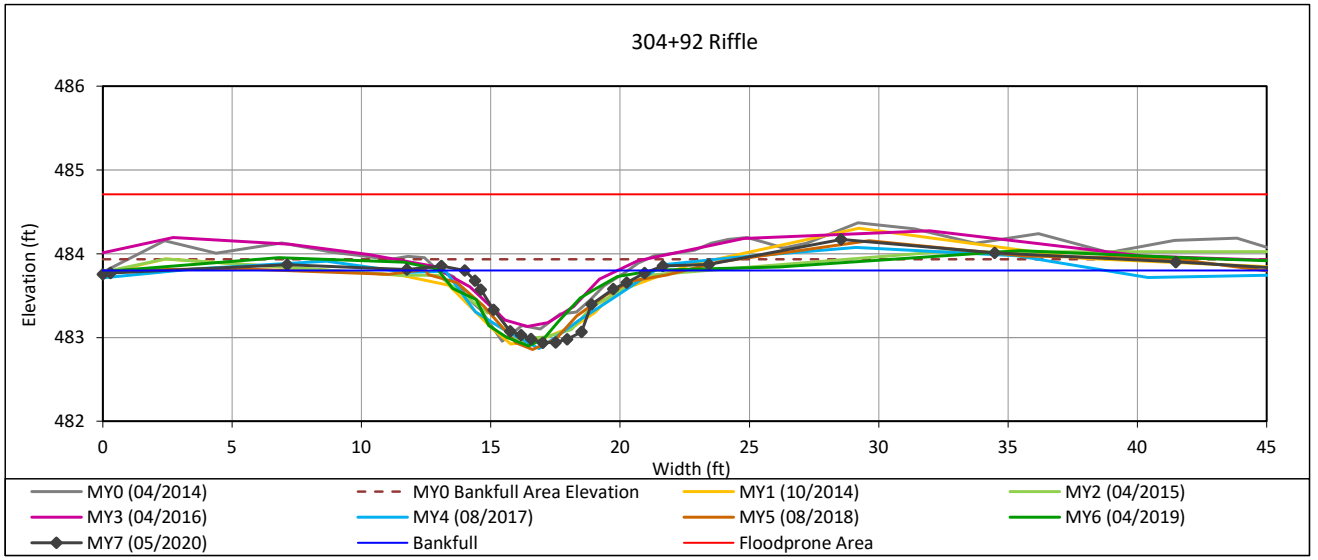
View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360

Monitoring Year 7 - 2020

Cross-Section 12-UT2 Reach 1



Bankfull Dimensions

3.5	x-section area (ft.sq.)
7.2	width (ft)
0.5	mean depth (ft)
1.1	max depth (ft)
7.5	wetted parimeter (ft)
0.5	hyd radi (ft)
14.9	width-depth ratio
134.4	W flood prone area (ft)
18.6	entrenchment ratio
0.9	low bank height ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

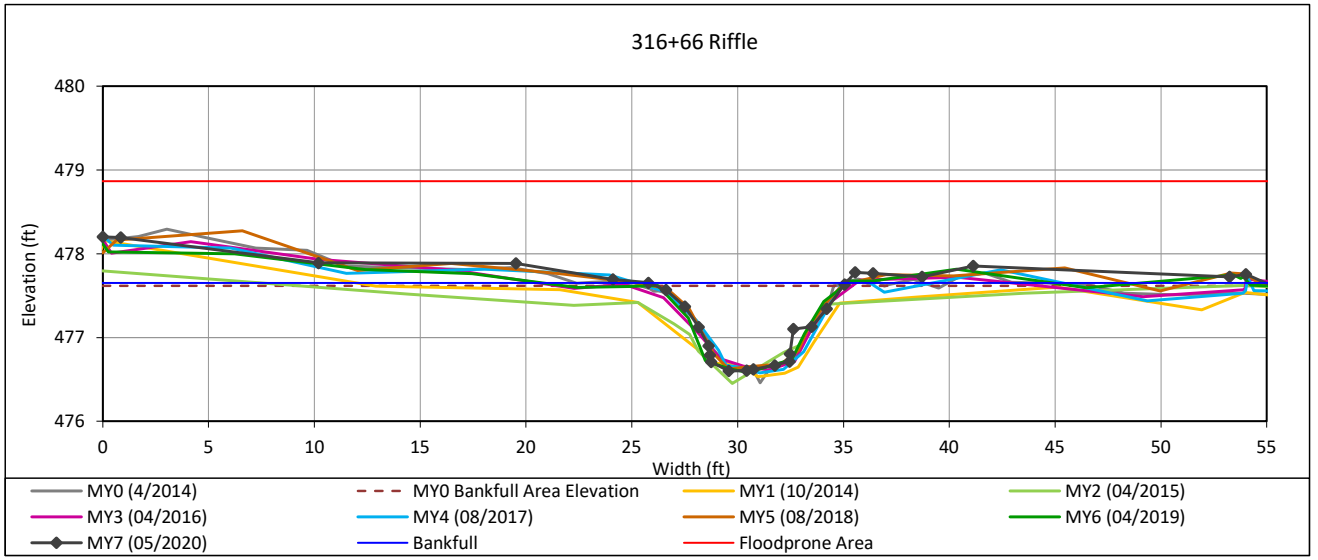
View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360

Monitoring Year 7 - 2020

Cross-Section 13-UT2 Reach 2



Bankfull Dimensions

5.6	x-section area (ft.sq.)
9.3	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
9.9	wetted parimeter (ft)
0.6	hyd radi (ft)
15.5	width-depth ratio
>200	W flood prone area (ft)
>22	entrenchment ratio
1.0	low bank height ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

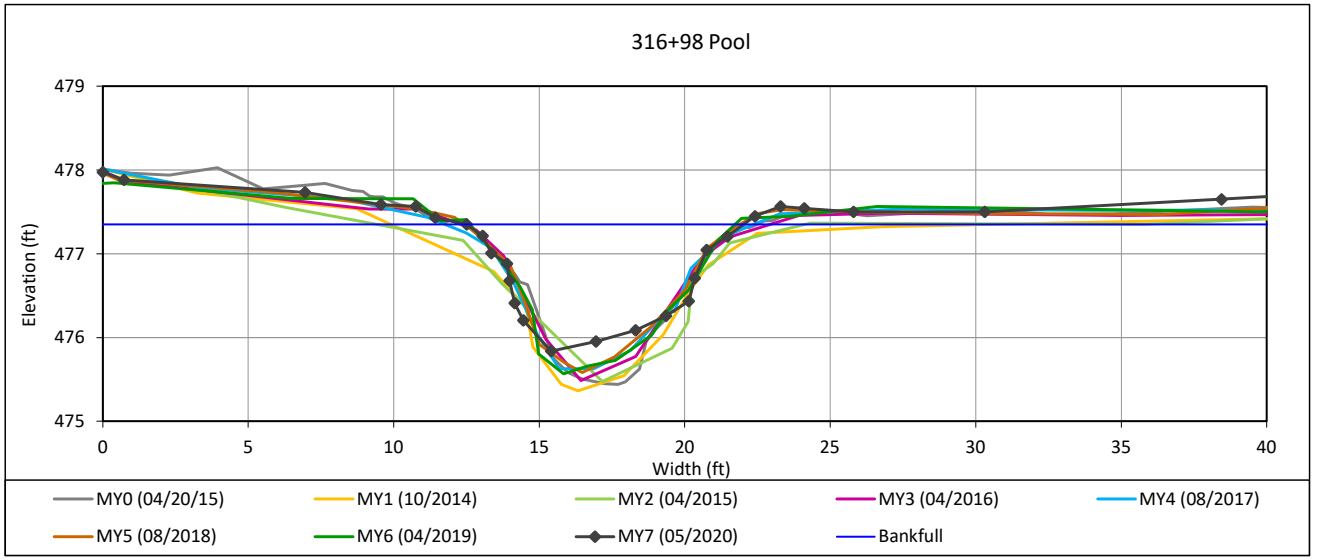
View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360

Monitoring Year 7 - 2020

Cross-Section 14-UT2 Reach 2



Bankfull Dimensions

8.7	x-section area (ft.sq.)
9.5	width (ft)
0.9	mean depth (ft)
1.5	max depth (ft)
10.4	wetted parimeter (ft)
0.8	hyd radi (ft)
10.4	width-depth ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

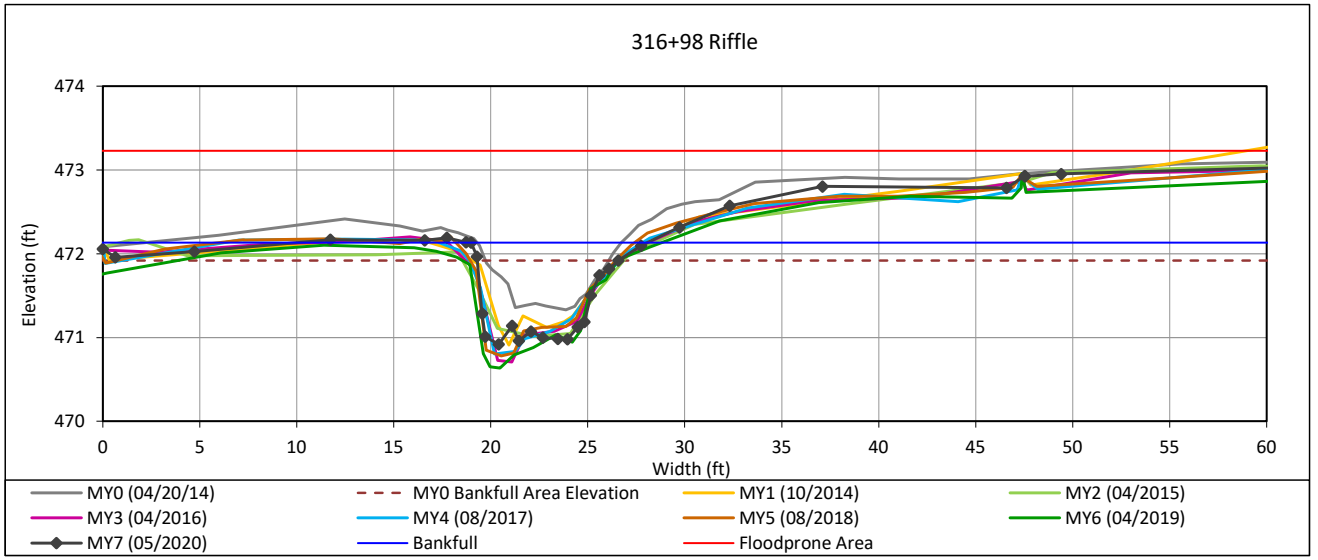
View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360

Monitoring Year 7 - 2020

Cross-Section 15-UT2 Reach 2



Bankfull Dimensions

6.9	x-section area (ft.sq.)
9.1	width (ft)
0.8	mean depth (ft)
1.2	max depth (ft)
10.1	wetted parimeter (ft)
0.7	hyd radi (ft)
11.9	width-depth ratio
>72	W flood prone area (ft)
>7.9	entrenchment ratio
1.2	low bank height ratio

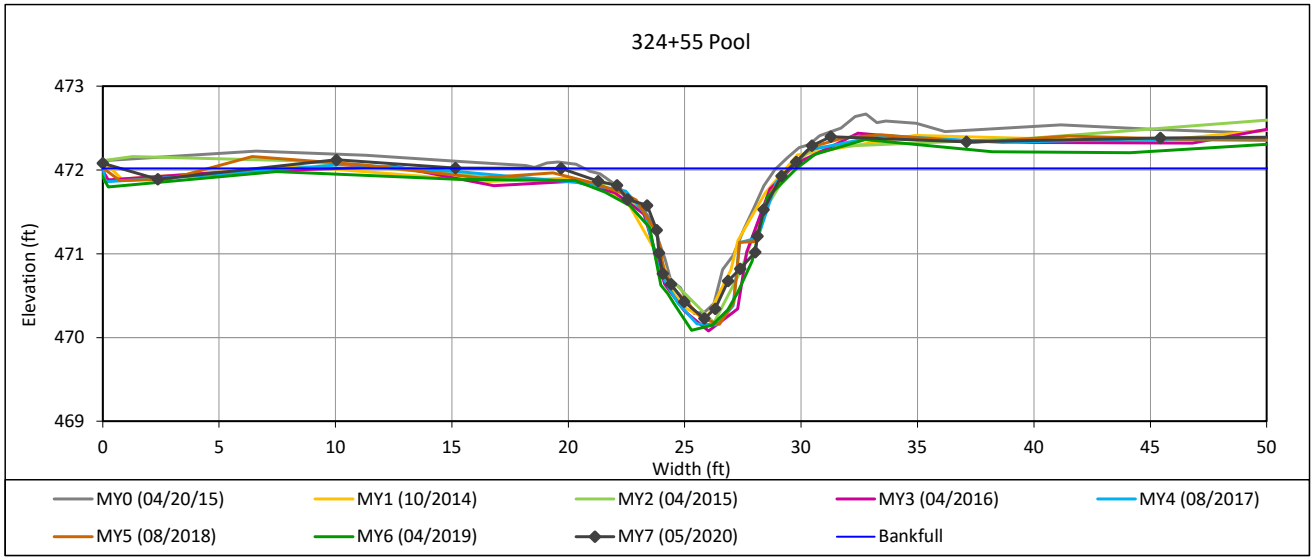
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross-Section 16-UT2 Reach 2



Bankfull Dimensions

7.5	x-section area (ft.sq.)
9.8	width (ft)
0.8	mean depth (ft)
1.8	max depth (ft)
10.9	wetted parimeter (ft)
0.7	hyd radi (ft)
12.8	width-depth ratio

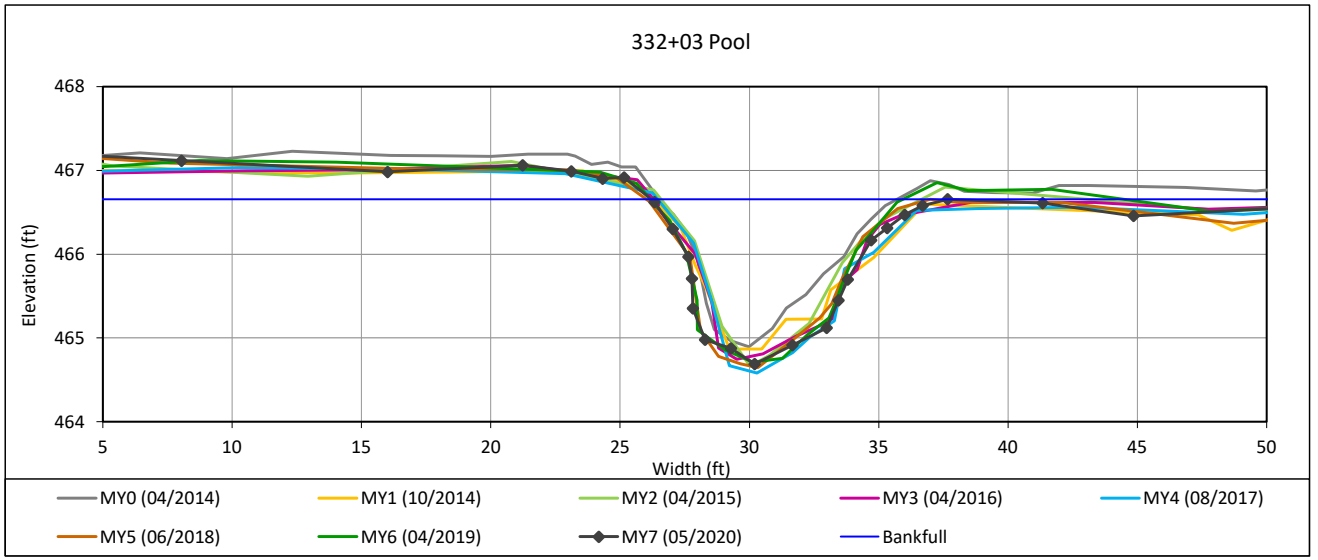
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross-Section 17-UT2 Reach 3A



Bankfull Dimensions

11.9	x-section area (ft.sq.)
11.5	width (ft)
1.0	mean depth (ft)
2.0	max depth (ft)
12.6	wetted parimeter (ft)
0.9	hyd radi (ft)
11.1	width-depth ratio

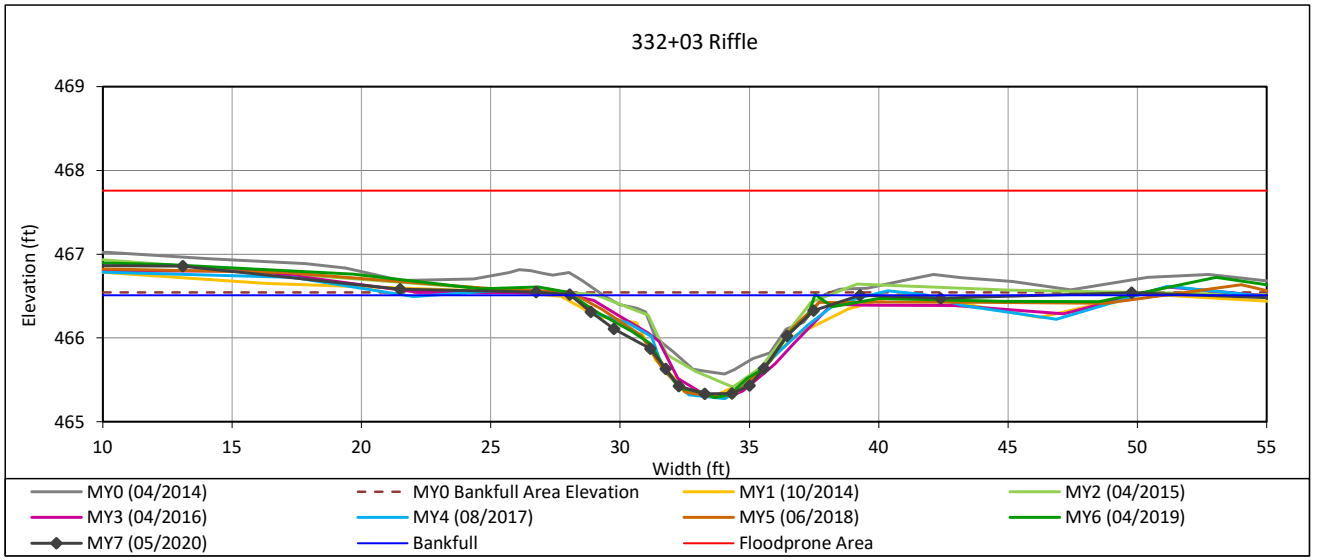
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross-Section 18-UT2 Reach 3A



Bankfull Dimensions

6.8	x-section area (ft.sq.)
11.2	width (ft)
0.6	mean depth (ft)
1.2	max depth (ft)
11.5	wetted parimeter (ft)
0.6	hyd radi (ft)
18.4	width-depth ratio
>200	W flood prone area (ft)
>18	entrenchment ratio
1.0	low bank height ratio

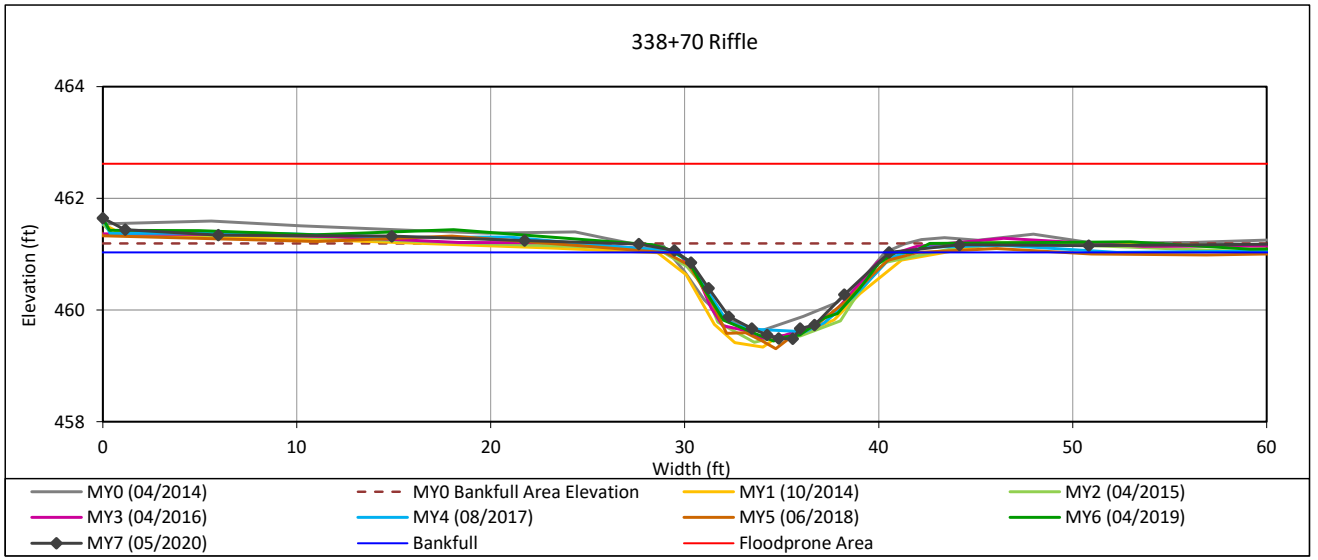
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross-Section 19-UT2 Reach 3B



Bankfull Dimensions

10.0	x-section area (ft.sq.)
10.9	width (ft)
0.9	mean depth (ft)
1.5	max depth (ft)
11.5	wetted parimeter (ft)
0.9	hyd radi (ft)
12.0	width-depth ratio
127.0	W flood prone area (ft)
11.7	entrenchment ratio
0.9	low bank height ratio

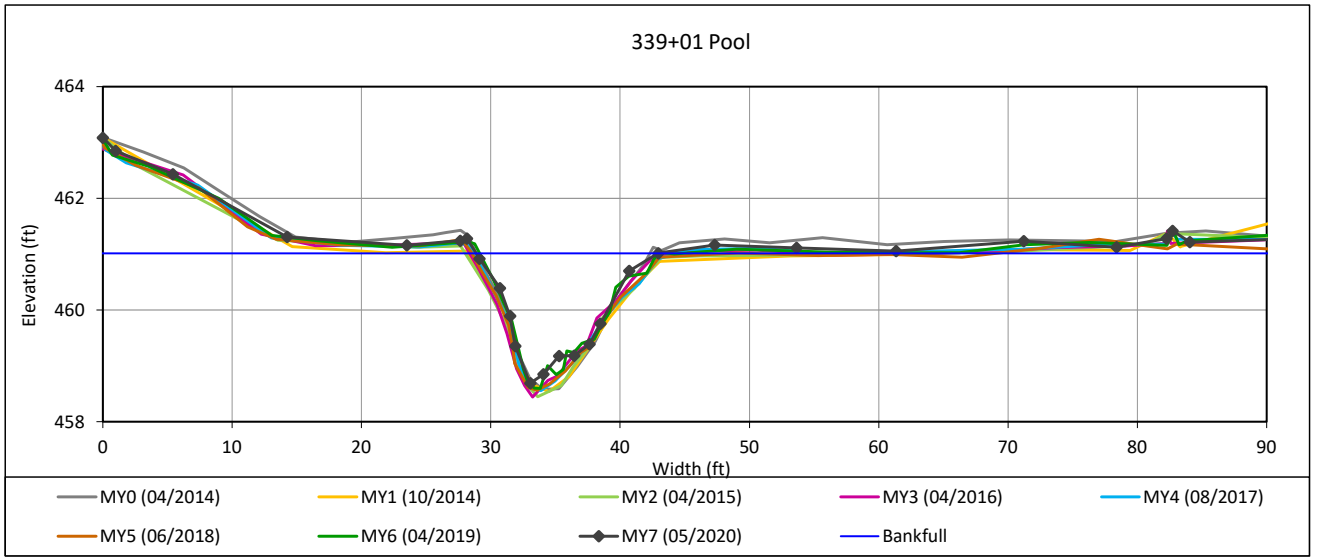
Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Cross-Section 20-UT2 Reach 3B



Bankfull Dimensions

16.4	x-section area (ft.sq.)
14.1	width (ft)
1.2	mean depth (ft)
2.3	max depth (ft)
15.1	wetted parimeter (ft)
1.1	hyd radi (ft)
12.1	width-depth ratio

Survey Date: 05/2020
Field Crew: Wildlands Engineering

View Downstream

Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

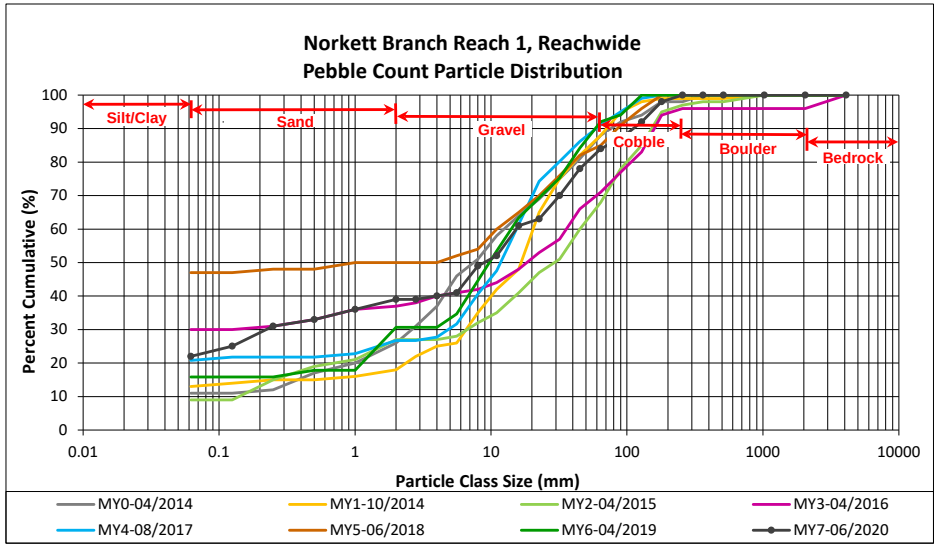
DMS Project No. 95360

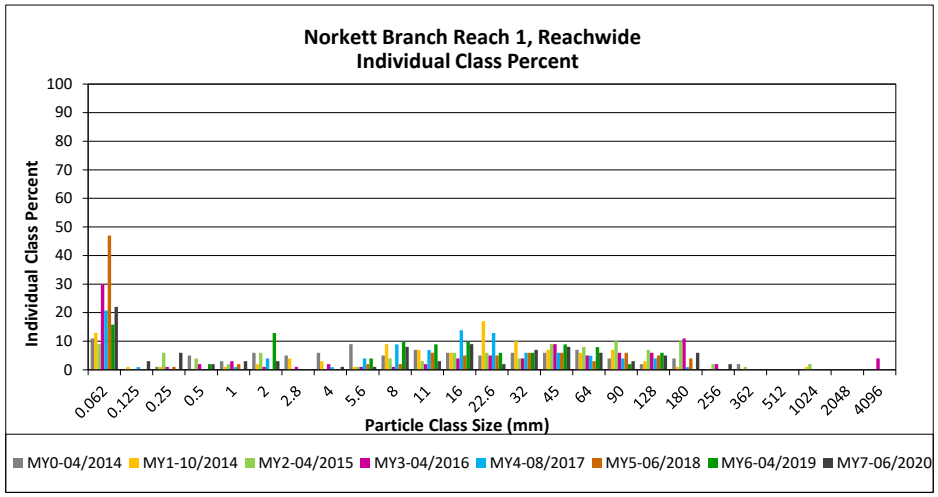
Monitoring Year 7 - 2020

Norkett Branch Reach 1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	5	17	22	22	22
SAND	Very fine	0.062	0.125	2	1	3	3	25
	Fine	0.125	0.250	5	1	6	6	31
	Medium	0.25	0.50		2	2	2	33
	Coarse	0.5	1.0		3	3	3	36
	Very Coarse	1.0	2.0		3	3	3	39
GRAVEL	Very Fine	2.0	2.8					39
	Very Fine	2.8	4.0	1		1	1	40
	Fine	4.0	5.6		1	1	1	41
	Fine	5.6	8.0	5	3	8	8	49
	Medium	8.0	11.0	1	2	3	3	52
	Medium	11.0	16.0	2	7	9	9	61
	Coarse	16.0	22.6		2	2	2	63
	Coarse	22.6	32	4	3	7	7	70
	Very Coarse	32	45	6	2	8	8	78
	Very Coarse	45	64	6		6	6	84
COBBLE	Small	64	90	3		3	3	87
	Small	90	128	5		5	5	92
	Large	128	180	3	3	6	6	98
	Large	180	256	2		2	2	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.8
D_{50} =	8.9
D_{84} =	64.0
D_{95} =	151.8
D_{100} =	256.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

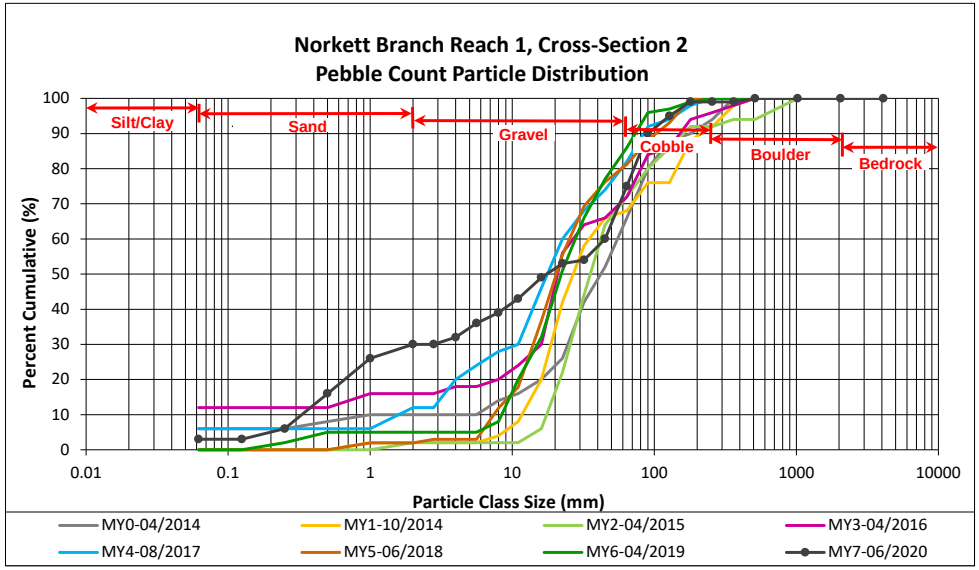
DMS Project No. 95360

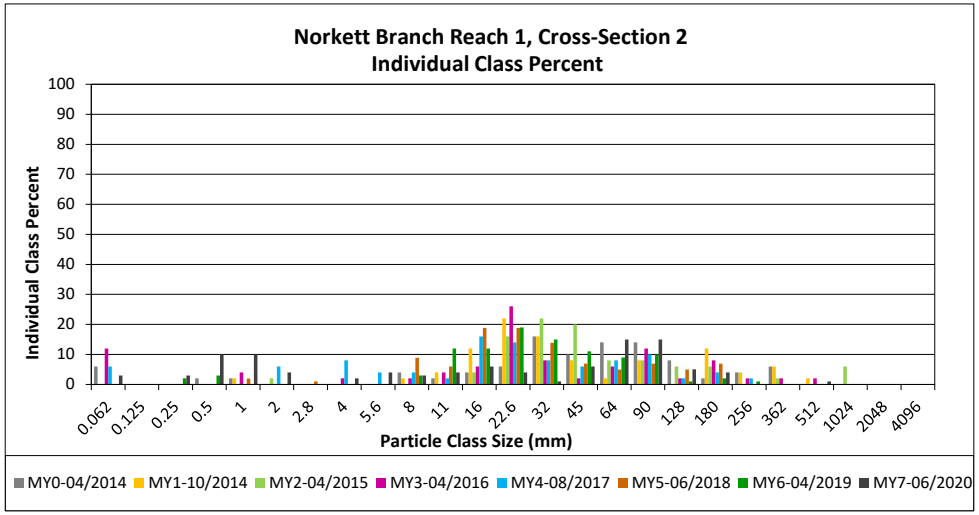
Monitoring Year 7 - 2020

Norkett Branch Reach 1, Cross-Section 2

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	3	3	3
SAND	Very fine	0.062	0.125			3
	Fine	0.125	0.250	3	3	6
	Medium	0.25	0.50	10	10	16
	Coarse	0.5	1.0	10	10	26
	Very Coarse	1.0	2.0	4	4	30
GRAVEL	Very Fine	2.0	2.8			30
	Very Fine	2.8	4.0	2	2	32
	Fine	4.0	5.6	4	4	36
	Fine	5.6	8.0	3	3	39
	Medium	8.0	11.0	4	4	43
	Medium	11.0	16.0	6	6	49
	Coarse	16.0	22.6	4	4	53
	Coarse	22.6	32	1	1	54
	Very Coarse	32	45	6	6	60
	Very Coarse	45	64	15	15	75
COBBLE	Small	64	90	15	15	90
	Small	90	128	5	5	95
	Large	128	180	4	4	99
	Large	180	256			99
BOULDER	Small	256	362			99
	Small	362	512	1	1	100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 2	
Channel materials (mm)	
D_{16} =	0.5
D_{35} =	5.1
D_{50} =	17.4
D_{84} =	78.5
D_{95} =	128.0
D_{100} =	512.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

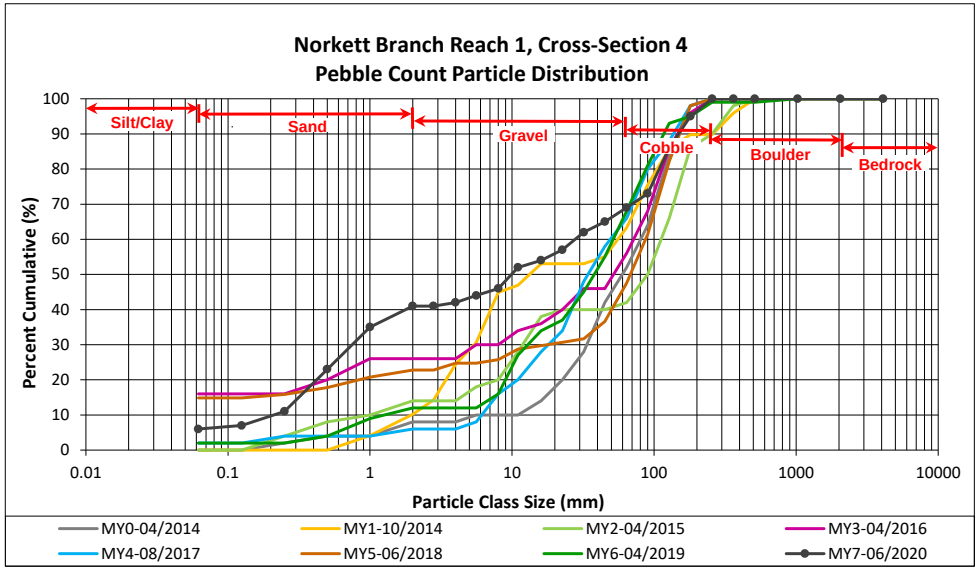
DMS Project No. 95360

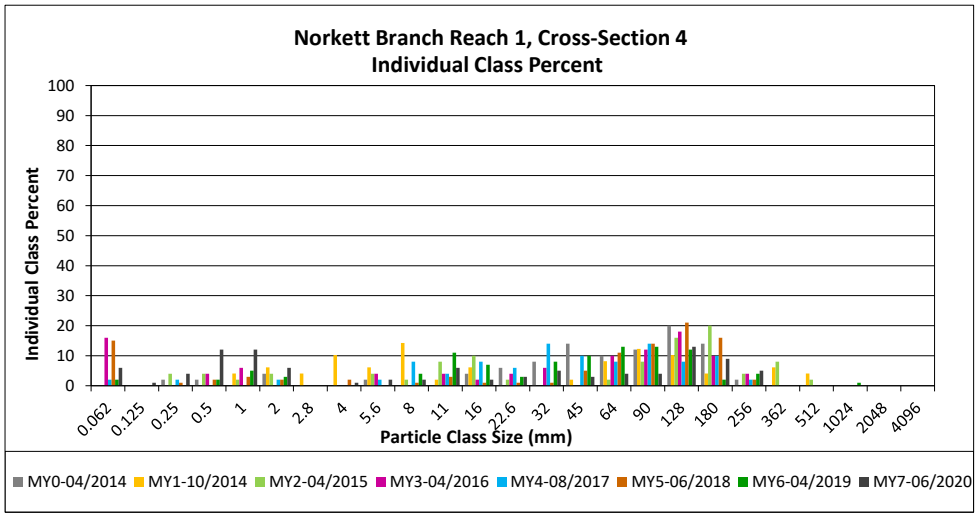
Monitoring Year 7 - 2020

Norkett Branch Reach 1, Cross-Section 4

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	6	6	6
SAND	Very fine	0.062	0.125	1	1	7
	Fine	0.125	0.250	4	4	11
	Medium	0.25	0.50	12	12	23
	Coarse	0.5	1.0	12	12	35
	Very Coarse	1.0	2.0	6	6	41
GRAVEL	Very Fine	2.0	2.8			41
	Very Fine	2.8	4.0	1	1	42
	Fine	4.0	5.6	2	2	44
	Fine	5.6	8.0	2	2	46
	Medium	8.0	11.0	6	6	52
	Medium	11.0	16.0	2	2	54
	Coarse	16.0	22.6	3	3	57
	Coarse	22.6	32	5	5	62
	Very Coarse	32	45	3	3	65
	Very Coarse	45	64	4	4	69
COBBLE	Small	64	90	4	4	73
	Small	90	128	13	13	86
	Large	128	180	9	9	95
	Large	180	256	5	5	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 4	
Channel materials (mm)	
D_{16} =	0.3
D_{35} =	1.0
D_{50} =	9.9
D_{84} =	121.2
D_{95} =	180.0
D_{100} =	256.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

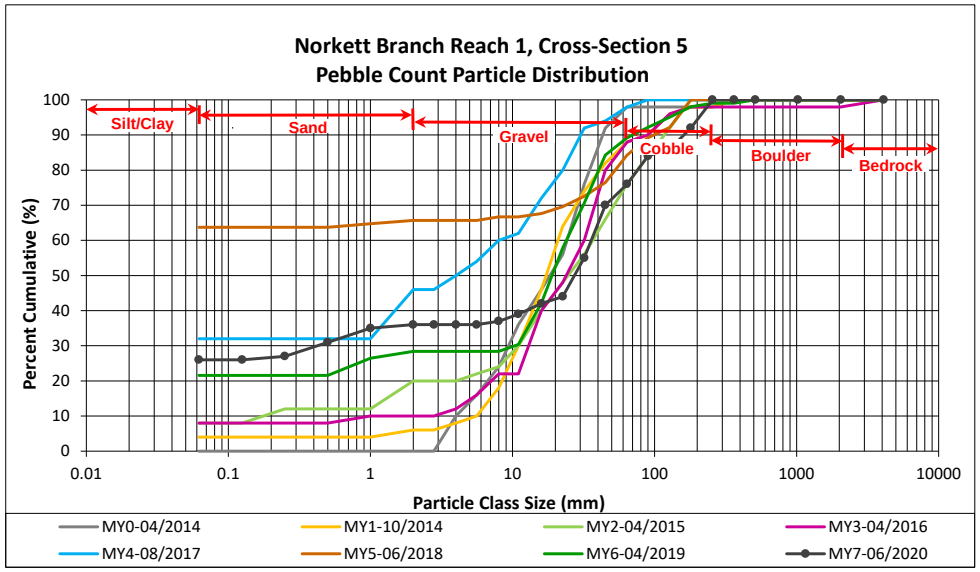
DMS Project No. 95360

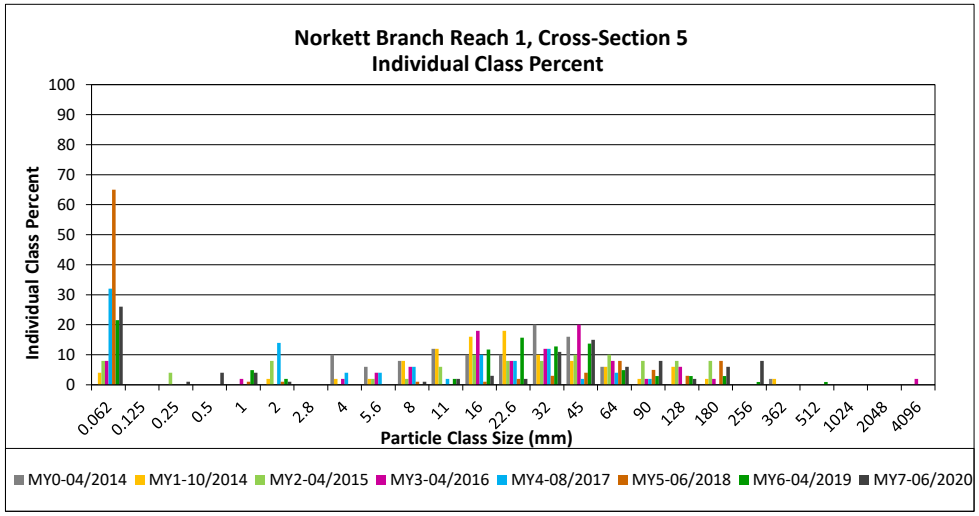
Monitoring Year 7 - 2020

Norkett Branch Reach 1, Cross-Section 5

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	26	26	26
SAND	Very fine	0.062	0.125			26
	Fine	0.125	0.250	1	1	27
	Medium	0.25	0.50	4	4	31
	Coarse	0.5	1.0	4	4	35
	Very Coarse	1.0	2.0	1	1	36
GRAVEL	Very Fine	2.0	2.8			36
	Very Fine	2.8	4.0			36
	Fine	4.0	5.6			36
	Fine	5.6	8.0	1	1	37
	Medium	8.0	11.0	2	2	39
	Medium	11.0	16.0	3	3	42
	Coarse	16.0	22.6	2	2	44
	Coarse	22.6	32	11	11	55
	Very Coarse	32	45	15	15	70
	Very Coarse	45	64	6	6	76
COBBLE	Small	64	90	8	8	84
	Small	90	128	2	2	86
	Large	128	180	6	6	92
	Large	180	256	8	8	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 5	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	1.0
D_{50} =	27.3
D_{84} =	90.0
D_{95} =	205.4
D_{100} =	256.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

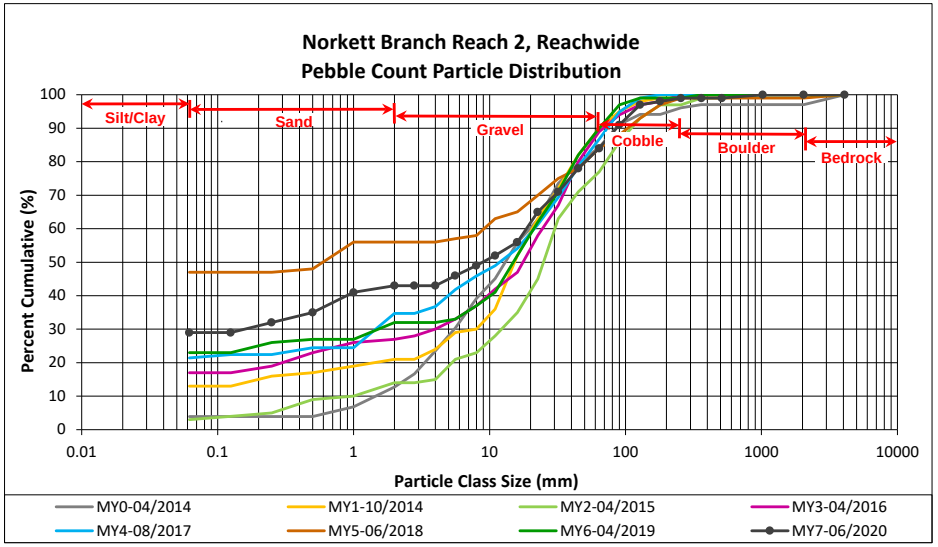
DMS Project No. 95360

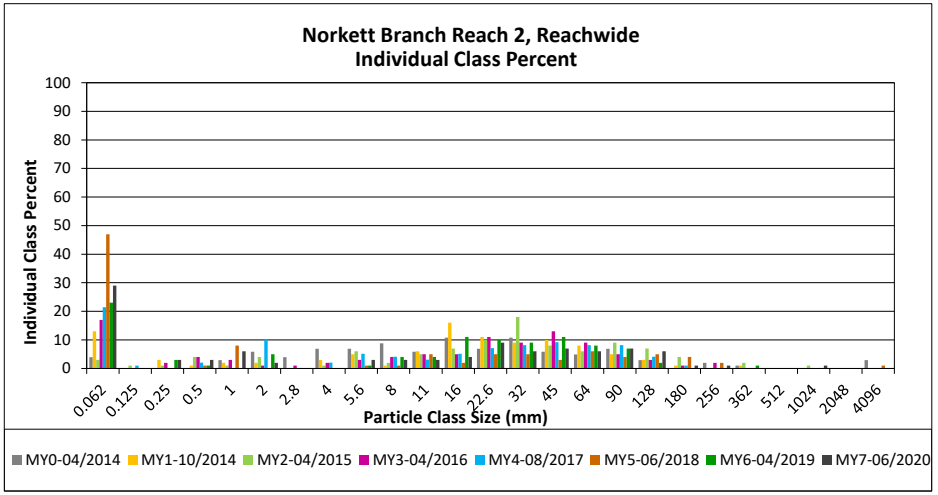
Monitoring Year 7 - 2020

Norkett Branch Reach 2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	11	18	29	29	29
SAND	Very fine	0.062	0.125					29
	Fine	0.125	0.250	2	1	3	3	32
	Medium	0.25	0.50	2	1	3	3	35
	Coarse	0.5	1.0	3	3	6	6	41
	Very Coarse	1.0	2.0	1	1	2	2	43
GRAVEL	Very Fine	2.0	2.8					43
	Very Fine	2.8	4.0					43
	Fine	4.0	5.6	2	1	3	3	46
	Fine	5.6	8.0		3	3	3	49
	Medium	8.0	11.0	1	2	3	3	52
	Medium	11.0	16.0	2	2	4	4	56
	Coarse	16.0	22.6	4	5	9	9	65
	Coarse	22.6	32	3	3	6	6	71
	Very Coarse	32	45	2	5	7	7	78
	Very Coarse	45	64	4	2	6	6	84
COBBLE	Small	64	90	6	1	7	7	91
	Small	90	128	4	2	6	6	97
	Large	128	180	1		1	1	98
	Large	180	256	1		1	1	99
BOULDER	Small	256	362					99
	Small	362	512					99
	Medium	512	1024	1		1	1	100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.5
D_{50} =	8.9
D_{84} =	64.0
D_{95} =	113.8
D_{100} =	1024.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

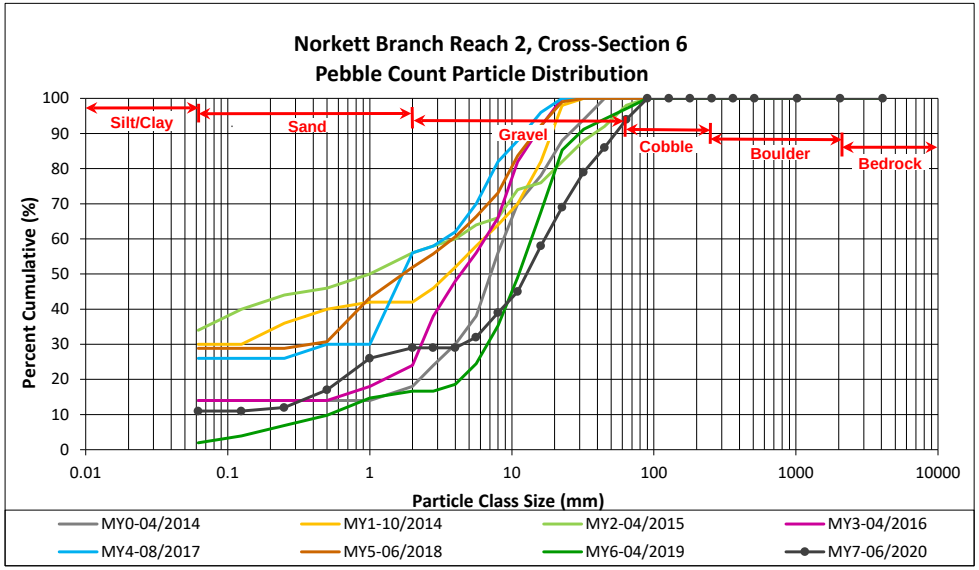
DMS Project No. 95360

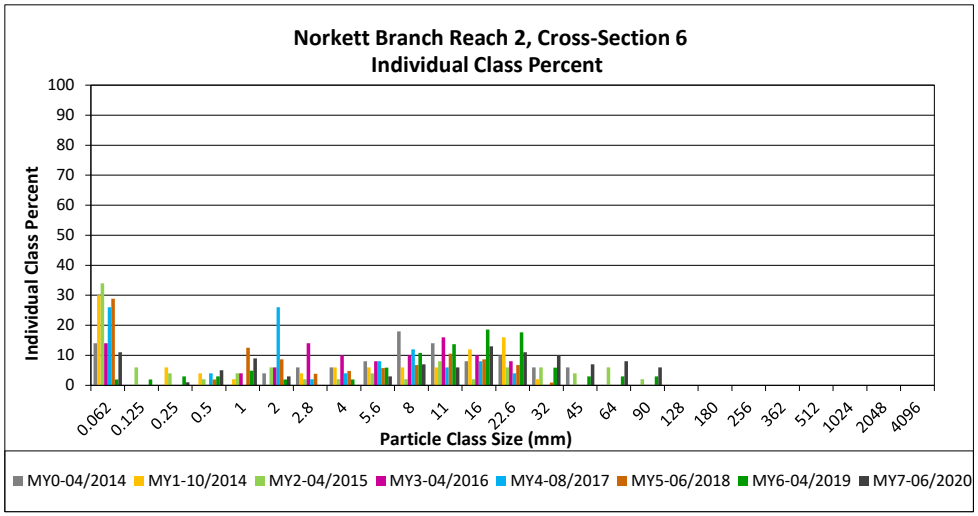
Monitoring Year 7 - 2020

Norkett Branch Reach 2, Cross-Section 6

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	11	11	11
SAND	Very fine	0.062	0.125			11
	Fine	0.125	0.250	1	1	12
	Medium	0.25	0.50	5	5	17
	Coarse	0.5	1.0	9	9	26
	Very Coarse	1.0	2.0	3	3	29
GRAVEL	Very Fine	2.0	2.8			29
	Very Fine	2.8	4.0			29
	Fine	4.0	5.6	3	3	32
	Fine	5.6	8.0	7	7	39
	Medium	8.0	11.0	6	6	45
	Medium	11.0	16.0	13	13	58
	Coarse	16.0	22.6	11	11	69
	Coarse	22.6	32	10	10	79
	Very Coarse	32	45	7	7	86
	Very Coarse	45	64	8	8	94
COBBLE	Small	64	90	6	6	100
	Small	90	128			100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 6	
Channel materials (mm)	
D_{16} =	0.4
D_{35} =	6.5
D_{50} =	12.7
D_{84} =	40.8
D_{95} =	67.7
D_{100} =	90.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

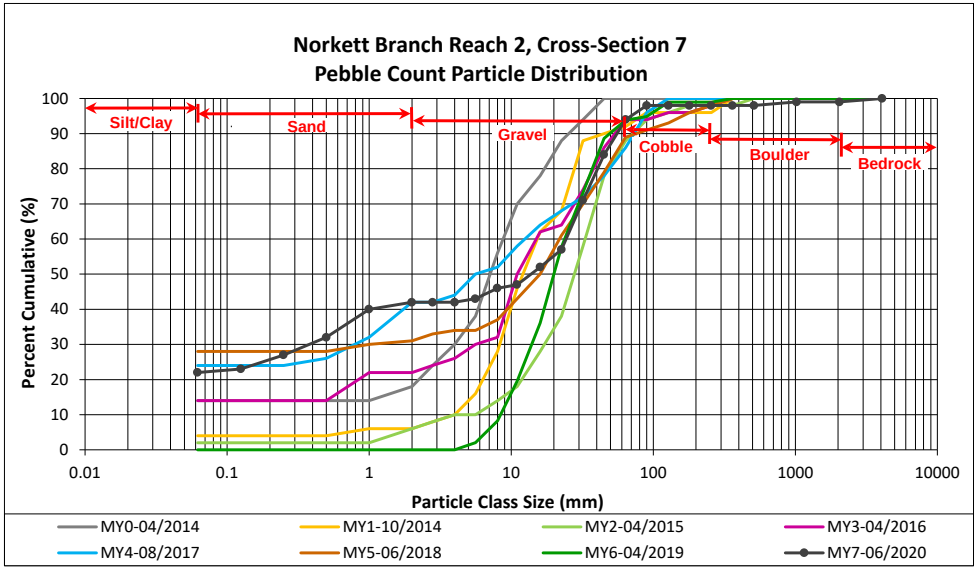
DMS Project No. 95360

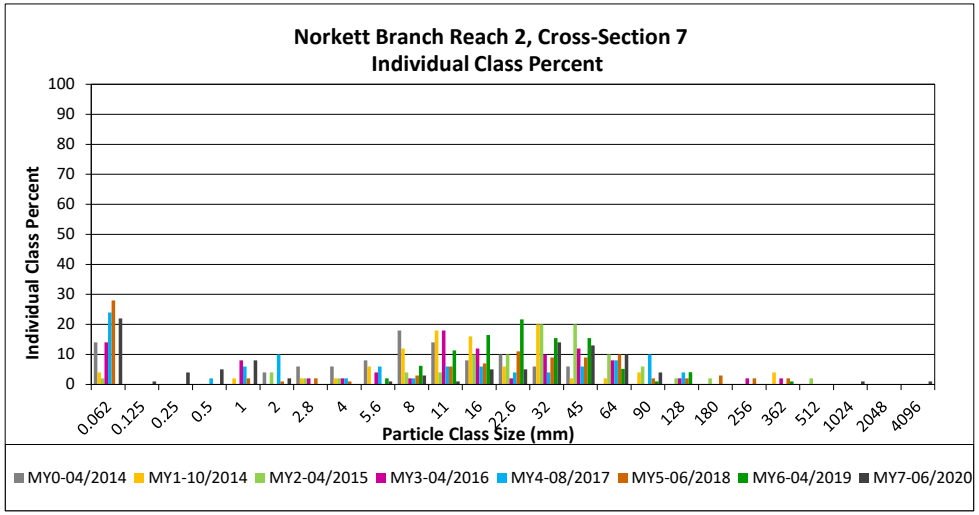
Monitoring Year 7 - 2020

Norkett Branch Reach 2, Cross-Section 7

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	22	22	22
SAND	Very fine	0.062	0.125	1	1	23
	Fine	0.125	0.250	4	4	27
	Medium	0.25	0.50	5	5	32
	Coarse	0.5	1.0	8	8	40
	Very Coarse	1.0	2.0	2	2	42
GRAVEL	Very Fine	2.0	2.8			42
	Very Fine	2.8	4.0			42
	Fine	4.0	5.6	1	1	43
	Fine	5.6	8.0	3	3	46
	Medium	8.0	11.0	1	1	47
	Medium	11.0	16.0	5	5	52
	Coarse	16.0	22.6	5	5	57
	Coarse	22.6	32	14	14	71
	Very Coarse	32	45	13	13	84
	Very Coarse	45	64	10	10	94
COBBLE	Small	64	90	4	4	98
	Small	90	128			98
	Large	128	180			98
	Large	180	256			98
BOULDER	Small	256	362			98
	Small	362	512			98
	Medium	512	1024	1	1	99
	Large/Very Large	1024	2048			99
BEDROCK	Bedrock	2048	>2048	1	1	100
			Total	**100**	**100**	**100**

Cross-Section 7	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.6
D_{50} =	13.8
D_{84} =	45.0
D_{95} =	69.7
D_{100} =	>2048





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

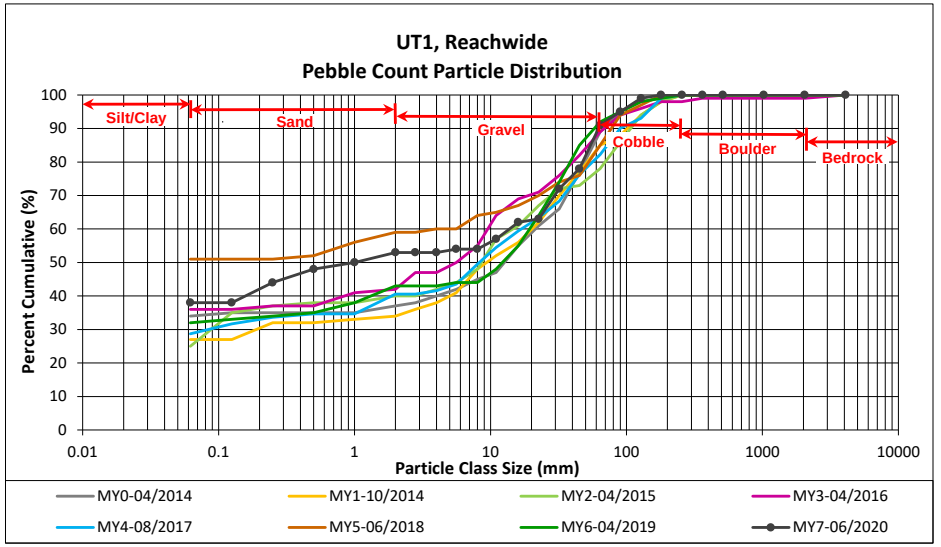
DMS Project No. 95360

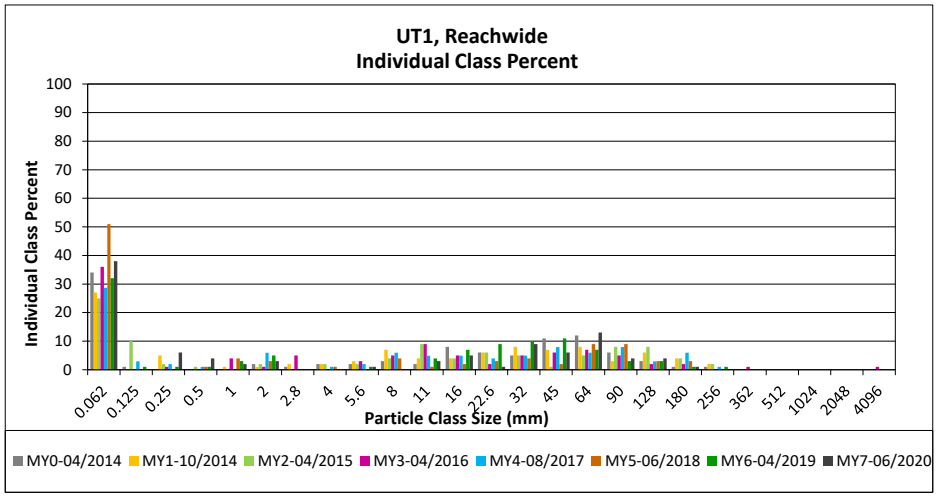
Monitoring Year 7 - 2020

UT1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	5	33	38	38	38
SAND	Very fine	0.062	0.125					38
	Fine	0.125	0.250	3	3	6	6	44
	Medium	0.25	0.50	2	2	4	4	48
	Coarse	0.5	1.0	2		2	2	50
	Very Coarse	1.0	2.0	2	1	3	3	53
GRAVEL	Very Fine	2.0	2.8					53
	Very Fine	2.8	4.0					53
	Fine	4.0	5.6	1		1	1	54
	Fine	5.6	8.0					54
	Medium	8.0	11.0	1	2	3	3	57
	Medium	11.0	16.0	2	3	5	5	62
	Coarse	16.0	22.6	1		1	1	63
	Coarse	22.6	32	7	2	9	9	72
	Very Coarse	32	45	6		6	6	78
	Very Coarse	45	64	10	3	13	13	91
COBBLE	Small	64	90	3	1	4	4	95
	Small	90	128	4		4	4	99
	Large	128	180	1		1	1	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	1.0
D_{84} =	52.9
D_{95} =	90.0
D_{100} =	180.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

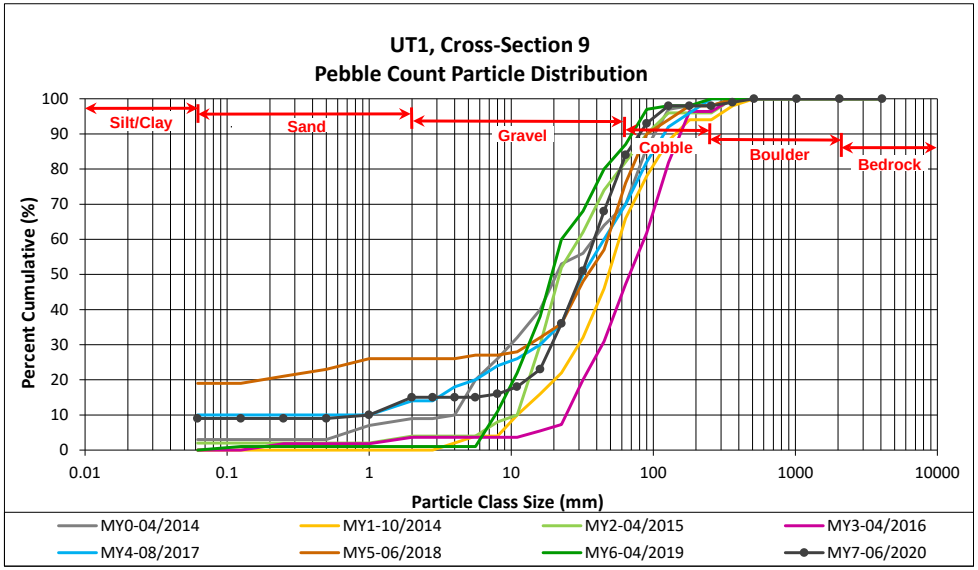
DMS Project No. 95360

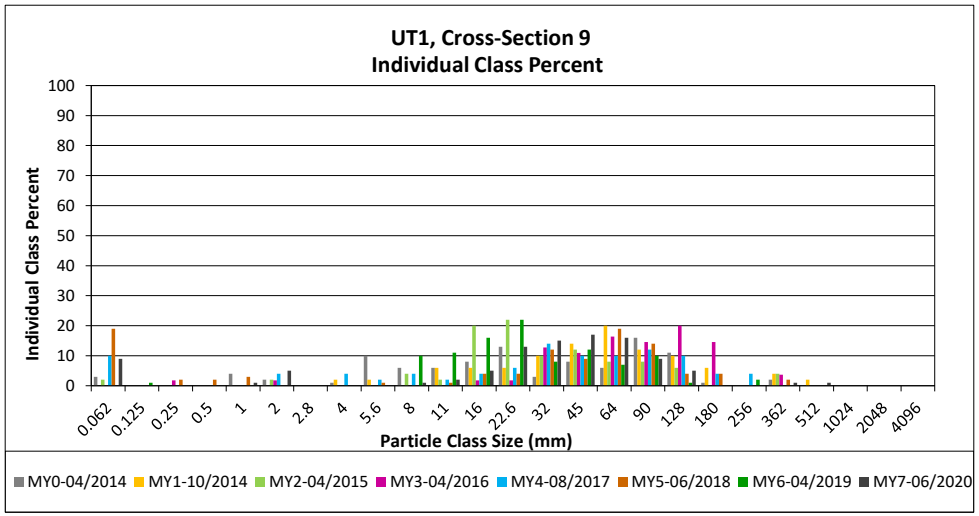
Monitoring Year 7 - 2020

UT1, Cross-Section 9

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	9	9	9
SAND	Very fine	0.062	0.125			9
	Fine	0.125	0.250			9
	Medium	0.25	0.50			9
	Coarse	0.5	1.0	1	1	10
	Very Coarse	1.0	2.0	5	5	15
GRAVEL	Very Fine	2.0	2.8			15
	Very Fine	2.8	4.0			15
	Fine	4.0	5.6			15
	Fine	5.6	8.0	1	1	16
	Medium	8.0	11.0	2	2	18
	Medium	11.0	16.0	5	5	23
	Coarse	16.0	22.6	13	13	36
	Coarse	22.6	32	15	15	51
	Very Coarse	32	45	17	17	68
	Very Coarse	45	64	16	16	84
COBBLE	Small	64	90	9	9	93
	Small	90	128	5	5	98
	Large	128	180			98
	Large	180	256			98
BOULDER	Small	256	362	1	1	99
	Small	362	512	1	1	100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 9	
Channel materials (mm)	
D_{16} =	8.0
D_{35} =	22.0
D_{50} =	31.3
D_{84} =	64.0
D_{95} =	103.6
D_{100} =	512.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

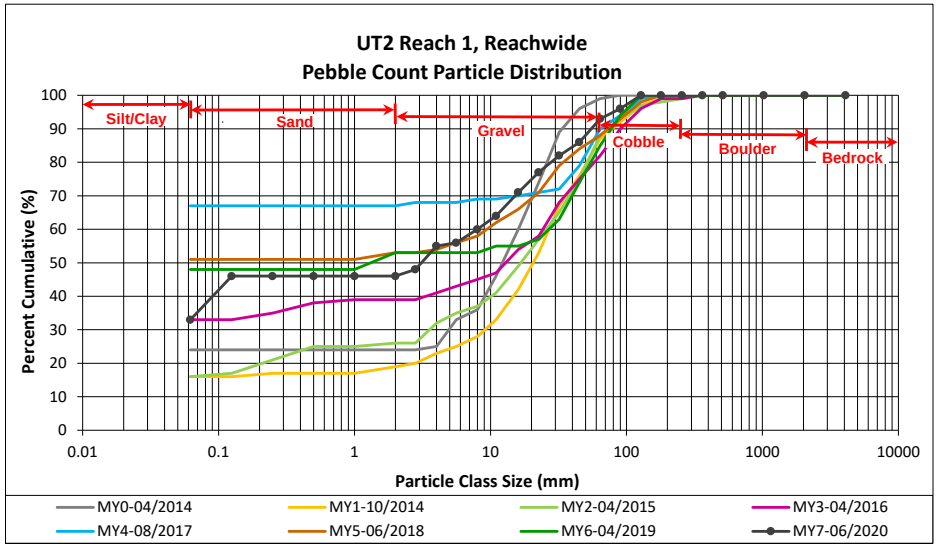
DMS Project No. 95360

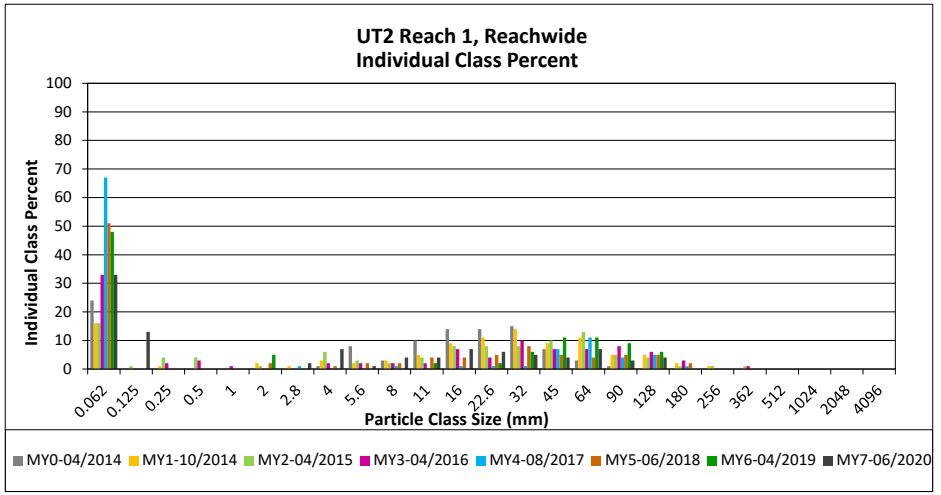
Monitoring Year 7 - 2020

UT2 Reach 1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	3	30	33	33	33
SAND	Very fine	0.062	0.125	1	12	13	13	46
	Fine	0.125	0.250					46
	Medium	0.25	0.50					46
	Coarse	0.5	1.0					46
	Very Coarse	1.0	2.0					46
GRAVEL	Very Fine	2.0	2.8	1	1	2	2	48
	Very Fine	2.8	4.0	4	3	7	7	55
	Fine	4.0	5.6	1		1	1	56
	Fine	5.6	8.0	3	1	4	4	60
	Medium	8.0	11.0	4		4	4	64
	Medium	11.0	16.0	6	1	7	7	71
	Coarse	16.0	22.6	5	1	6	6	77
	Coarse	22.6	32	4	1	5	5	82
	Very Coarse	32	45	4		4	4	86
	Very Coarse	45	64	7		7	7	93
COBBLE	Small	64	90	3		3	3	96
	Small	90	128	4		4	4	100
	Large	128	180					100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.07
D_{50} =	3.1
D_{84} =	37.9
D_{95} =	80.3
D_{100} =	128.0





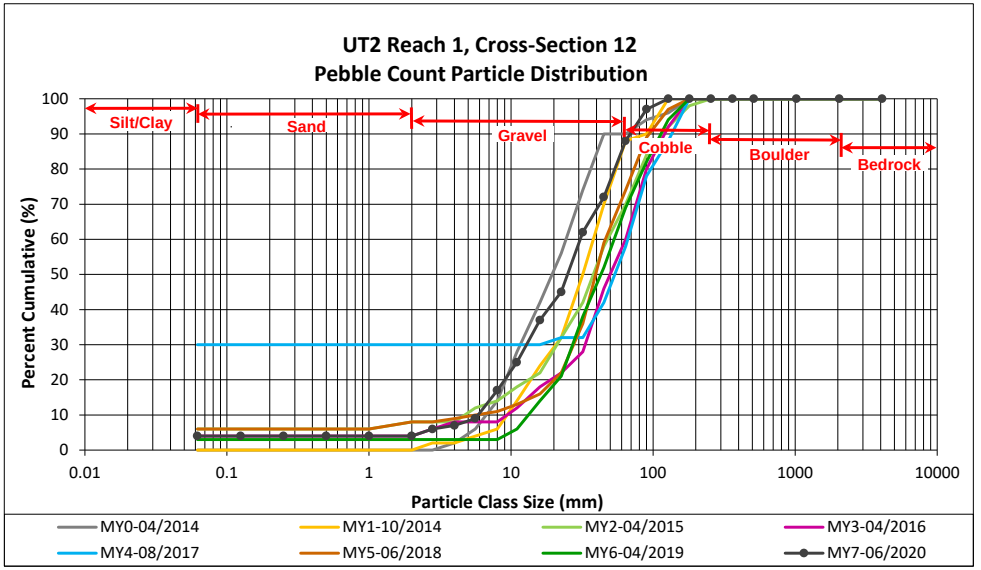
Reachwide and Cross-Section Pebble Count Plots

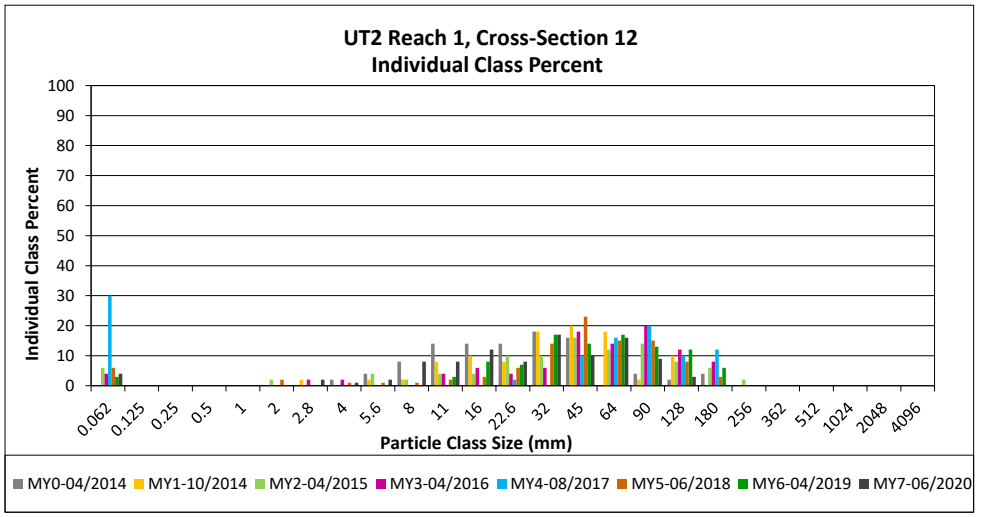
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 1, Cross-Section 12

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	4	4	4
SAND	Very fine	0.062	0.125			4
	Fine	0.125	0.250			4
	Medium	0.25	0.50			4
	Coarse	0.5	1.0			4
	Very Coarse	1.0	2.0			4
GRAVEL	Very Fine	2.0	2.8	2	2	6
	Very Fine	2.8	4.0	1	1	7
	Fine	4.0	5.6	2	2	9
	Fine	5.6	8.0	8	8	17
	Medium	8.0	11.0	8	8	25
	Medium	11.0	16.0	12	12	37
	Coarse	16.0	22.6	8	8	45
	Coarse	22.6	32	17	17	62
	Very Coarse	32	45	10	10	72
	Very Coarse	45	64	16	16	88
COBBLE	Small	64	90	9	9	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 12	
Channel materials (mm)	
D_{16} =	7.7
D_{35} =	15.0
D_{50} =	25.0
D_{84} =	58.6
D_{95} =	83.4
D_{100} =	128.0





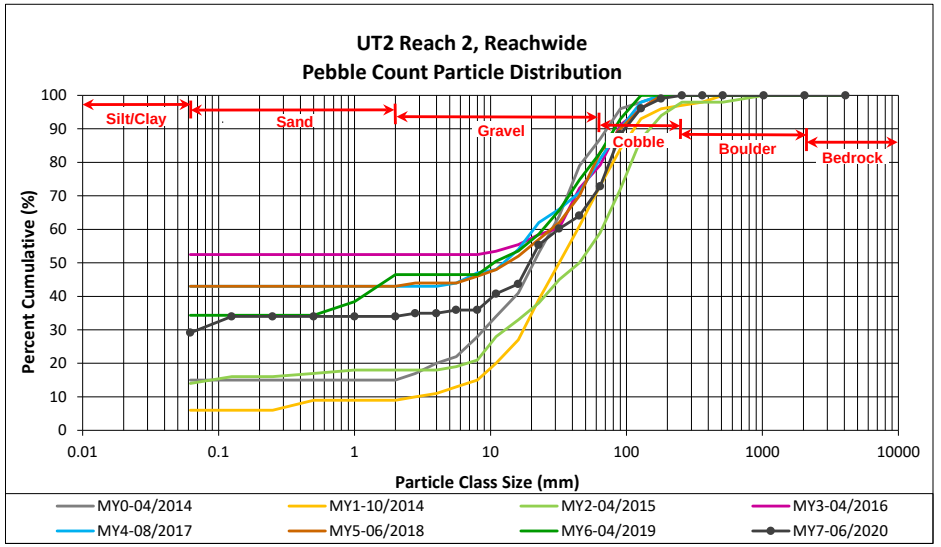
Reachwide and Cross-Section Pebble Count Plots

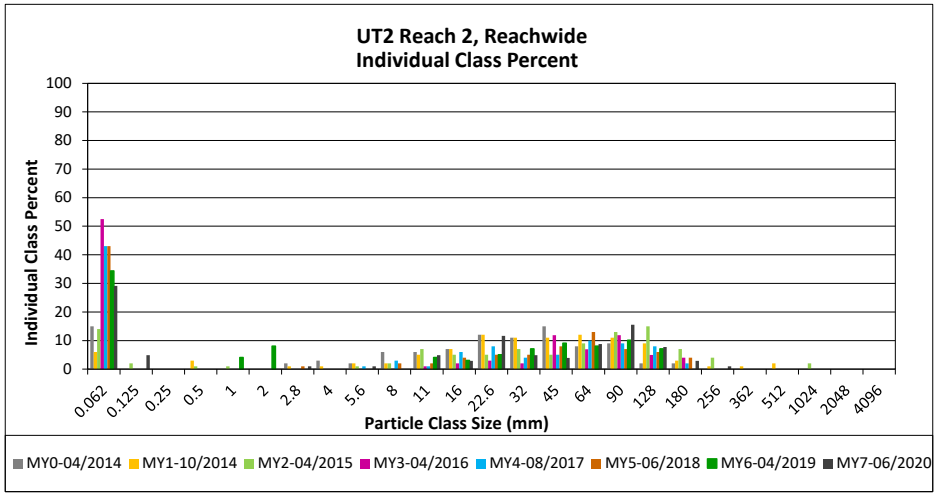
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	5	25	30	29	29
SAND	Very fine	0.062	0.125		5	5	5	34
	Fine	0.125	0.250					34
	Medium	0.25	0.50					34
	Coarse	0.5	1.0					34
	Very Coarse	1.0	2.0					34
GRAVEL	Very Fine	2.0	2.8		1	1	1	35
	Very Fine	2.8	4.0					35
	Fine	4.0	5.6		1	1	1	36
	Fine	5.6	8.0					36
	Medium	8.0	11.0	3	2	5	5	41
	Medium	11.0	16.0	2	1	3	3	44
	Coarse	16.0	22.6	12		12	12	55
	Coarse	22.6	32	2	3	5	5	60
	Very Coarse	32	45	2	2	4	4	64
	Very Coarse	45	64	7	2	9	9	73
COBBLE	Small	64	90	13	3	16	16	88
	Small	90	128	7	1	8	8	96
	Large	128	180		3	3	3	99
	Large	180	256		1	1	1	100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**53**	**50**	**103**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	4.1
D_{50} =	19.3
D_{84} =	81.8
D_{95} =	121.7
D_{100} =	256.0





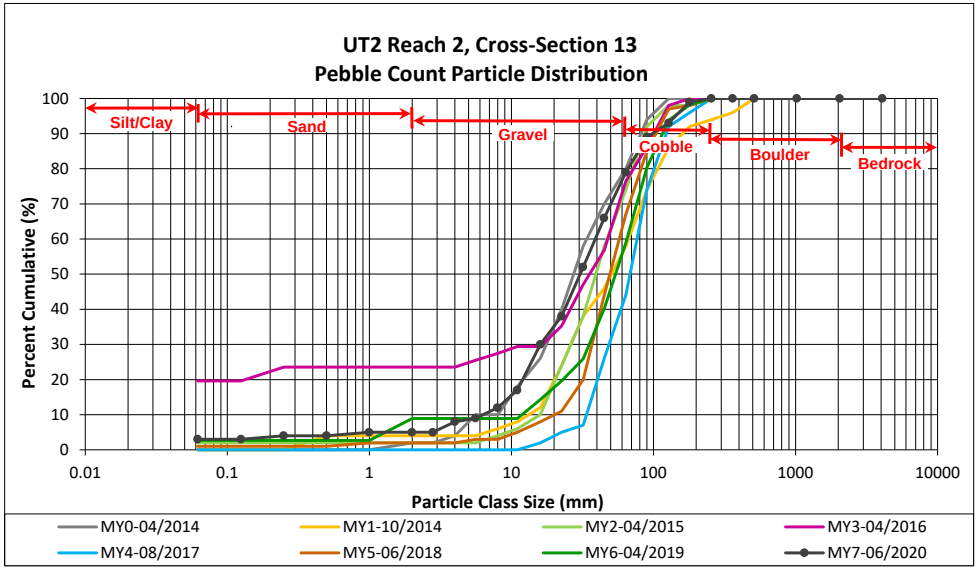
Reachwide and Cross-Section Pebble Count Plots

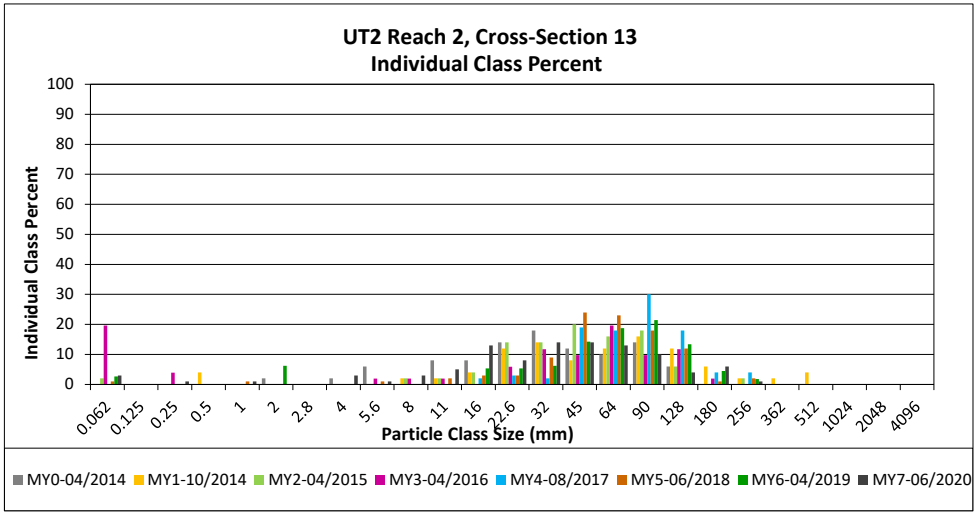
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 2, Cross-Section 13

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	3	3	3
SAND	Very fine	0.062	0.125			3
	Fine	0.125	0.250	1	1	4
	Medium	0.25	0.50			4
	Coarse	0.5	1.0	1	1	5
	Very Coarse	1.0	2.0			5
GRAVEL	Very Fine	2.0	2.8			5
	Very Fine	2.8	4.0	3	3	8
	Fine	4.0	5.6	1	1	9
	Fine	5.6	8.0	3	3	12
	Medium	8.0	11.0	5	5	17
	Medium	11.0	16.0	13	13	30
	Coarse	16.0	22.6	8	8	38
	Coarse	22.6	32	14	14	52
	Very Coarse	32	45	14	14	66
	Very Coarse	45	64	13	13	79
COBBLE	Small	64	90	10	10	89
	Small	90	128	4	4	93
	Large	128	180	6	6	99
	Large	180	256	1	1	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 13	
Channel materials (mm)	
D_{16} =	10.3
D_{35} =	19.9
D_{50} =	30.4
D_{84} =	75.9
D_{95} =	143.4
D_{100} =	256.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

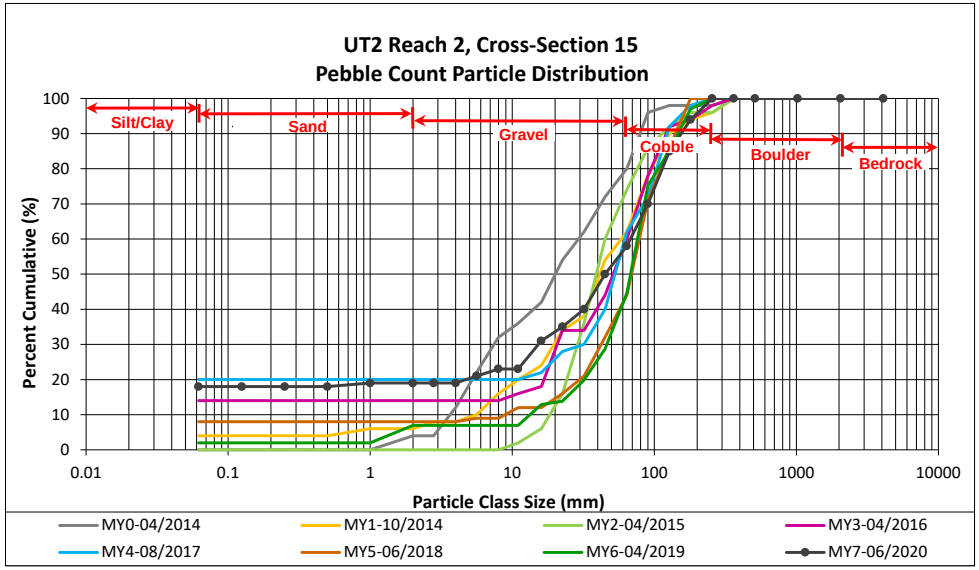
DMS Project No. 95360

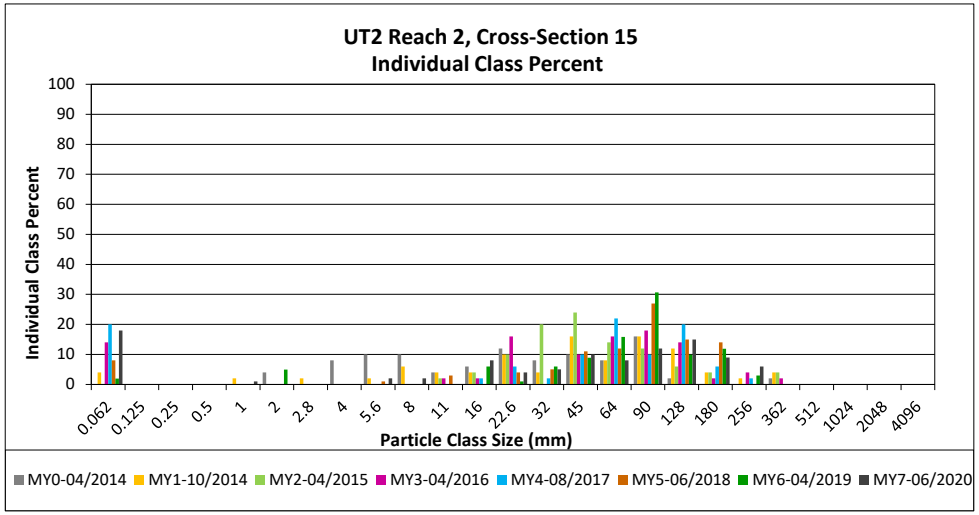
Monitoring Year 7 - 2020

UT2 Reach 2, Cross-Section 15

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	18	18	18
SAND	Very fine	0.062	0.125			18
	Fine	0.125	0.250			18
	Medium	0.25	0.50			18
	Coarse	0.5	1.0	1	1	19
	Very Coarse	1.0	2.0			19
GRAVEL	Very Fine	2.0	2.8			19
	Very Fine	2.8	4.0			19
	Fine	4.0	5.6	2	2	21
	Fine	5.6	8.0	2	2	23
	Medium	8.0	11.0			23
	Medium	11.0	16.0	8	8	31
	Coarse	16.0	22.6	4	4	35
	Coarse	22.6	32	5	5	40
	Very Coarse	32	45	10	10	50
	Very Coarse	45	64	8	8	58
COBBLE	Small	64	90	12	12	70
	Small	90	128	15	15	85
	Large	128	180	9	9	94
	Large	180	256	6	6	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 15	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	22.6
D_{50} =	45.0
D_{84} =	125.0
D_{95} =	190.9
D_{100} =	256.0





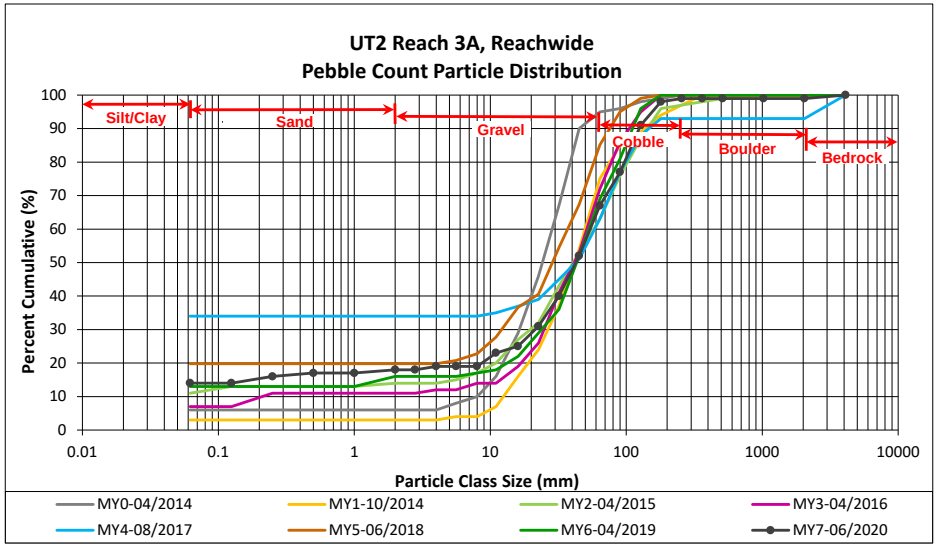
Reachwide and Cross-Section Pebble Count Plots

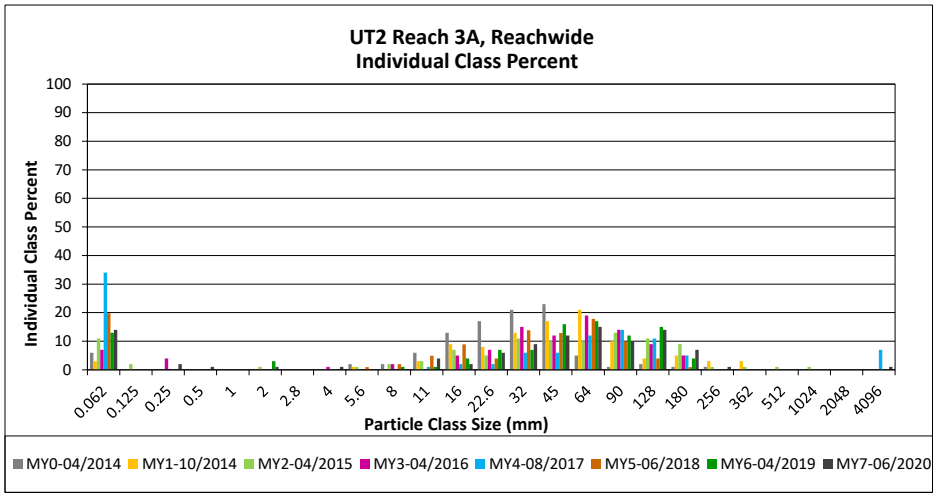
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 3A, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	13	14	14	14
SAND	Very fine	0.062	0.125					14
	Fine	0.125	0.250	1	1	2	2	16
	Medium	0.25	0.50		1	1	1	17
	Coarse	0.5	1.0					17
	Very Coarse	1.0	2.0		1	1	1	18
GRAVEL	Very Fine	2.0	2.8					18
	Very Fine	2.8	4.0	1		1	1	19
	Fine	4.0	5.6					19
	Fine	5.6	8.0					19
	Medium	8.0	11.0	3	1	4	4	23
	Medium	11.0	16.0	1	1	2	2	25
	Coarse	16.0	22.6	2	4	6	6	31
	Coarse	22.6	32	5	4	9	9	40
	Very Coarse	32	45	8	4	12	12	52
	Very Coarse	45	64	6	9	15	15	67
COBBLE	Small	64	90	8	2	10	10	77
	Small	90	128	12	2	14	14	91
	Large	128	180	2	5	7	7	98
	Large	180	256		1	1	1	99
BOULDER	Small	256	362					99
	Small	362	512					99
	Medium	512	1024					99
	Large/Very Large	1024	2048					99
BEDROCK	Bedrock	2048	>2048		1	1	1	100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.3
D_{35} =	26.4
D_{50} =	42.5
D_{84} =	107.3
D_{95} =	90.0
D_{100} =	>2048





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

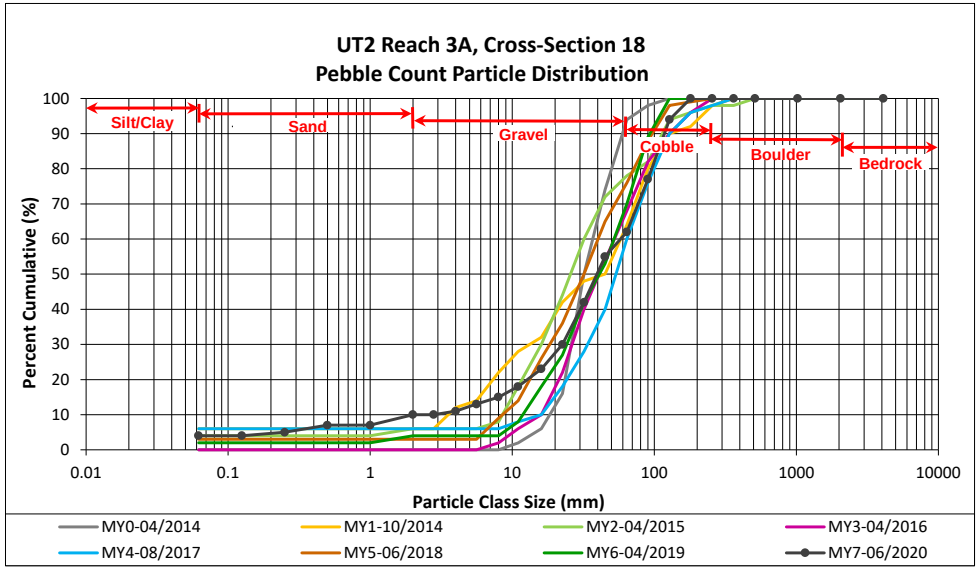
DMS Project No. 95360

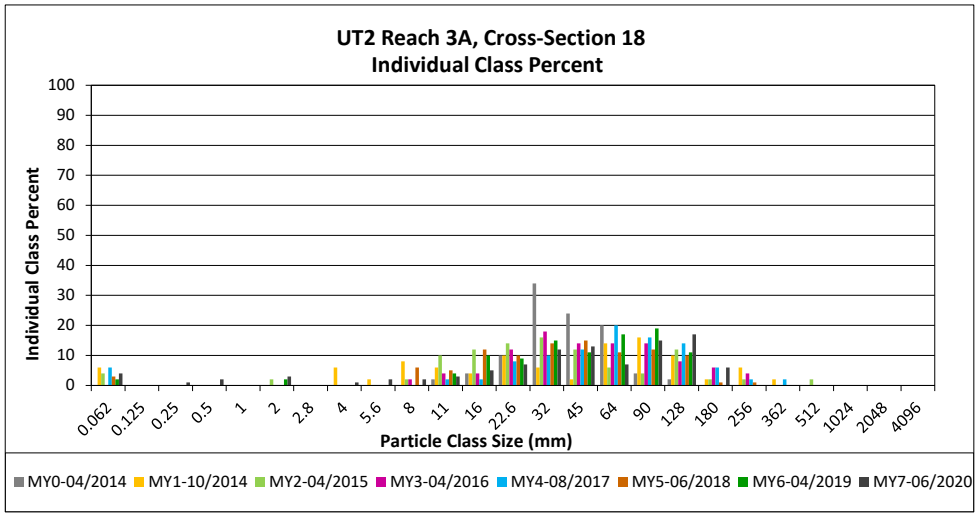
Monitoring Year 7 - 2020

UT2 Reach 3A, Cross-Section 18

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	4	4	4
SAND	Very fine	0.062	0.125			4
	Fine	0.125	0.250	1	1	5
	Medium	0.25	0.50	2	2	7
	Coarse	0.5	1.0			7
	Very Coarse	1.0	2.0	3	3	10
GRAVEL	Very Fine	2.0	2.8			10
	Very Fine	2.8	4.0	1	1	11
	Fine	4.0	5.6	2	2	13
	Fine	5.6	8.0	2	2	15
	Medium	8.0	11.0	3	3	18
	Medium	11.0	16.0	5	5	23
	Coarse	16.0	22.6	7	7	30
	Coarse	22.6	32	12	12	42
	Very Coarse	32	45	13	13	55
	Very Coarse	45	64	7	7	62
COBBLE	Small	64	90	15	15	77
	Small	90	128	17	17	94
	Large	128	180	6	6	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 18	
Channel materials (mm)	
D_{16} =	8.9
D_{35} =	26.1
D_{50} =	39.5
D_{84} =	104.0
D_{95} =	135.5
D_{100} =	180.0





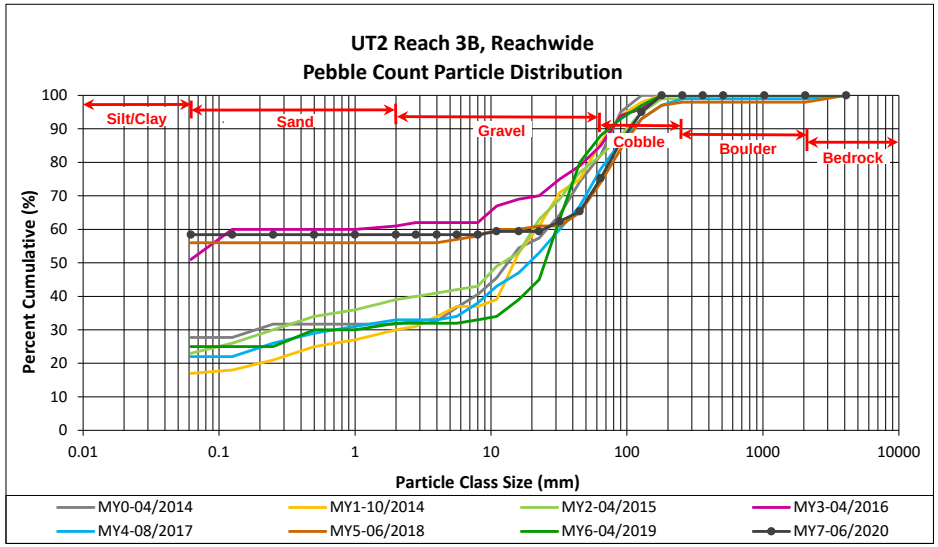
Reachwide and Cross-Section Pebble Count Plots

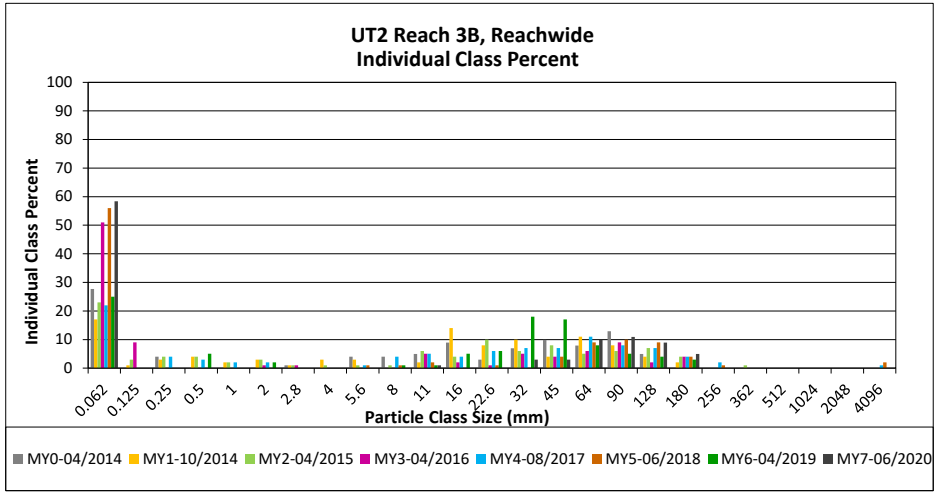
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

UT2 Reach 3B, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	18	41	59	58	58
SAND	Very fine	0.062	0.125					58
	Fine	0.125	0.250					58
	Medium	0.25	0.50					58
	Coarse	0.5	1.0					58
	Very Coarse	1.0	2.0					58
GRAVEL	Very Fine	2.0	2.8					58
	Very Fine	2.8	4.0					58
	Fine	4.0	5.6					58
	Fine	5.6	8.0					58
	Medium	8.0	11.0	1		1	1	59
	Medium	11.0	16.0					59
	Coarse	16.0	22.6					59
	Coarse	22.6	32	3		3	3	62
	Very Coarse	32	45	1	2	3	3	65
	Very Coarse	45	64	6	4	10	10	75
COBBLE	Small	64	90	9	2	11	11	86
	Small	90	128	8	1	9	9	95
	Large	128	180	5		5	5	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**51**	**50**	**101**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	Silt/Clay
D_{84} =	84.2
D_{95} =	127.7
D_{100} =	180.0





Reachwide and Cross-Section Pebble Count Plots

Norkett Branch Stream Mitigation Site

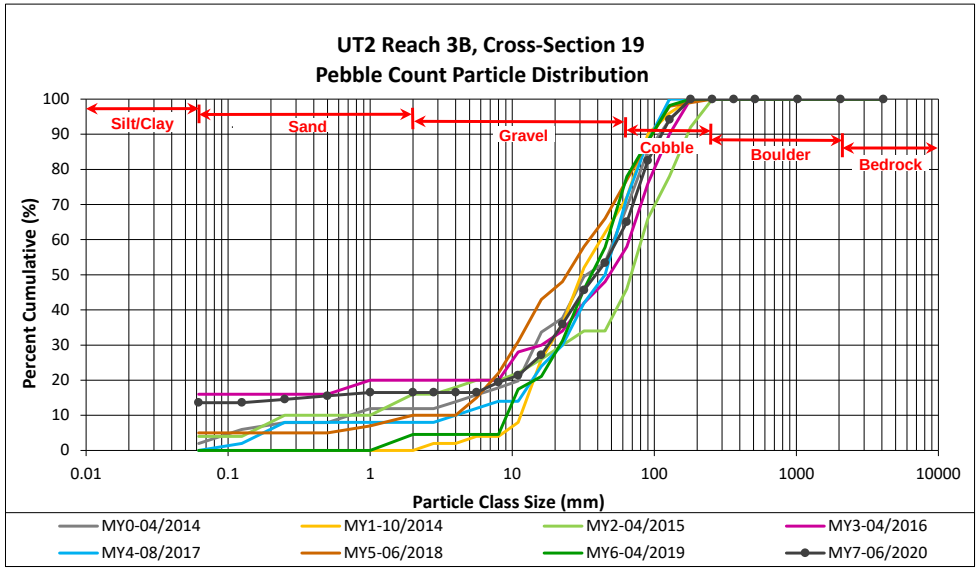
DMS Project No. 95360

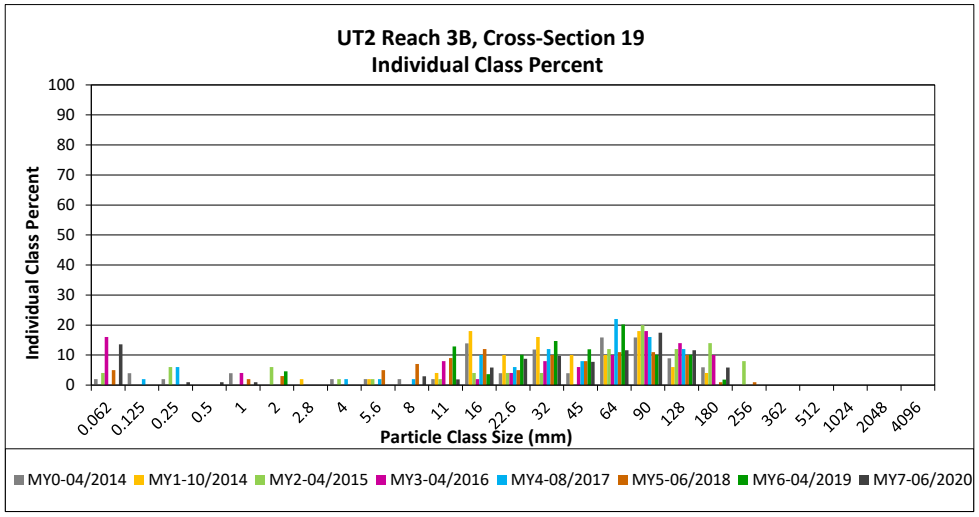
Monitoring Year 7 - 2020

UT2 Reach 3B, Cross-Section 19

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	14	14	14
SAND	Very fine	0.062	0.125			14
	Fine	0.125	0.250	1	1	15
	Medium	0.25	0.50	1	1	16
	Coarse	0.5	1.0	1	1	17
	Very Coarse	1.0	2.0			17
GRAVEL	Very Fine	2.0	2.8			17
	Very Fine	2.8	4.0			17
	Fine	4.0	5.6			17
	Fine	5.6	8.0	3	3	19
	Medium	8.0	11.0	2	2	21
	Medium	11.0	16.0	6	6	27
	Coarse	16.0	22.6	9	9	36
	Coarse	22.6	32	10	10	46
	Very Coarse	32	45	8	8	53
	Very Coarse	45	64	12	12	65
COBBLE	Small	64	90	18	17	83
	Small	90	128	12	12	94
	Large	128	180	6	6	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**103**	**100**	**100**

Cross-Section 19	
Channel materials (mm)	
D_{16} =	0.7
D_{35} =	21.8
D_{50} =	38.8
D_{84} =	94.1
D_{95} =	134.3
D_{100} =	180.0





APPENDIX 5. Hydrology Data

Table 14. Verification of Bankfull Events
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Monitoring Year	Reach	Date of Data Collection	Date of Occurrence	Method
MY1	UT2 Reach 3A (CG #1 XS18)	6/3/2014	5/30/2014	Stream Gage
		9/4/2014	7/21/2014	Stream Gage
		10/17/2014	9/16/2014	Wrack Line
	UT1 (CG #2 XS9)	6/3/2014	5/30/2014	Stream Gage
		9/4/2014	7/21/2014	Stream Gage
	Norkett Branch Reach 2 (CG #3 XS6)	6/3/2014	5/30/2014	Stream Gage
		9/4/2014	7/21/2014	Stream Gage
		10/17/2014	9/16/2014	Stream Gage
MY2	UT2 Reach 3A (CG #1 XS18)	1/4/2015	1/4/2015	Stream Gage
		1/12/2015	1/12/2015	Stream Gage
		2/26/2015	2/26/2015	Stream Gage
		3/5/2015	3/5/2015	Stream Gage
		4/19/2015	4/19/2015	Stream Gage
		10/3/2015	10/3/2015	Stream Gage, Crest Gage
	Norkett Branch Reach 2 (CG #3 XS6)	1/4/2015	1/4/2015	Stream Gage
		1/12/2015	1/12/2015	Stream Gage
		2/26/2015	2/26/2015	Stream Gage
		3/5/2015	3/5/2015	Stream Gage, Crest Gage
		4/19/2015	4/19/2015	Stream Gage, Crest Gage
		10/3/2015	10/3/2015	Stream Gage, Crest Gage
MY3	UT2 Reach 3A (CG #1 XS18)	2/3/2016	2/3/2016	Stream Gage
		2/16/2016	2/16/2016	Stream Gage
		2/24/2016	2/24/2016	Stream Gage
		3/28/2016	3/28/2016	Stream Gage, Crest Gage
		10/8/2016	10/8/2016	Stream Gage
	UT1 (CG #2 XS9)	4/22/2016	Unknown	Crest Gage
		10/8/2016	10/8/2016	Stream Gage
	Norkett Branch Reach 2 (CG #3 XS6)	2/3/2016	2/3/2016	Stream Gage
		2/16/2016	2/16/2016	Stream Gage
		2/24/2016	2/24/2016	Stream Gage
		3/28/2016	3/28/2016	Stream Gage, Crest Gage
		10/8/2016	10/8/2016	Stream Gage
MY4	UT2 Reach 3A (CG #1 XS18)	1/22/2017	1/22/2017	Stream Gage
		4/24/2017	4/24/2017	Stream Gage
		5/22/2017	5/22/2017	Stream Gage
		5/24/2017	5/24/2017	Stream Gage
		6/20/2017	6/20/2017	Stream Gage
		6/29/2017	Unknown	Crest Gage
	Norkett Branch Reach 2 (CG #3 XS6)	1/23/2017	1/23/2017	Stream Gage
		5/24/2017	5/24/2017	Stream Gage
MY5	UT2 Reach 3A (CG #1 XS18)	2/4/2018	2/4/2018	Stream Gage
		2/7/2018	2/7/2018	Stream Gage
		3/12/2018	3/12/2018	Stream Gage, Crest Gage
		4/24/2018	4/24/2018	Stream Gage
		5/24/2018	5/24/2018	Stream Gage, Crest Gage
		9/16/2018	9/16/2018	Stream Gage, Crest Gage
	UT1 (CG #2 XS9)	5/24/2018	5/24/2018	Stream Gage
		9/16/2018[1]	9/16/2018[1]	Stream Gage
		9/16/2018[1]	9/16/2018[1]	Stream Gage
	Norkett Branch Reach 2 (CG #3 XS6)	2/4/2018	2/4/2018	Stream Gage, Crest Gage
		4/24/2018	4/24/2018	Stream Gage
		5/24/2018	5/24/2018	Stream Gage, Crest Gage
		9/16/2018	9/16/2018	Stream Gage, Crest Gage

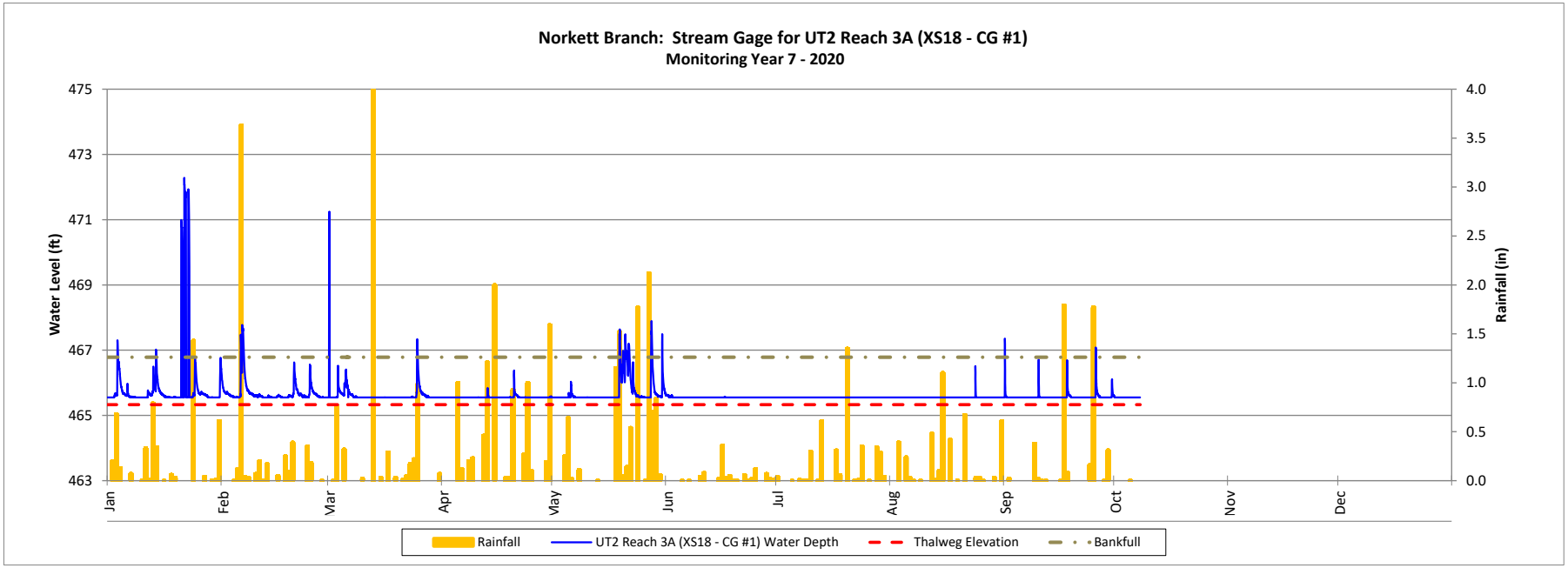
[1] Two bankfull events were recorded on UT1 when the site received more than 5 inches of rain from the remnants of Hurricane Florence (9/16/18).

Table 14. Verification of Bankfull Events
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

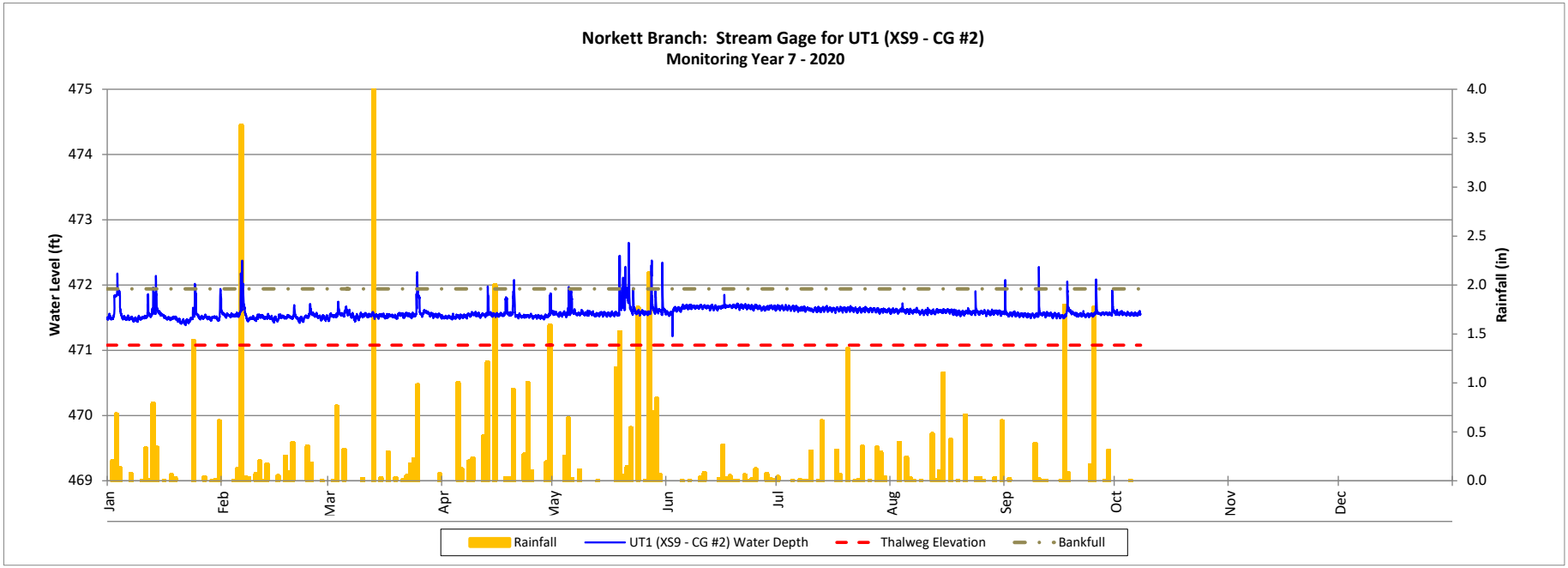
Monitoring Year	Reach	Date of Data Collection	Date of Occurrence	Method
MY6	UT2 Reach 3A (CG #1 XS18)	3/7/2019	Unknown	Crest Gage
	UT1 (CG #2 XS9)	3/7/2019	Unknown	Crest Gage
		6/3/2019	5/4/2019	Stream Gage, Crest Gage
	Norkett Branch Reach 2 (CG #3 XS6)	3/7/2019	Unknown	Crest Gage
		6/3/2019	5/4/2019	Stream Gage, Crest Gage
MY7	UT2 Reach 3A (CG #1 XS18)	3/6/2020	1/3/2020	Stream Gage
		3/6/2020	1/14/2020	Stream Gage
		3/6/2020	1/21/2020 - 1/23/2020	Stream Gage
		3/6/2020	2/6/2020 - 2/7/2020	Stream Gage
		3/6/2020	3/1/2020	Stream Gage
		4/30/2020	3/25/2020	Stream Gage, Crest Gage
		6/2/2020	5/19/2020 - 5/21/2020	Stream Gage
		6/2/2020	5/27/2020 - 5/28/2020	Stream Gage
		6/2/2020	5/30/2020	Stream Gage, Crest Gage
		10/8/2020	8/31/2020	Stream Gage
		10/8/2020	9/25/2020	Stream Gage, Crest Gage
	UT1 (CG #2 XS9)	3/6/2020	1/3/2020	Stream Gage
		3/6/2020	1/13/2020 - 1/14/2020	Stream Gage
		3/6/2020	1/24/2020	Stream Gage
		3/6/2020	1/31/2020	Stream Gage
		3/6/2020	2/6/2020	Stream Gage
		4/30/2020	3/25/2020	Stream Gage
		4/30/2020	4/13/2020	Stream Gage
		4/30/2020	4/20/2020	Stream Gage
		6/2/2020	5/5/2020	Stream Gage
		6/2/2020	5/19/2020 - 5/22/2020	Stream Gage
		6/2/2020	5/27/2020	Stream Gage
		6/2/2020	5/30/2020	Stream Gage
		10/8/2020	8/31/2020	Stream Gage
		10/8/2020	9/9/2020	Stream Gage
		10/8/2020	9/17/2020	Stream Gage
		10/8/2020	9/25/2020	Stream Gage
	Norkett Branch Reach 2 (CG #3 XS6)	3/6/2020	1/3/2020 - 1/4/2020	Stream Gage
		3/6/2020	1/14/2020	Stream Gage
		3/6/2020	1/31/2020	Stream Gage
		3/6/2020	2/6/2020 - 2/7/2020	Stream Gage
		4/30/2020	3/25/2020	Stream Gage, Crest Gage
		6/2/2020	5/19/2020 - 5/21/2020	Stream Gage
		6/2/2020	5/27/2020 - 5/28/2020	Stream Gage
		6/2/2020	5/30/2020	Stream Gage

[1] Two bankfull events were recorded on UT1 when the site received more than 5 inches of rain from the remnants of Hurricane Florence (9/16/18).

Recorded In-stream Flow Events
Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

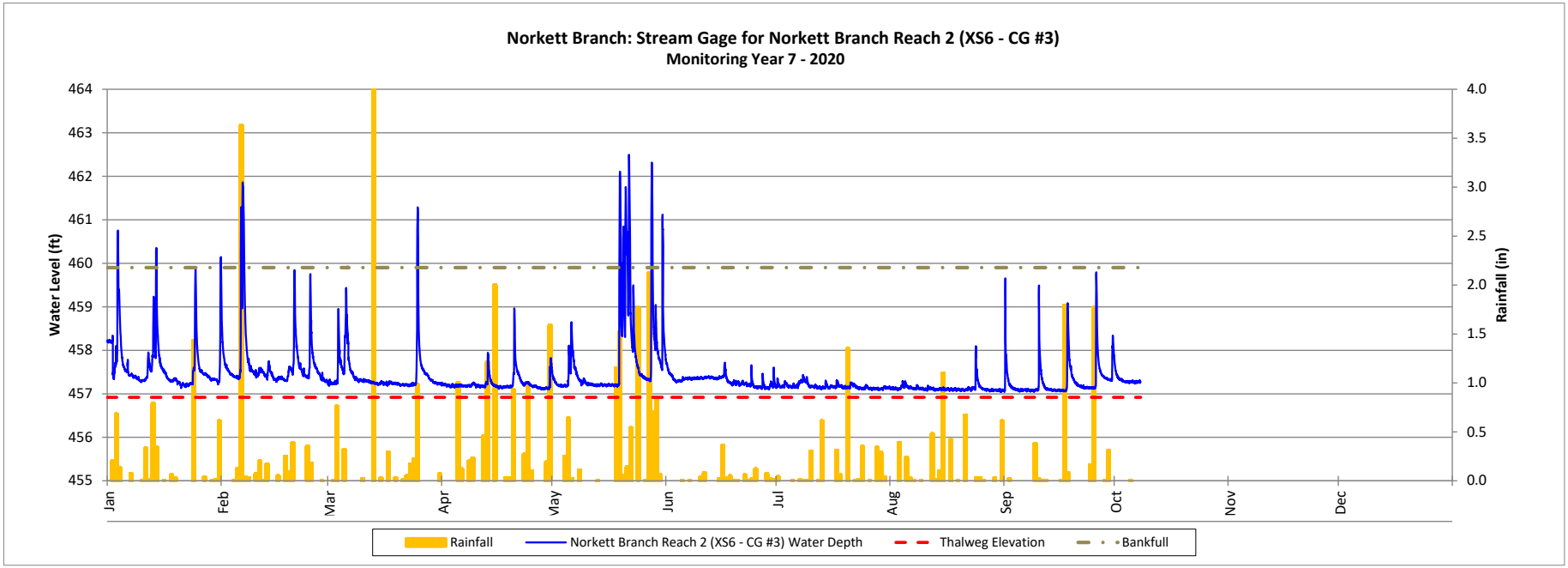


Recorded In-stream Flow Events
Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020



Recorded In-stream Flow Events

Norkett Branch Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

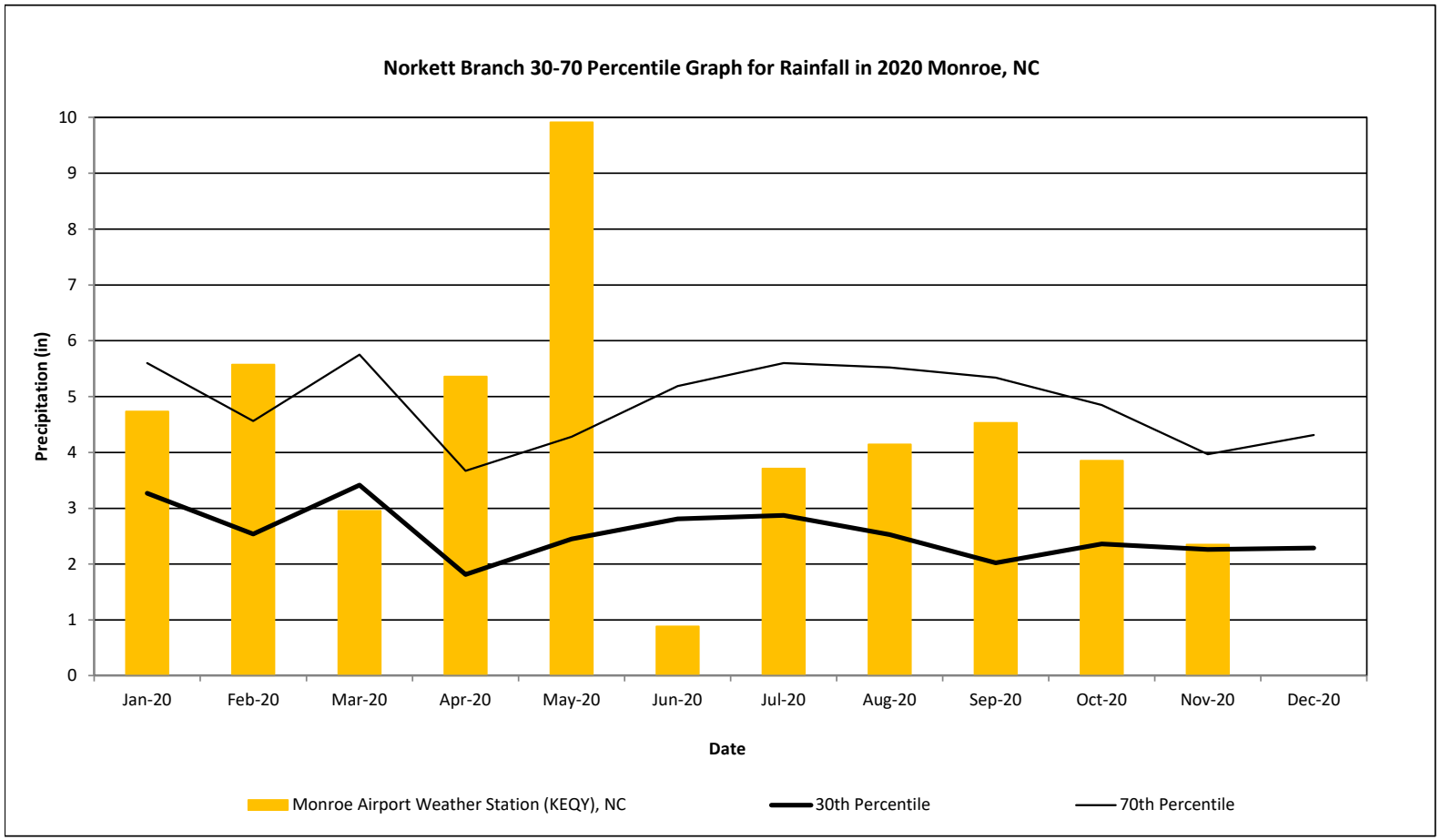


Monthly Rainfall Plot

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

Monitoring Year 7 - 2020



30th and 70th percentile rainfall data collected from weather station Monroe 2 SE, in Monroe, NC (USDA, 2000).

APPENDIX 6. Water Quality BMPs

Table 15. Water Quality Sampling Results
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020

Monitoring Year	Location	Sample Collection Date	TN (mg/L)	NO_x (mg/L)	TKN (mg/L)	TP (mg/L)	TSS (mg/L)	FC (CFU/100mL)	Conductivity (µS/cm)	Temp °C	pH
MY1	SPSC BMP Inlet	4/22/2014 (Baseflow)	1.1	0.2	0.9	0.4	16.0	31	151.0	21.4	7.0
	SPSC BMP Outlet		0.9	DL	0.9	0.5	25.0	11	127.6	23.5	7.3
	PW BMP Inlet		DL	DL	0.5	0.2	11.0	68	65.0	25.3	7.4
	PW BMP Outlet		DL	0.1	DL	0.3	39.0	110	69.8	26.2	7.0
	SPSC BMP Inlet	5/15/2014	100.0	50.0	50.0	19.0	970.0	20000	1230.0	21.0	6.8
	SPSC BMP Outlet		47.0	18.0	29.0	7.0	410.0	20000	1185.0	21.0	6.9
	PW BMP Inlet		2.5	0.2	2.3	0.6	15.0	5600	95.5	22.9	6.9
	PW BMP Outlet		1.8	0.2	1.6	0.5	150.0	2100	11.3	23.8	6.9
	SPSC BMP Inlet	10/15/2014	5.5	1.3	4.2	5.4	27.0	490	437.0	19.8	7.1
	SPSC BMP Outlet		1.8	0.2	1.7	0.7	10.0	2300	333.0	21.0	7.1
	PW BMP Inlet		NF								
	PW BMP Outlet										
	SPSC BMP Inlet	11/26/2014	7.2	2.2	5.0	5.0	30.0	HT	201.1	10.1	7.2
	SPSC BMP Outlet		6.5	2.0	4.6	4.9	32.0		196.2	10.0	7.2
	PW BMP Inlet		2.8	1.1	1.7	0.6	6.6		57.8	11.2	6.7
	PW BMP Outlet		2.6	1.0	1.7	1.0	6.3		82.0	11.1	6.8
MY2	SPSC BMP Inlet	3/30/2015	1.2	0.16	1.0	0.3	6.2	120	277.8	10.0	7.1
	SPSC BMP Outlet		1.5	0.12	1.3	0.3	DL	DL	329.9	10.5	7.2
	PW BMP Inlet		DL	0.12	DL	0.3	16.0	120	180.0	9.5	7.3
	PW BMP Outlet		1.2	0.12	1.1	0.2	9.0	64	184.0	11.8	8.1
	SPSC BMP Inlet	10/28/2015	3.8	1.3	2.5	1.2	16.0	150.0	141.9	17.5	6.6
	SPSC BMP Outlet		4.5	2.4	2.1	1.0	20.0	140.0	154.8	17.0	6.4
	PW BMP Inlet		2.9	1.1	1.8	0.8	48.0	DL	97.7	17.1	4.2
	PW BMP Outlet		1.7	DL	1.7	0.3	7.6	DL	92.7	18.7	7.2
MY3	SPSC BMP Inlet	9/3/2016	13.0	1.6	11.0	5.2	140.0	HT	---	---	---
	SPSC BMP Outlet		8.5	5.2	3.2	2.5	DL		---	---	---
	PW BMP Inlet		2.3	1.0	1.3	0.9	6.7		---	---	---
	PW BMP Outlet		NF								
MY4	SPSC BMP Inlet	4/4/2017	5.9	0.7	5.2	0.2	480.0	---	---	---	---
	SPSC BMP Outlet		3.2	1.2	2.1	---	---	---	---	---	---
	PW BMP Inlet		6.1	1.4	4.7	0.3	840.0	---	---	---	---
	PW BMP Outlet		5.3	0.3	5.0	DL	150.0	---	---	---	---
	SPSC BMP Inlet	5/23/2017	5.2	1.3	4.0	2.1	25.0	---	170.0	---	6.7
	SPSC BMP Outlet		3.5	0.6	2.9	1.5	30.0	---	---	---	6.6
	PW BMP Inlet		2.6	0.4	2.2	0.2	21.0	---	42.0	---	5.8
	PW BMP Outlet		1.3	DL	1.3	0.3	3.5	---	51.0	---	6.4
MY5	SPSC BMP Inlet	3/12/2018	5.9	0.5	5.3	1.6	1700.0	---	200.0	---	7.1
	SPSC BMP Outlet		3.6	DL	3.6	2.1	540.0	---	180.0	---	7.2
	PW BMP Inlet		1.3	0.3	1.0	0.5	720.0	---	300.0	---	6.5
	PW BMP Outlet		1.4	0.4	0.9	0.2	60.0	---	96.0	---	6.6
	SPSC BMP Inlet	8/6/2018	11.0	0.4	11.0	1.7	540.0	---	96.0	---	6.2
	SPSC BMP Outlet		1.9	1.0	0.9	0.2	---	---	26.0	---	6.8
	PW BMP Inlet		2.5	0.8	1.8	1.2	390.0	---	61.0	---	6.2
	PW BMP Outlet		17.0	0.3	17.0	0.2	---	---	22.0	---	6.5
MY6	SPSC BMP Inlet	3/26/2019	2.3	0.6	1.7	0.5	3500.0	---	160.0	---	6.6
	SPSC BMP Outlet		1.5	0.4	1.0	0.4	570.0	---	200.0	---	6.8
	PW BMP Inlet		5.2	0.1	5.1	0.3	2500.0	---	330.0	---	6.5
	PW BMP Outlet		5.5	DL	5.5	0.3	120.0	---	85.0	---	6.0
	SPSC BMP Inlet	8/5/2019	130.0	DL	130.0	37.0	5000[A]	---	340.0	---	6.3
	SPSC BMP Outlet		9.5	5.1	4.3	2.1	220.0	---	140.0	---	6.2
	PW BMP Inlet		6.9	3.1	3.8	1.0	630.0	---	76.0	---	5.6
	PW BMP Outlet		4.6	1.5	3.1	0.7	40.0	---	67.0	---	5.4
MY7	SPSC BMP Inlet	4/30/2020	76.0	58.0	19.0	4.9	190.0	---	1100.0	---	6.8
	SPSC BMP Outlet		8.0	2.0	6.0	2.3	610.0	---	330.0	---	6.8
	PW BMP Inlet		5.3	0.8	4.5	0.8	3800.0	---	140.0	---	6.2
	PW BMP Outlet		12.0	1.9	9.8	1.2	120.0	---	83.0	---	6.2
	SPSC BMP Inlet	9/18/2020	1.5	0.6	0.9	2.0	1400.0	---	180.0	---	6.7
	SPSC BMP Outlet		5.6	0.5	5.0	1.2	600.0	---	170.0	---	7.6
	PW BMP Inlet		3.1	1.0	2.1	1.2	150.0	---	120.0	---	6.3
	PW BMP Outlet		2.3	0.8	1.5	0.4	44.0	---	120.0	---	5.8

DL: Parameter was below the detection limit

NF: No flow was available for sample collection/insufficient sample volume

HT: Laboratory analysis was not available due to the short holding time for this parameter

A: Sample residue exceeds detection limit. Result is an estimate.

--- : Data was not provided

Table 16. Pollutant Removal Rates

Norkett Branch Stream Mitigation Site

DMS Project No. 95360

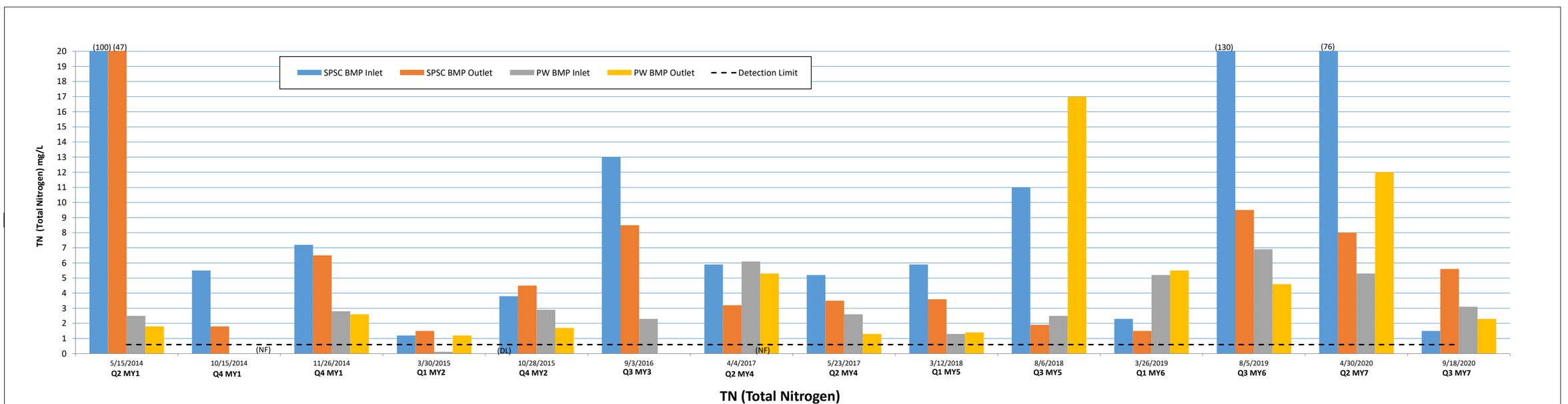
Monitoring Year 7 - 2020

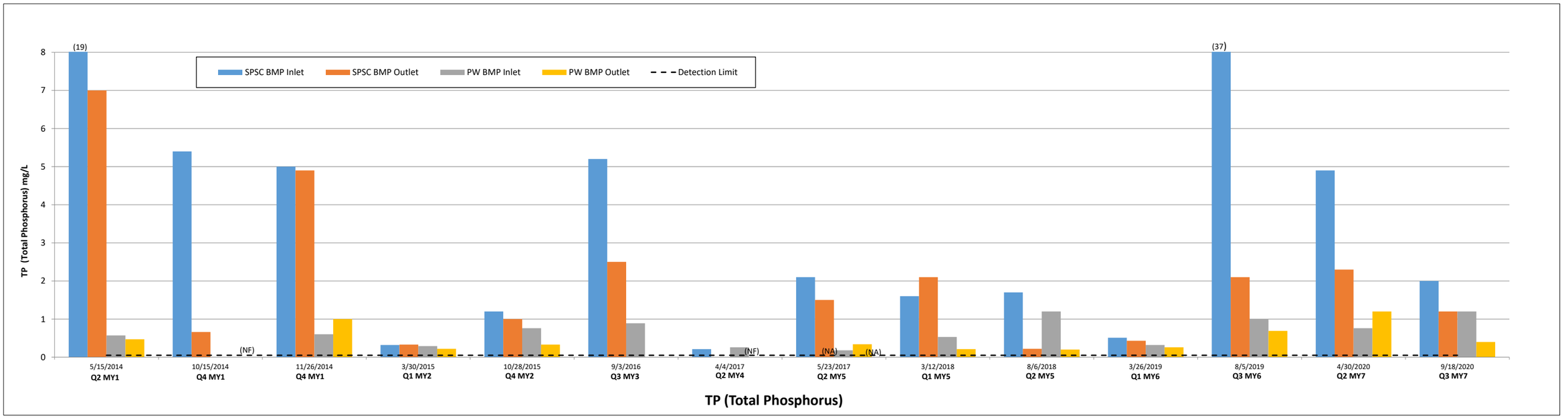
Monitoring Year	Location	Sample Collection Date	Percent Reduction[1]					
			TN	NO_x	TKN	TP	TSS	FC
MY1	SPSC BMP	4/22/2014 (Baseflow)	18%	57%	1%	-29%	-56%	65%
	PW BMP		N/A	N/A	0%	-74%	-255%	-62%
	SPSC BMP	5/15/2014	53%	64%	42%	63%	58%	0%
	PW BMP		28%	27%	30%	18%	-900%	63%
	SPSC BMP	10/15/2014	67%	88%	60%	88%	63%	-369%
	PW BMP		N/A					
	SPSC BMP	11/26/2014	10%	9%	8%	2%	-7%	N/A
	PW BMP		7%	14%	0%	-67%	5%	
MY2	SPSC BMP	3/30/2015	-25%	25%	-30%	-3%	N/A	N/A
	PW BMP		N/A	0%	N/A	24%	44%	47%
	SPSC BMP	10/28/2015	-18%	-85%	16%	17%	-25%	7%
	PW BMP		41%	N/A	6%	57%	84%	N/A
MY3	SPSC BMP	9/3/2016	35%	-225%	71%	52%	N/A	N/A
	PW BMP		N/A	N/A	N/A	N/A	N/A	N/A
MY4	SPSC BMP	4/4/2017	46%	-67%	60%	N/A	N/A	N/A
	PW BMP		13%	78%	-6%	N/A	82%	N/A
	SPSC BMP	5/23/2017	33%	55%	28%	29%	-20%	N/A
	PW BMP		50%	N/A	41%	-89%	83%	N/A
MY5	SPSC BMP	3/12/2018	83%	N/A	92%	87%	N/A	N/A
	PW BMP		-580%	56%	-844%	83%	N/A	N/A
	SPSC BMP	8/6/2018	35%	24%	41%	16%	N/A	N/A
	PW BMP		-6%	N/A	-8%	19%	N/A	N/A
MY6	SPSC BMP	3/26/2019	35%	24%	41%	16%	84%	N/A
	PW BMP		-6%	N/A	-8%	19%	95%	N/A
	SPSC BMP	8/5/2019	93%	N/A	97%	94%	96%	N/A
	PW BMP		33%	52%	18%	31%	94%	N/A
MY7	SPSC BMP	4/30/2020	89%	97%	68%	53%	-221%	N/A
	PW BMP		-126%	-141%	-118%	-58%	97%	N/A
	SPSC BMP	9/18/2020	-273%	4%	-432%	40%	57%	N/A
	PW BMP		26%	16%	29%	67%	71%	N/A

[1]Positive values indicate a reduction in pollutant concentration from inlet to outlet samples, negative values indicate an increase in concentration

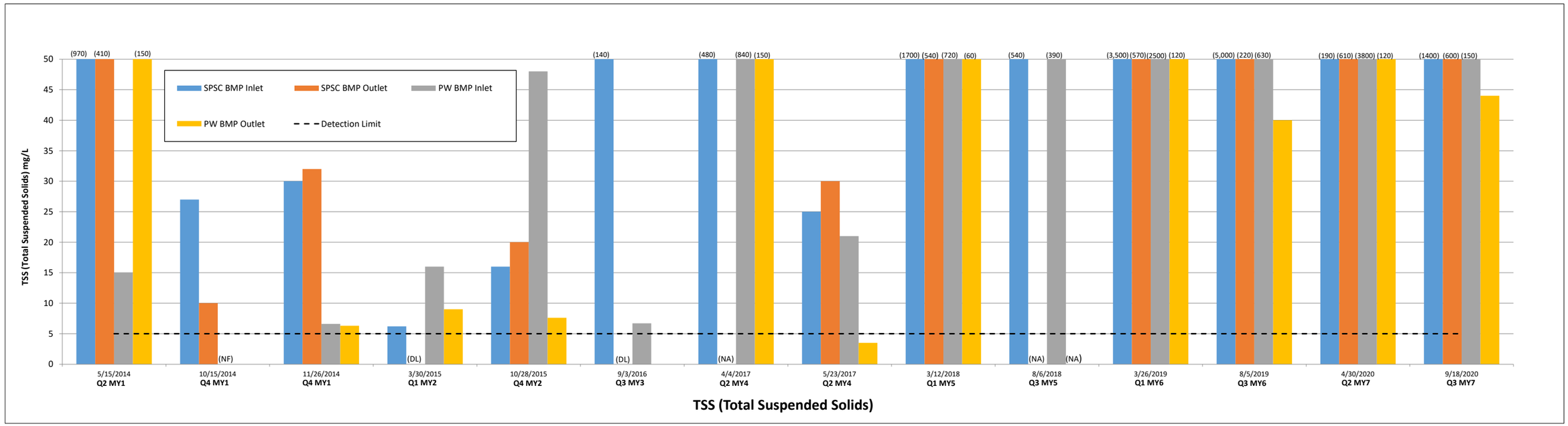
N/A: Metric cannot be calculated

Water Quality Data
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020



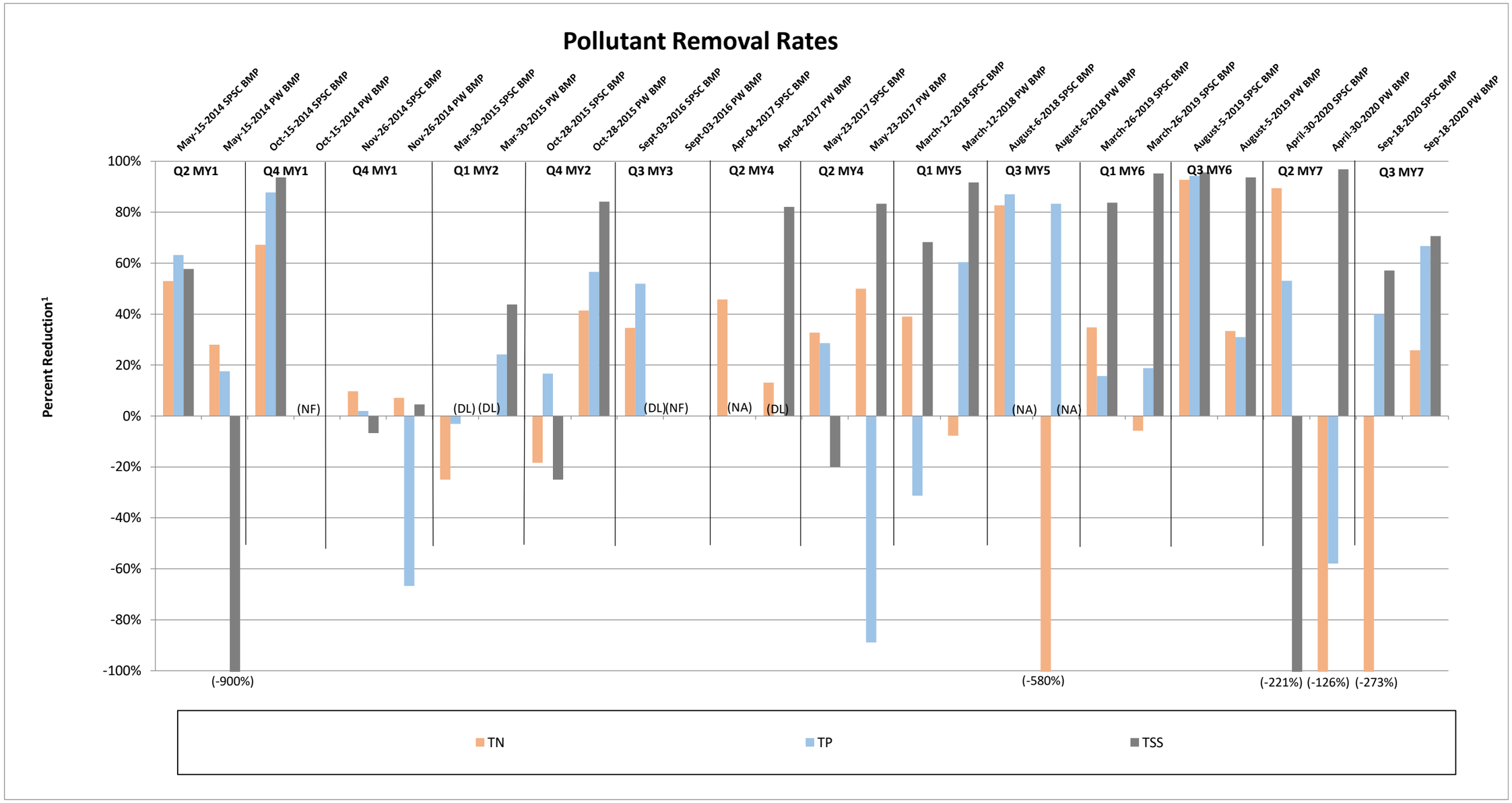


Water Quality Data
Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020



Pollutant Removal Plot

Norkett Branch Stream Mitigation Site
DMS Project No. 95360
Monitoring Year 7 - 2020



DL: Parameter was below the detection limit

NF: No flow was available for sample collection/insufficient sample volume

NA: No data available at inlet and/or outlet sample for comparison

[1]Positive values indicate a reduction in pollutant concentration from inlet to outlet samples, negative values indicate an increase in concentration

APPENDIX 7. Additional Data Requested by IRT during 2020 Credit Release Meeting

Wetland Data Point Notes and Photographs

Norkett Branch Mitigation Site – Wetland Data Point **4/30/2020**
Notes and Photographs **Ian Eckardt**

BH – 1

Depth (Inches)	**Matrix Color**	**Redox Color**	**Texture**	Notes
0 – 3	10 YR 4/2 (100%)	N/A	Silt loam	No redox, organic materials common
3 – 9	10 YR 5/2 (75%)	5YR 5/6 (25%)	Silt loam	Meets F3 indicator
9 - 13	10 YR 5/2 (85%)	5YR 5/6 (15%)	Silt loam	

Hydrology indicators present: Inundation (1”), saturation (4”), iron oxidizing bacteria, drift deposits

BH – 1 (Vicinity)

BH – 1

BH – 2 (Very similar soils and hydrology to BH -1)

BH – 2 (Vicinity photo / No soil boring photo taken)

BH - 3

Depth (Inches)	**Matrix Color**	**Redox Color**	**Texture**	Notes
0 – 2	10 YR 4/3 (100%)	N/A	Silt loam	No redox
2 – 7	10 YR 5/3 (80%)	5YR 4/6 (20%)	Silt loam	
7 - 13	2.5Y 7/2 (75%)	10YR 6/6 (25%)	Silt loam	Meets F3 indicator

Hydrology indicators present: Drift deposits

BH – 3 (No vicinity photo taken)

BH – 4 (Similar to BH-3)

Depth (Inches)	**Matrix Color**	**Redox Color**	**Texture**	Notes
0 – 3	10 YR 5/2 (90%)	5YR 4/6 (10%)	Silt loam	Meets F3 indicator
3 – 8	2.5Y 7/2 (70%)	10YR 5/6 (30%)	Loam	Meets F3 indicator
8 – 13	10YR 6/2 (70%)	10YR 5/6 (30%)	Loam	

Hydrology indicators present: Drift deposits

BH – 4 (Vicinity)

BH – 4

Stream Photographs

Norkett Branch Reach 1 (Station 100+00 to 103+00)
Immediately Below Cox Stream Violation
Monitoring Year 7

	
Station 100+00 – looking upstream above project *(04/30/2020)*	**Station 100+00** – looking downstream *(04/30/2020)*
	
Station 100+50 – looking upstream *(04/30/2020)*	**Station 100+50** – looking downstream *(04/30/2020)*
	
Station 103+00 – looking upstream *(04/30/2020)*	**Station 103+00** – looking downstream *(04/30/2020)*