As-built Baseline Monitoring Report Little Buffalo Creek Stream Mitigation Project NCDENR-DMS Project Number: 94147 Contract Number: 2029 USACE Action ID: 2014-0386 DWR Permit: 14-0129 Cabarrus County, North Carolina Data collection: December 2014 Submitted: July 2015





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Division of Mitigation Services

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Executive Summary

The Little Buffalo Creek Stream Mitigation site is located in Cabarrus County, North Carolina, two miles southwest of the Town of Gold Hill, and 12 miles east of Kannapolis. The site encompasses approximately 47 acres of former cattle pasture, crop land and riparian forest along Little Buffalo Creek and portions of seven unnamed tributaries (Figure 1).

Through the North Carolina Ecosystem Enhancement Program full-delivery process, the Louis Berger Group, Inc. (Louis Berger) is under contract to generate a total of 6,170 stream mitigation units through stream restoration, enhancement and preservation of the above listed streams. The goal of the project is to address stressors identified in the Targeted Local Watershed (TLW) such as improving water quality, aquatic and terrestrial habitat, and flood flow attenuation. The goals were addressed by restoring stable channel morphology and sediment transport capacity, improving stream bed form and habitat, improving stream bank stabilization, removing cattle, and providing riparian buffer restoration and enhancement by re-establishing a native plant community within the easement and removing invasive plant species.

Historic land use at the site had consisted primarily of ranching activities, including cattle access to the stream and riparian zone. Several reaches of the stream have bedrock in their streambed and vertical migration of the stream has been confined to a small percentage of the project site.

The Little Buffalo Creek Mitigation Site consists of six reaches along the mainstem and seven unnamed tributaries (UTs). The mainstem of Little Buffalo Creek as well as UT 4 and UT 7 are perennial streams. The remainders of the UTs are intermittent stream associated with groundwater seeps. This stream mitigation project includes reaches of restoration, enhancement, and preservation along the mainstem and its associated UTs. In total, the Site will provide 13,362 linear feet of restoration, enhancement, and preservation.

Restoration activities will create a new, stable stream channel with the appropriate dimension, pattern, and profile to transport perennial flow and sediment, and will re-connect the stream to its floodplain. Reestablishment of vegetation and cattle exclusion will also occur as part of the restoration activities.

Enhancement activities will include reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor and excluding cattle with fencing. In the case of enhancement level I the activities will also include reshaping or relocating the bed and banks.

Preservation will be conducted within portions of the stream corridors that have intact riparian forests and stable stream reaches.

At a 1:1 ratio for restoration, 1.5:1 for enhancement level I, 2.5:1 for enhancement level II, and a 5:1 ratio for preservation, the NCDENR-DMS will receive approximately 6,411 stream mitigation units from the Site. In addition, approximately 47 acres of riparian buffer will be protected within a conservation easement.



1.0 Project Goals

The goals of the proposed Little Buffalo Creek Stream Restoration project include, but are not limited to, the enhancement of water quality and aquatic/terrestrial habitat, stream stability improvement, and erosion reduction. The uplift of these stream functions specifically requires:

- Protecting and improving water quality through the removal or minimization of the biological, chemical, and physical stressors;
 - reducing sediment input into the stream from erosion,
 - reducing non-point pollutant impacts by removing livestock access (including restoring forested buffer,
 - protecting headwater springs
- Improving aquatic and terrestrial wildlife habitat;
 - moderating stream water temperatures by improving canopy coverage over the channel; and,
 - restoring, enhancing, reconnecting, and protecting valuable wildlife habitat.
- Restore floodplain connectivity
 - re-establishing a floodplain connection thereby dissipating energy associated with flood flows.

In addition to the ecological uplift that the project will provide to the Site through the improvement of the stream functions, this project establishes the following environmentally advantageous goals:

- > providing a water source for livestock removed from the stream and riparian corridor;
- > reducing the number of locations that livestock are able to cross the stream; and
- > providing a safe and environmentally appropriate stream crossing points for livestock.

In order to achieve the project goals, Berger proposes to accomplish the following objectives:

- fence the cattle out of the stream and riparian corridor,
- > remove invasive vegetative species from the riparian corridor,
- restore and enhance unstable portions of the stream,
- > preserve the stream channel and banks through a conservation easement, and
- > plant the riparian corridor with native tree and shrub vegetation.

The expected ecological benefits and goals associated with the Little Buffalo Creek site mitigation plan serve to meet objectives consistent with the resource protection objectives detailed in the Yadkin-Pee Dee River Basinwide Water Quality Plan, 2008.

2.0 Project Success Criteria

2.1 Streams

For stream hydrology, a minimum of two bankfull events must be documented within the standard 5year monitoring period. In order for the monitoring to be considered complete, the two verification events must occur in separate monitoring years. All of the morphologic and channel stability parameters will be evaluated in the context of hydrologic events to which the system is exposed.

- Dimension General maintenance of a stable cross-section and hydrologic access to the floodplain features over the course of the monitoring period will generally represent success in dimensional stability. For stream dimension, cross-sectional overlays and key parameters such as cross-sectional area, and the channel's width to depth ratios should demonstrate relative stability in order to be deemed successful.
- Pattern Pattern features should show little adjustment over the standard 5 year monitoring period. Rates of lateral migration need to be moderate.
- Profile For the channels' profile, the reach under assessment should not demonstrate any trends in thalweg aggradation or degradation over any significant continuous portion of its length. Over the monitoring period, the profile should also demonstrate the maintenance or development of bedform (facets) more in keeping with reference level diversity and distributions for the stream type in question. It should also provide a meaningful contrast in terms of bedform diversity against the pre-existing condition. Bedform distributions, riffle/pool lengths and slopes will vary, but should do so with maintenance around design distributions. This requires that the majority of pools are maintained at greater depths with lower water surface slopes and riffles are shallow with greater water surface slopes.
- Substrate and Sediment Transport Substrate measurements should indicate progression towards, or maintenance of the known distributions from the design phase. Sediment Transport should be deemed successful in by absence of any significant trend in the aggradation or depositional potential of the channel.

2.2 Vegetation

Survival of woody species planted at mitigation sites should be at least 320 stems/acre through year three. A 10 percent mortality rate will be accepted in year four (288 stems/acre) and another 10 percent in year five resulting in a required survival rate of 260 trees/acre through year five. This is consistent with Wilmington District (1993) guidance for wetland mitigation (USACE 2003).

3.0 **Project Description**

Louis Berger is contracted with Division of Mitigation Services (DMS) to provide 6,170 stream mitigation units through the implementation of the Little Buffalo Creek Stream Mitigation Project. The Little Buffalo Creek Stream Mitigation Site (Site) is located in Cabarrus County, North Carolina, approximately 12 miles east of Kannapolis and two miles southwest of Gold Hill. The Site is located in the Rocky River basin of the Yadkin-Pee Dee River basin (Figure 1). The Mitigation Plan estimated approximately 6,679 stream mitigation units could be provided to DMS to compensate for projects occurring within the Yadkin-Pee Dee River basin. Subsequent to the Plan approval and prior to and during construction, design modifications were made that has reduced the total anticipated stream mitigation units to 6,411.

The original stream channel has been altered by years of ranching activities, including cattle access to the stream and riparian zone. Several reaches of the stream have bedrock in their streambed and vertical migration of the stream has been confined to a small percentage of the project site. The stability in the vertical direction coupled with the loss of vegetation along the stream due to cattle accessing the stream via the streambank have led to streambank failures and lateral stream migration on several stream reaches throughout the Site.

4.0 Mitigation Components

A detailed summary of the project components is available in Appendix A, Table 1, and illustrated in Appendix B: Figure 2. Restoration components are included in Reaches 1 and 3 and in UTs 2, 3, 7, and 8. Preservation components are included in Reach 6 and UT 2. Enhancement Level I components are included in Reaches 4 and 5 and in UTs 3 and 4. Enhancement Level II components are included in Reaches 1, 2, 3, 4, and 5 and in UTs 1, 2, 3, 4, 5, and 6.

5.0 Design & Approach

The project components described below are illustrated in Appendix B: Figure 2 and Appendix E. The linear feet of each stream restoration, enhancement or preservation component is summarized in Table 1.

Reach 1 – Restoration has included re-aligning the stream channel for a more natural flow for 377 feet. Two log vanes were placed along the realignment to slow the energy of the water. This restoration will bring the stream closer to its original width and landscape position, restore sinuosity, and alleviate the instability associated with the turn. The old channel has been filled. The remaining 1928 feet of the stream length has undergone enhancement level II, which included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence within the easement has been removed.

Reach 2 – Only enhancement level II is proposed for 1244 feet on this reach. This included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence within the easement has been removed.

Reach 3 – Restoration has aligned a new channel for 244 feet where the stream historically existed along the center of the valley floor. The old channel has been filled and the bank repaired. Just upstream of the restoration segment, the channel has over-widened and undercut the east bank. Root wads in two sections of the turning channel at this location of the east bank have been placed to help direct preferential flow towards the center of the channel and reinforce the bank from the velocities of the channel undercutting the bank. The remaining 839 feet of stream has undergone enhancement level II, which included removal of invasive plant species and establishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

Reach 4 – Enhancement level I is proposed for the 151 foot segment that contains concrete slabs along the right stream bank just upstream of the confluence of UT 3. The concrete has been removed and the stream bank reestablished with vegetation at a more gradual slope. The remaining 818 feet of stream has undergone enhancement level II, which included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

Reach 5 – Only enhancement level II is proposed for 826 feet on this reach. This included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

Reach 6 – Preservation is proposed for this 2,043 foot reach. The easement boundary has been fenced and any pre-existing fence has been removed from within the easement.

UT 1 – Only enhancement level II is proposed for 111 feet on this reach. This included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

UT 2 – The upper 335 feet has been preserved, and a 49 foot section has had the channel profile and banks restored with the removal of a 12-inch concrete pipe for restoration. The remaining 567 feet has undergone enhancement level II. This included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

UT 3 – This reach has short segments of restoration through a former pond and at pipe removals, followed by sections of either enhancement level I or enhancement level II. Moving from upstream to downstream, the first 215feet consists of restoration where the segment was previously ponded and there is no existing concentrated flow path. The stream's dimension, pattern, and profile have been established throughout this segment by cutting a channel through the formerly ponded area. Additionally, a pipe section has been removed from this section. The next 252 feet consists of enhancement level II and included removal of invasive plant species and establishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence within the easement has been removed. The following 555 feet consists of sections of enhancement level I and restoration. This reach had down cut severely and become entrenched. The stream banks have been laid back throughout this reach in order to reduce the shear stress along the stream banks. These actions will affect the stream's dimension and pattern. Additionally, 19 feet of restoration was performed in a section where the profile had been adjusted and a pipe section was been removed as well. In total, this 555 foot section consists of 536 feet of enhancement level I and 19 feet of restoration. The following 107 feet consists of enhancement level II followed by a section of 26 feet of restoration where a pipe was removed and the profile and stream banks were reestablished. The lower part of UT 3 consists of three sections, a 250 foot section of enhancement level II, followed by a 45 foot section of restoration for the removal of another pipe and reestablishment of the channel profile and banks, and ending with 25 feet of enhancement level II.

UT 4 – The upper 421 feet is enhancement level II. This included removal of invasive plant species and establishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence has been removed from the easement. The lower 410 feet is enhancement level I. The stream banks have been laid back throughout this reach in order to reduce the shear stress along the stream banks.

UT 5 – Only enhancement level II is proposed for 184 feet on this reach. This included removal of invasive plant species and establishing native riparian vegetation within a 50-foot easement along each

bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

UT 6 – Only enhancement level II is proposed for 151 feet on this reach. This included removal of invasive plant species and establishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing. Any pre-existing fence has been removed from the easement.

UT 7 – Enhancement level I is proposed for the first 147 feet of UT-7. The existing channel has been plugged at the downstream section of the first enhancement section, and a large pool was established to provide backwater through the culvert and establish adequate flows to remove a fish barrier at the Old Mine Road culvert. Restoration is proposed for the remaining 980 feet of UT-7. This reach had been straightened and has downcut several feet until it has reached bedrock. UT-7 has been entirely reconstructed on its original floodplain and rejoins the mainstem of Little Buffalo Creek upstream of the prior confluence. The old channel has been plugged at specified locations and filled with the dirt excavated from the new channel. Areas of existing channel have been left open between the plugs to develop new amphibian ponds. Two rock cross vanes are proposed, one along the upper section and one below the new confluence with UT-8, an unnamed tributary to UT 7. A series of 7 step pools have been installed along the lower segment for approximately 90 feet to account for the drop in elevation. The segments of enhancement and restoration included removal of invasive plant species and reestablishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor, and excluding cattle with fencing where required. Any pre-existing fence has been removed from the easement.

UT 8 – The entire 62 feet of UT 8 associated with this project is proposed as restoration. The existing UT 8 channel has been plugged, and a new channel with appropriate profile and bank connections developed at a new confluence point with UT 7 just upstream of the previously existing confluence. Restoration included removal of invasive plant species and establishing native riparian vegetation within a 50-foot easement along each bank of the stream corridor and replacing an incised channel with appropriate dimension and connection with the floodplain. Any pre-existing fence has been removed from the easement.

6.0 Timeframe

Appendix A: Table 2 presents a detailed description of the timeframe for all project activities and reporting history completed to date.

7.0 Significant Deviations & Post-Construction Issues

Several deviations from the original proposed design were necessary to address site conditions encountered during construction. The design changes included profile changes, channel re-alignments, and structure changes. These deviations were the result of:

- Changes required due to errors in the initial existing conditions survey;
- Natural site constraints such as encountering bedrock during excavation;
- Engineering design aspects that were noticed in the functioning sections of LBC that would help the functionality of the proposed restoration activities.

Reach 1- The proposed sections of enhancement level II and restoration were modified to only account for the sections of restoration in Reach 1 where grading occurred during construction. In addition, the profile of the restoration reach was raised and the max bankfull depth decreased by .19 feet (constructed max bankfull depth of 1.81 feet) within the straight and curve pools. This change occurred due to the high elevation of bedrock in the vicinity of restoration and to meet characteristic slopes of the C4 channel type on top of the bedrock table. Inner berms were also established to contain low flow conditions of the restoration channel. As construction began, it was determined that the proposed bankfull width was similar to the existing bankfull width of the channel, but functioning sections of LBC had vegetated berms within the channel that contained low flow conditions and established low flow riffle-pool patterns. Inner vegetated berms were added to the cross section to establish this existing low flow characteristic of LBC versus the overly wide designed channel bottom that would lose these pattern characteristics at normal conditions.

Reach 3 – The proposed sections of enhancement level II and restoration were modified to account for the sections of restoration in Reach 3 where grading occurred during construction. In addition, the profile of the restoration reach was raised while maintaining the original bankfull capacity within the proposed cross-sections. This change occurred due to the high elevation of bedrock in the vicinity of restoration. Inner berms were also established to contain low flow conditions of the restoration channel. As construction began, it was determined that the proposed bankfull width was similar to the existing bankfull width of the channel, but functioning sections of LBC had vegetated berms within the channel that contained low flow conditions and established low flow riffle-pool patterns. Inner vegetated berms were added to the cross section to establish this existing low flow characteristic of LBC versus the overly wide designed channel bottom that would lose these pattern characteristics at normal conditions. Lastly, two (2) root wads were used to provide bank protection and redirect flow and velocities of flood waters in the channel bend upstream of the restoration section. This area was no longer over-widened, as an inner berm had established, but the flow of high flows were severely undercutting the banks within this bend. Root wads will not only provide protection to the bank and slow/redirect flood waters within the bend, but they can provide additional habitat areas for fish and amphibians within the channel as well.

Reach 4 – The proposed channel pattern and profile were not adjusted within the section of enhancement level I where concrete slabs were removed from the channel bank. The existing pattern and profile of this area has an existing, well-established riffle-pool profile and meandering pattern. Channel dimensions were modified as the concrete slabs were removed, and channel bank slopes were cut back along the right bank.

UT 2 – A 49-foot section of enhancement level II was changed to restoration as a 12 inch concrete pipe was removed, with the channel form, profile and banks re-established.

UT 3 – Multiple segments of UT 3 have been modified to be counted as restoration instead of enhancement level I or enhancement level II for the removal of multiple concrete pipes along the tributary. The channel profile and banks were re-established where sections of pipe have been removed.

UT 7 – The length of restoration was decreased and enhancement level I is now proposed for the first 147-foot section of channel. No grading occurred in the first 147 feet of channel, but the head cut developed at the Old Mine Road culvert was removed by raising the profile of the restoration channel to

match the elevation of the culvert inlet. In addition, the UT 7 and UT 8 channel connection to LBC has been relocated to a point upstream of the original proposed design, with the channel patterns adjusted to make this connection at this upstream point. This was performed due to the proximity of the original proposed channel and LBC. Concerns that flood waters may cut a new channel in the flood plain to tie into the LBC connection that was built grew out of pre-construction site visits. Step pool structures were reduced due to the relocation of the channel connection to LBC. In addition to these deviations, the profile was raised by 2 feet to match the invert of the Old Mine Road culvert. The existing survey from 2008 listed the invert elevation incorrectly, and the error was identified during site layout of this channel.

8.0 Methods and References

Monitoring for stream stability, stream hydrology, and vegetation will be monitored annually for five years following the initial Baseline and As-Built Report. Annual monitoring requirements are based on the U.S. Army Corp of Engineers *Stream Mitigation Guidelines* document (USACE 2003) and supplemental requirements listed in the NCDENR-DMS *Ecosystem Enhancement Program Monitoring Requirements and Performance Standards for Stream and Wetland Mitigation* guidance document dated January 1, 2010 (NCEEP 2010). Establishment, collection, and summarization of data collected will be in accordance with the NCDENR-DMS guidance document *Monitoring Report Template Version 1.3* (1/15/10).

8.1. Stream Channel Stability and Geomorphology

8.1.1 Cross sections

A total of 15 cross-sections, including 9 riffles and 6 pools, were installed upon completion of construction and will be monitored annually. The total number of cross-sections includes five on the mainstem of Little Buffalo Creek, one on Unnamed Tributary (UT) 2, four on UT 3, two on UT 4 and three on UT 7. The total number of cross-sections was reduced from the original estimate in the Mitigation Plan to be consistent with the USACE 2003 Stream Mitigation Guidelines that call for a permanent, monumented cross-section at a rate of 1 cross-section per 20 bankfull channel widths, and approximately 50% of cross-sections occurring at pools and 50% at riffles/ripples. Two additional cross-sections will be added during the initial Monitoring phase within the step-pool portion of UT 7.

8.1.2 Longitudinal Profiles

A total of approximately 2950 feet of channel along 8 longitudinal profiles will be surveyed annually. This includes 335 feet on LBC Reach 1, 225 feet on LBC Reach 3, 112 feet on LBC Reach 4, 51 feet on UT 2, 771 feet on UT 3, 411 feet on UT 4, 977 on UT 7 and 62 feet on UT 8. Data collected from annual monitoring will be compared with the as-built conditions to document the current state of the channel and any trends in the stream profile occurring throughout the monitoring period. The start and finish locations of each cross-section and longitudinal profile reach were marked with rebar and PVC conduit. Both cross-sections and longitudinal profile data will be collected using a total station.

8.2. Stream Hydrology

A total of eight water level gages were installed on site. The gages will be monitored quarterly o document highest stage for the monitoring interval and verify occurrences of bankfull events. In

addition, observations of wrack and depositional features in the floodplain will be documented with photos.

8.3 Vegetation

The CVS-DMS entry tool database was used to calculate the number of monitoring plots needed based on project acreage. Louis Berger established twelve vegetation monitoring plots across all reaches and tributaries of the project area based on guidance given in the *CVS-DMS Protocol for Recording Vegetation Version 4.2* (Lee et al. 2008). Each plot measures approximately 0.025 acres individually and were established and is staked out with bright orange painted rebar and marked with an upright section of PVC pipe. After planting had been completed Louis Berger recorded the coordinates and height of each planted stem within each plot. Photos of each plot were also collected as well as GPS coordinates for plot corners and center points. Year 0 monitoring data was then entered into the CVS-DMS database under the Little Buffalo Creek Stream Mitigation Project (Project ID 94147).

8.4. Permanent Photo Locations

Permanent photo stations were established at each cross-section to digitally document annual conditions of the left and right banks. Each vegetation monitoring plot includes a photo station taken diagonally from a plot corner towards the opposite plot corner.

8.5. Visual Assessment

Visual stream assessments will occur during annual monitoring to summarize performance percentages of morphological and structural features. Visual vegetation assessments will occur to catalog the extent and type of vegetation issue areas as compared to the total planted acreage within the project site.

8.6. Maintenance and Contingency

Louis Berger will monitor the site and shall conduct a physical inspection of the site a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following:

- *Stream* Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, securing of loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where storm water and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head- cutting.
- *Vegetation* Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations.
- *Site Boundaries* Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or

conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis.

• Ford Crossing- Ford crossings within the site may be maintained only as allowed by Conservation Easement or existing easement, deed restrictions, rights of way, or corridor agreements.

8.7 References

Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-DMS Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm)

US Army Corps of Engineers (USACE). 2003. Stream Mitigation Guidelines, April 2003, Wilmington District, NC

Appendix A. Background Tables

Table 1. Project Components and Mitigation Credits Little Buffalo Creek Stream Mitigation Project **NCDENR- DMS Project No. 94147 Mitigation Credit Summations Riparian Wetland** Non-riparian Wetland Buffer Nitrogen Nutrient Offset Phosphorus Nutrient Stream **Overall Mitigation Units** 6,411 0 0 **Project Components Restoration Footage or Acreage Reach ID Restoration Level** Stationing **Existing Feet (linear feet) Restoration or Rest Equiv. Mitigation Ratio** 377 R Restoration Restoration 1:1 Reach 1 10+00 to 33+05 2,305 N/A 1928 EII Enhancement Level II Enhancement Level II Reach 2 33+66 to 46+10 1,244 1244 EII Enhancement Level II N/A Enhancement Level II 244 R Restoration Restoration 1:1 1,083 N/A Reach 3 46+10 to 56+93 839 EII Enhancement Level II Enhancement Level II Enhancement Level I 151 EI Enhancement Level I 969 Reach 4 56+93 to 66+62 N/A 818 EII Enhancement Level II Enhancement Level II Reach 5 66+62 to 74+88 826 826 EII Enhancement Level II N/A Enhancement Level II 75+19 to 82+55; Reach 6 2,043 2.043 P Preservation N/A Preservation 5:1 91+89 to 104+96 10+00 to 11+11 111 UT 1 111 EII Enhancement Level II N/A Enhancement Level II 49 R Restoration 1:1 Restoration 951 567 EII UT 2 10+00 to 19+51 Enhancement Level II N/A Enhancement Level II 335 P Preservation Preservation 5:1 305 R; Restoration Restoration 1:1 UT 3 10+00 to 24+75 1,475 536 EI Enhancement Level I N/A Enhancement Level I 634 EII Enhancement Level II Enhancement Level II 410 EI Enhancement Level I Enhancement Level I UT 4 100+00 to 18+31 831 N/A 421 EII Enhancement Level II Enhancement Level II UT 5 10+00 to 11+84 184 184 EII Enhancement Level II N/A Enhancement Level II UT 6 10+00 to 11+51 151 151 EII Enhancement Level II N/A Enhancement Level II 980 R Restoration Restoration 1:1 UT 7* 10+00 to 21+27 1,127 N/A 147 EI Enhancement Level I Enhancement Level I UT 8* 10+00 to 21+2762 62 R N/A Restoration Restoration 1:1 *UT 8 to UT 7's flow was redirected to join UT 7 at new location, and to remove entrenchment of UT8. Note: Stationing based off of proposed lengths; therefore it may not correspond to existing feet. Also, due to rounding some of the values when added may appear to be 1' short of total, this is purely a pro-Length and Area Summations **Restoration Level** Stream (linear feet) Riparian Wetland (acres) Non-riparian Wetland (acres) Buffer (square feet) Upland (acres) Riverine Non-riverine 2,017 N/A N/A N/A 201,700 N/A Restoration Enhancement N/A N/A N/A N/A N/A N/A 1,244 124,400 Enhancement I N/A N/A N/A N/A 7,723 N/A N/A N/A 772,300 N/A Enhancement II N/A Creation N/A N/A N/A N/A N/A 237,800 Preservation 2,378 N/A N/A N/A N/A High Quality Preservation N/A N/A N/A N/A N/A N/A **BMP Elements** Element Location Purpose/Function Notes

			
Offset			
)	Stream Mitigation Units	No	tes
,			
2.5:1	1148		
2.5:1	498		
	580		
2.5:1	500		
1.5:1	428		
2.5:1	330		
2.J.I			
	409		
2.5:1	44		
2.5:1	343		
1.5:1	916		
2.5:1	910		
1.5:1	440		
2.5:1	442		
2.5:1	74		
2.5:1	60		
1 5 1	1078		
1.5:1	62		
	02		
oduct of	f values being rounded to nea	arest linear fo	ot
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Table 2:	Project Activity and Reporting Hi	story
Little B	uffalo Creek Stream Mitigation Pr	oject
Ν	CDENR-DMS Project No. 94147	
Activity or Report	Data Collection Complete	Completion or Delivery
Technical Proposal	June 2009	August 2008
Categorical Exclusion	February 2010	March 2010
Secure Conservation Easement	March 2010	July 2012
Mitigation Plan	August 2010	April 2014
Final Design – Construction Plans	N/A	May 2014
Construction	June 2014	December 2014
Fencing Installation	June 2014	December 2014
Native Species Planting	December 2014	December 2014
Mitigation Plan / As-built (Year 0 Monitoring – Baseline)	March 2015	July 2015
Year 1 Monitoring		
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Little Buffa	ole 3: Project Contact Table lo Creek Stream Mitigation Project ENR-DMS Project No. 94147
Designer	The Louis Berger Group, Inc.
	1001 Wade Avenue, Suite 400 Raleigh, NC 27605
Primary Project Design POC	Edward Samanns (973) 407-1468
Construction Contractor	Backwater Environmental, Doug Smith P.O. Box 1107
Construction contractor POC	Eden, NC 27289
Fencing Contractor	
	Strader Fencing Inc 5434 Amick Road Julian, NC 27283
Fencing Contractor POC	
Planting Contractor	Carolina Sylvics 908 Indian Trail Edenton, NC 27932
Planting Contract POC	
Nursery Stock Suppliers	To be determined
Monitoring Performers	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, NC 27605
Stream Monitoring POC	Louis Berger Group, Inc., Ed Samanns, CE, PWS (973- 407-1468)
Vegetation Monitoring POC	Louis Berger Group, Inc.

			Table 4 Projec	t Information					1
Project Name				reek Stream Mitig	gation Project				
County			Cabarrus County]
Project Area (acres)			12						
Project Coordinates (latitude and longitude)			35.491041°N,	-80.366698° W.					-
Project Watershed Summary Information Physiographic Province			Piedmont						1
River Basin			Yadkin-Pee Dee	River					1
	040105	USGS Hyd	rologic Unit 14-d			3040105020060			
DWQ Sub-basin					03-07-12]
Project Drainage Area (acres)					4,039				
Project Drainage Area Percentage of Impervious	s Area				5%				
CGIA Land Use Classification					Rural				
Reach Summary Information (Mainstem)									
Parameters			Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	
Length of reach (linear feet)			2,305	1,244	1,083	969	826	2,043	
Valley classification			Type 8	Type 8	Type 8	Type 8	Type 8	Type 8	
Drainage area (acres)			1914	2146	2446	2568	2632	4039	
NCDWQ stream identification score			37.5	37.5	37.5	37.5	37.5	37.5	
NCDWQ Water Quality Classification			C	C	C	C	C	C	4
Morphological Description (stream type)			C4/F4	C4/E4	C4/F4	C4	C4/D4b	C4	
Design Rosgen Stream Type			C4	C4	C4	C4	C4	C4	-
Evolutionary Trend			R; EII	EII	R; EII	EI; EII	EII	Р	-
Design Approach (P1, P2, P3, E, etc) Underlying mapped soils			Chewacla/	Ell Chewacla	R; Ell Chewacla	El; Ell Chewacla	Ell Chewacla	P Chewacla	1
Drainage class			Goldston Mod. Well	Mod. Well	Mod. Well	Mod. Well	Mod. Well	Mod. Well	-
Drainage class			Drained - Well	Drained - Well	Drained - Well	Drained - Well	Drained - Well	Drained - Well	
			Drained - well	Drained - well	Drained - Well	Drained - well	Drained - well	Drained - well	
Soil Hydric status			Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	1
Slope			0.48%	0.38%	0.51%	0.39%	0.47%	0.43%	1
FEMA classification			N/A	N/A	N/A	N/A	N/A	N/A]
Native vegetation community		-	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture	1
Percent composition of exotic invasive vegetation									
Reach Summary Information (Unnamed Tril	butaries		T						
Parameters			UT 1	UT 2	UT 3	UT 4	UT 5	UT 6	UT 7/UT 8
Length of reach (linear feet)			111	951	1,475	831	184	151	1,127
Valley classification			N/A	Type 2	Type 2	Type 2	N/A	N/A	Type 8
Drainage area (acres)			293	193	62	254	8	16	1222
NCDWQ stream identification score			21	20	26.5	36.5	27.5	24.8	36.5
NCDWQ Water Quality Classification			C N/A	C B6	C	C P4a	C N/A	C N/A	C F4
Morphological Description (stream type) Design Rosgen Stream Type			N/A No Restoration	B6 B6	B6/G6 B6	B4c B4c	N/A No Restoration	N/A No Restoration	F4 C4
Evolutionary Trend			110 Restoration	00	00	540	NO RESIDIATION	NO RESIDIATION	C4
Design Approach (P1, P2, P3, E, etc)			EII	R; EII, P	R; EI; EII	EI; EII	EII	EII	R; EI
Underlying mapped soils					Badin/Georgevi				
			Chewacla	Chewacla	lle	Goldston	Goldston	Goldston	Chewacla
Drainage class			Mod. Well	Mod. Well	Mod. Well	Mod. Well	Mod. Well	Mod. Well	Mod. Well
			Drained - Well	Drained - Well	Drained - Well	Drained - Well	Drained - Well	Drained - Well	Drained - Well
			Drained	Drained	Drained	Drained	Drained	Drained	Drained
Soil Hydric status			Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric	Non-hydric
Slope EEMA alogaification			N/A	2.45%	2.35%	2.17%	N/A	N/A	0.96%
FEMA classification			N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Native vegetation community Percent composition of exaotic invasive vegetation	ion		N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A	N/A N/A
Wetland Summary Information	1011		1 1/ 13	11/13	1.1/12	11/13	11/13	11/11	11/11
Parameters			Wetland 1		Wetland 2			Wetland 3	1
Size of Wetland (acres)		N/A			N/A			N/A]
Wetland Type (non-riparian, riparian riverine or	riparian	N/A			N/A			N/A	1
Mapped Soil Series		N/A			N/A			N/A	4
Drainage class		N/A			N/A			N/A	4
Soil Hydric Status		N/A			N/A			N/A	4
Source of Hydrology		N/A			N/A			N/A	4
Hydrologic Impairment		N/A			N/A			N/A	-
Native vegetation community Percent composition of exotic invasive vegetation	n	N/A N/A			N/A N/A			N/A N/A	1
recent composition of exotic invasive vegetant		11//1	Regulatory C	onsiderations	11/21			11/21	1
n1-4				Resolved?			Supportin - P	mmonto#	1
Regulation			Applicable?	Resolved?			Supporting Do		1
Waters of the United States – Section 404			Y	Y			Permit 2014-003		4
Waters of the United States - Section 401			Y	Y			Letter from NCI		
							February 24, 20 Nationwide Perr		
Endangered Species Act			Y	Y			Letter to USFW		-
							November 16, 2		1
Historic Preservation Act			Y	Y			Letter from NC February 2, 2010		
Coastal Zone Management Act (CZMA)/ Coasta	al <u>Area</u> Ma	anagement	N	N/A			N/A		1
FEMA Floodplain Compliance			Y	Y			FEMA Floodpla]
			NY.	37/4			Restoration Plan	Appendix 9	4
Essential Fisheries Habitat			N	N/A			N/A		L

Appendix B. Visual Assessment Data

ream Crossing	n Crossing Table		Let use a second and the second and
a cum crussilig	X	Y	
sec UT-2 1R Left	1593738.95	638664.85	
sec UT-2 1R Right	1593732.02	638658.44	
ec UT-3 1R Left	1592433.99	637263.36	
sec UT-3 1R Right	1592433.59	637254.55	
ec UT-3 2R Left	1592829.75	636796.51	
ec UT-3 2R Right	1592819.33	636785.11	
ec UT-3 3R Left	1593222.11	636347.03	
ecUT-3 3R Right	1593217.91	636339.01	
sec UT-3 2P Left	1592661.48	636999.11	
ec UT-3 2P Right	1592653.78	636988.71	
ec UT-4 4R Left	1593604.59	637247.26	
ec UT-4 4R Right	1593593.76	637257.64	
ec UT-4 4P Left	1593740.62	637206.8	
ec UT-4 4P Right	1593748.10	637227.61	
ec UT-7 1R Left	1591172.68	634681.1	
ec UT-7 1R Right	1591141.15	634702.2	
ec UT-7 2R Left	1591364.05	634289.31	
ec UT-7 2R Right	1591351.15	634265.91	
ec UT-7 1P Left	1591207.99	634472.87	
ec UT-7 1P Right	1591170.91	634452.31	
ec MS-1R Left	1595087.16	639683.11	
ec MS-1R Right	1595050.59	639683.48	
ec MS-2R Right	1593958.47	637698.33	
ec MS-2R Left	1593916.09	637684.9	
ec MS-1P Left	1594967.71	639791.11	
ec MS-1P Right	1594947.07	639745.38	
ec MS-2P Left	1593963.42	637591.83	
ec MS-2P Right	1593917.94	637594.22	
sec MS-3P Left	1593320.09	636524.66	
ec MS-3P Right	1593289.67	636540.36	
) ' 7	50'	1500'
50' C			
50' C)' 7 _E: 1"=		
50' C			Gage Table
50' C			Gage # X
50' C			Gage Table Gage # X 1 1594832.530
50' C			Gage # X 11594832.530 2 1593530.727
50' C			Gage # X 1594332.730 1594027.413
50' C			Gage # X 1593530.727 3 1594027.413 4 1593741.192
50' C			Gage Table Gage # X 1
50' C			Gage Table Gage # X 1
50' C			Gage # X 1 1594832.530 2 159350.721 3 1594027.411.92 5 1593301.355 6 1592343.768





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648.6 * * *******	TLE BUFFALO STA BEGIN EZ X:1595368. Y: 640628.	A. 10+00.00 236 321	NO. REVISIONS
645 .645 .645 	4 645 3645		NCDENR-DMS
650 Stream Stream Crossing	Crossing Table	¥	THE LOUIS BERGER GROUP, Inc. 1001 Wade Avenue Raleigh, North Carolina 27605
Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left	* 1593738.95 1593732.02 1592433.99 1592433.59 1592829.75	638664.85 638658.44 637263.36 637254.55 636796.51	THE LOUIS F 100 ⁻ Raleigh, N
Xsec UT-3 2R Right Xsec UT-3 3R Left XsecUT-3 3R Right Xsec UT-3 2P Left	1592819.33 1593222.11 1593217.91 1592661.48	636785.11 636347.03 636339.01 636999.11	9
Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right	1592653.78 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68 1591141.15	636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2	REEK N PROJECT NTY SERVICES LAN VIEW
Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Left Xsec MS-1R Right	1591364.05 1591351.15 1591207.99 1591170.91 1595087.16 1595050.59	634289.31 634265.91 634472.87 634452.31 639683.11 639683.48	LITTLE BUFFALO CREEK STREAM RESTORATION PROJECT CABARRUS COUNTY DIVISION OF MITIGATION SERVICES CURRENT CONDITIONS PLAN VIEW
Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Left Xsec MS-1P Right Xsec MS-2P Left Xsec MS-2P Right Xsec MS-3P Left	1593958.47 1593916.09 1594967.71 1594947.07 1593963.42 1593917.94 1593320.09	637698.33 637684.9 639791.11 639745.38 637591.83 637594.22 636524.66	
Xsec MS-3P Right	1593289.67	636540.36	PROJECT NO. 94147 FIGURE 2 OF 10



			erean		
			Stream Crossing	Х	Y
Stream	Crossing Table		Xsec UT-7 1R Left	1591172.68	634681.1
Stream Crossing	x	Y	Xsec UT-7 1R Right	1591141.15	634702.2
Xsec UT-2 1R Left	1593738.95	638664.85	Xsec UT-7 2R Left	1591364.05	634289.31
Xsec UT-2 1R Right	1593732.02	638658.44	Xsec UT-7 2R Right	1591351.15	634265.91
Xsec UT-31R Left	1592433.99	637263.36	Xsec UT-7 1P Left	1591207.99	63 4 472.87
Xsec UT-3 1R Right	1592433.59	637254.55	Xsec UT-7 1P Right	1591170.91	634452.31
Xsec UT-3 2R Left	1592829.75	636796.51	Xsec MS-1R Left	1595087.16	639683.11
Xsec UT-3 2R Right	1592819.33	636785.11	Xsec MS-1R Right	1595050.59	639683.48
Xsec UT-3 3R Left	1593222.11	636347.03	Xsec MS-2R Right	1593958.47	637698.33
XsecUT-3 3R Right	1593217.91	636339.01	Xsec MS-2R Left	1593916.09	637684.9
Xsec UT-3 2P Left	1592661.48	636999.11	Xsec MS-1P Left	1594967.71	639791.11
Xsec UT-3 2P Right	1592653.78	636988.71	Xsec MS-1P Right	1594947.07	639745.38
Xsec UT-4 4R Left	1593604.59	637247.26	Xsec MS-2P Left	1593963.42	637591.83
Xsec UT-4 4R Right	1593593.76	637257.64	Xsec MS-2P Right	1593917.94	637594.22
Xsec UT-4 4P Left	1593740.62	637206.8	Xsec MS-3P Left	1593320.09	636524.66
Xsec UT-4 4P Right	1593748.10	637227.61	Xsec MS-3P Right	1593289.67	636540.36



	Gage Table	
Gage #	Х	Y
1	1594832.530	63978
2	1593530.727	63892
3	1594027.413	63837
4	1593741.192	63721
5	1593301.355	63653
6	1592343.768	63728
7	1593142.677	63646
8	1591214.694	63479

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See: U-1 28 (eff: 1992827.27 662/79.65.1 See: U-1 23 (eff: 1992827.11 630376.01 See: U-1 23 (eff: 1992827.11 630377.01 See: U-1 23 (eff: 1992827.11 630376.01 See: U-1 23 (eff: 1992827.11 630376.01 See: U-1 23 (eff: 199367.02 630376.01 See: U-1 24 (eff: 199367.02 630376.01 See: U-1 24 (eff: 199367.02 630376.01 See: U-1 48 (eff: 199376.02 63727.76 See: U-1 28 (eff: 199376.02 637227.76 See: U-1 28 (eff: 199376.02 637227.76 See: U-1 28 (eff: 199376.02 637227.76 See: U-1 28 (eff: 199376.02 637226.79 See: U-1 28 (eff: 199376.02 63722.77 See: U-1 28 (eff: 199376.02 63726.79				×						× / / / × · · / / /
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Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Left	X 1593738.95 1593732.02 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03	THE LOUIS BE 1001 W	
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Left XsecUT-3 3R Right	X 1593738.95 1593732.02 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01	THE LOUIS BE 1001 W	
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 2P Left	X 1593738.95 1593732.02 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11	THE LOUIS BE 1001 W	
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Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left	X 1593738.95 1593732.02 1592433.99 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1592653.78 1593604.59 1593593.76 1593740.62	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636988.71 637247.26 637257.64 637206.8		
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Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left	X 1593738.95 1593732.02 1592433.99 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1592653.78 1593604.59 1593593.76 1593740.62 1593748.10	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636988.71 637247.26 637257.64 637206.8		
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-4 4P Right Xsec UT-7 1R Left	X 1593738.95 1593732.02 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1592653.78 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1		
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Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 3P Left Xsec UT-3 2P Right Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Right Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec UT-7 1P Right Xsec UT-7 1P Right	X 1593738.95 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1592653.78 1593604.59 1593740.62 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591207.99 1591170.91 1595087.16	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634681.1 634702.2 634289.31 634265.91 634452.31 639683.11	LE BUFFALO CREEK A RESTORATION PROJECT ABARRUS COUNTY OF MITIGATION SERVICES	- CONDITIONS PLAN VIEW
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right	X 1593738.95 1593732.02 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591207.99 1591170.91 1595087.16 1595050.59	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636998.71 637257.64 637227.61 634681.1 634289.31 634289.31 634472.87 639683.11 639683.11	LE BUFFALO CREEK A RESTORATION PROJECT ABARRUS COUNTY OF MITIGATION SERVICES	- CONDITIONS PLAN VIEW
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-2R Left Xsec MS-1P Left	X 1593738.95 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591364.05 1591351.15 1591207.99 1591170.91 1595087.16 1593958.47 1593916.09 1594967.71	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636988.71 637247.26 637257.64 637227.61 634681.1 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11 639683.48 637698.33 637698.33		- CONDITIONS PLAN VIEW
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Left Xsec MS-1P Right	X 1593738.95 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591364.05 1591351.15 1591207.99 1591170.91 1595087.16 1593958.47 1593916.09 1594967.71 1594947.07	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636380.01 636390.01 6363999.11 636999.11 637206.8 637206.8 637207.61 634681.1 634265.91 634265.91 634472.87 634452.31 639683.11 639683.48 637698.33 637684.9 639791.11	LE BUFFALO CREEK A RESTORATION PROJECT ABARRUS COUNTY OF MITIGATION SERVICES	- CONDITIONS PLAN VIEW
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Right Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Left Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right	X 1593738.95 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1593604.59 1593593.76 1593740.62 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591364.05 1591351.15 1591207.99 1591207.99 1591170.91 1595087.16 1595050.59 1593958.47 1593916.09 1594967.71 1593963.42	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636347.03 63639.01 63639.01 6367247.26 637206.8 637206.8 637207.61 634681.1 634289.31 634265.91 634452.31 639683.11 639683.11 639683.11 639683.48 637698.33 637684.9 639791.11 6397591.83	LE BUFFALO CREEK A RESTORATION PROJECT ABARRUS COUNTY OF MITIGATION SERVICES	- CONDITIONS PLAN VIEW
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Right Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 1P Left Xsec UT-7 1P Left Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Left Xsec MS-1P Left Xsec MS-1P Left Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right Xsec MS-2P Left Xsec MS-1P Right Xsec MS-2P Left Xsec MS-2P Left Xsec MS-2P Right	X 1593738.95 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1592653.78 1593604.59 1593740.62 1593740.62 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591207.99 1591170.91 1595087.16 1595050.59 1593958.47 1593916.09 1594967.71 1594947.07	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636339.01 636999.11 636999.11 637206.8 637227.61 634681.1 634289.31 634265.91 634452.31 639683.11 639683.11 639683.11 639683.11 639683.11 639683.11 639683.11 639683.13 637698.33 637698.33 637698.33 637698.33 637698.33 637591.83 637594.22	LITTLE BUFFALO CREEK STREAM RESTORATION PROJECT CABARRUS COUNTY DIVISION OF MITIGATION SERVICES	CURRENT CONDITIONS PLAN VIEW
Stream Crossing Xsec UT-2 1R Left Xsec UT-2 1R Right Xsec UT-3 1R Left Xsec UT-3 1R Right Xsec UT-3 2R Left Xsec UT-3 2R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 3R Right Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Right Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Right Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Left Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right	X 1593738.95 1592433.99 1592433.59 1592829.75 1592819.33 1593222.11 1593217.91 1592661.48 1593604.59 1593593.76 1593740.62 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591364.05 1591351.15 1591207.99 1591207.99 1591170.91 1595087.16 1595050.59 1593958.47 1593916.09 1594967.71 1593963.42	638664.85 638658.44 637263.36 637254.55 636796.51 636785.11 636347.03 636347.03 63639.01 63639.01 6367247.26 637206.8 637206.8 637207.61 634681.1 634289.31 634265.91 634452.31 639683.11 639683.11 639683.11 639683.48 637698.33 637684.9 639791.11 6397591.83	Intre Buffalo Creek Stream restoration Project CABARRUS COUNTY Division of Mitigation Services	CURRENT CONDITIONS PLAN VIEW





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Xsec UT-2 1R Right	1593732.02	638658.44	
Xsec UT-3 1R Left	1592433.99	637263.36	
Xsec UT-3 1R Right	1592433.59	637254.55	] 폰
Xsec UT-3 2R Left	1592829.75	636796.51	
Xsec UT-3 2R Right	1592819.33	636785.11	
Xsec UT-3 3R Left	1593222.11	636347.03	
XsecUT-3 3R Right Xsec UT-3 2P Left	1593217.91	636339.01	-
Xsec UT-3 2P Left Xsec UT-3 2P Right	1592661.48 1592653.78	636999.11 636988.71	-
Xsec UT-4 4R Left	1593604.59	637247.26	11
Xsec UT-4 4R Right	1593593.76	637257.64	<b>1</b>
Xsec UT-4 4P Left	1593740.62	637206.8	EEK PROJECT TY SERVICES N VIEW
Xsec UT-4 4P Right	1593748.10	637227.61	
Xsec UT-7 1R Left	1591172.68	634681.1	I I I I I I I I I I I I I I I I I I I
Xsec UT-7 1R Right	1591141.15	634702.2	
Xsec UT-7 2R Left	1591364.05	634289.31	
Xsec UT-7 2R Right	1591351.15	634265.91	
Xsec UT-7 1P Left Xsec UT-7 1P Right	1591207.99 1591170.91	634472.87 634452.31	
Xsec MS-1R Left	1595087.16	639683.11	
Xsec MS-1R Right	1595050.59	639683.48	
Xsec MS-2R Right	1593958.47	637698.33	LITTLE BUFFALO CREEK STREAM RESTORATION PROJECT CABARRUS COUNTY DIVISION OF MITIGATION SERVICES CURRENT CONDITIONS PLAN VIEW
Laborno En light	1593916.09	637684.9	VIS VIS
Xsec MS-2R Left		639791.11	
Xsec MS-2R Left Xsec MS-1P Left	1594967.71		11
	1594967.71	639745.38	]]
Xsec MS-1P Left		639745.38 637591.83	
Xsec MS-1P Left Xsec MS-1P Right Xsec MS-2P Left Xsec MS-2P Right	1594947.07 1593963.42 1593917.94	637591.83 637594.22	
Xsec MS-1P Left Xsec MS-1P Right Xsec MS-2P Left	1594947.07 1593963.42	637591.83	DATE JUNE 2015 PROJECT NO. 94147

	INVE	2) 92"X 138" CULVERTS [92" 138" RT OUT 604. RT OUT 604.	CMP	UTTLE F	BUFFALO STA. 104/ END PRESERVATION					ALO STA.99+48.10
	,				and the second		5	/	/ UT-7	STA. 21+26.71 7 RESTORATION
	/				Cherry Contraction				END UT	
	n Crossing Table	v	4	× 11/ \\			_	_ //		
Stream Crossing	X	Y	4			Righing -				
Xsec UT-2 1R Left	1593738.95	638664.85	4			Elin (marine		/ / / / /		=////
Xsec UT-2 1R Right Xsec UT-3 1R Left	1593732.02 1592433.99	638658.44 637263.36	4			kii / ma		/////		
Xsec UT-3 1R Right	1592433.99	637253.36	1	×1/~\		Elin Mar			115	
Xsec UT-3 2R Left	1592829.75	636796.51	1			- Eller Marrie		[]]/]//		
Xsec UT-3 2R Right	1592819.33	636785.11	1			Sec. 1 Providence	/	(   / / / /	///////////////////////////////////////	
Xsec UT-3 3R Left	1593222.11	636347.03	1			- Ferry		1   ( / / / /	1////	
XsecUT-3 3R Right	1593217.91	636339.01	1			- Ceil		'     ( / / / /	( / / / /	
AGCCOL D DITTIGHT						1 8	1113			
	1592661.48	636999.11		* V			2112			
Xsec UT-3 2P Left Xsec UT-3 2P Right	1592661.48 1592653.78	636999.11 636988.71		*			Charles and the second se			
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left	1592661.48 1592653.78 1593604.59	636999.11 636988.71 637247.26					ranzan and a start and a start			
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right	1592661.48 1592653.78 1593604.59 1593593.76	636999.11 636988.71 637247.26 637257.64					Norman and a start of the start			
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left	1592661.48 1592653.78 1593604.59 1593593.76 1593740.62	636999.11 636988.71 637247.26 637257.64 637206.8					Constanting and the second sec			
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right	1592661.48 1592653.78 1593604.59 1593593.76 1593740.62 1593748.10	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61					Constanting of the second seco			638.4
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left	1592661.48 1592653.78 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1					Construction of the second sec			638.4
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right	1592661.48 1592653.78 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68 1591141.15	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2					Versnlot Table			638.4
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Left	1592661.48         1592653.78         1593604.59         1593740.62         1593740.62         1593748.10         1591172.68         1591141.15         1591364.05	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31				Vegnlot #	Vegplot Table			638.4
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 2R Right	1592661.48         1592653.78         1593604.59         1593740.62         1593740.62         1591172.68         1591141.15         1591364.05         1591351.15	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91				Vegplot #	Х	Y	LEGEND:	638.4
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 1P Left	1592661.48         1592653.78         1593604.59         1593740.62         1593748.10         1591172.68         1591364.05         1591364.05         1591321.15         1591207.99	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87				1	X 1594927.536	Y 640116.7609	LEGEND:	THALWEG
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Right Xsec UT-7 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right	1592661.48 1592653.78 1593604.59 1593593.76 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591207.99 1591170.91	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31		Gage Table			X 1594927.536 1595047.117	Y 640116.7609 639773.9516		THALWEG
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-7 4P Right Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Left	1592661.48 1592653.78 1593604.59 1593740.62 1593740.62 1593748.10 1591172.68 1591141.15 1591364.05 1591351.15 1591207.99 1591170.91 1595087.16	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11	Gage #	Gage Table		1 2	X 1594927.536 1595047.117 1594739.144	Y 640116.7609 639773.9516 639229.3984		THALWEG
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right	1592661.48         1592653.78         1593604.59         1593740.62         1593740.62         1593748.10         1591172.68         1591364.05         1591364.05         1591364.05         1591364.05         1591364.05         1591207.99         1591170.91         1595087.16         1595087.16	636999.11 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11 639683.48	Gage #	Х	Y	1 2 3	X 1594927.536 1595047.117 1594739.144 1594306.713	Y 640116.7609 639773.9516 639229.3984 638774.1979		THALWEG CONSERVATION EASEMENT
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Right Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Left Xsec MS-1R Right Xsec MS-2R Right	1592661.48           1592653.78           1593604.59           1593740.62           1593740.62           1593748.10           1591172.68           1591141.15           1591364.05           1591364.05           1591374.10           1591364.05           1591364.05           159137.15           1591207.99           1591170.91           1595087.16           1595050.59           1593958.47	636999.11 637247.26 637257.64 637206.8 637227.61 634681.1 634681.1 634289.31 634265.91 634472.87 634452.31 639683.11 639683.48 637698.33	1	X 1594832.530	Y 639785.468	1 2 3 4 5	X 1594927.536 1595047.117 1594739.144 1594306.713 1594018.189	Y 640116.7609 639773.9516 639229.3984 638774.1979 638067.7589	_ · _ · _ · _ · _ · _ · _ · _ · _ · _ ·	THALWEG CONSERVATION EASEMENT CONSERVATION FENCE CONSTRUCTED RIFFLE
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left	1592661.48           1592653.78           1593604.59           1593740.62           1593748.10           1591172.68           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591207.99           159107.91           1595087.16           1595050.59           1593958.47           1593916.09	636999.11 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11 639683.48 637698.33 637684.9		Х	Y 639785.468 638925.793	1 2 3 4	X 1594927.536 1595047.117 1594739.144 1594306.713	Y 640116.7609 639773.9516 639229.3984 638774.1979 638067.7589 637640.9700		THALWEG CONSERVATION EASEMENT CONSERVATION FENCE CONSTRUCTED RIFFLE BEDROCK
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Left Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-2R Left Xsec MS-1P Left	1592661.48           1592653.78           1593604.59           1593740.62           1593748.10           1591172.68           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591207.99           1591370.91           1595087.16           1595085.59           1593958.47           1593916.09           1594967.71	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11 639683.11 639683.48 637698.33 637684.9 639791.11	1 2	X 1594832.530 1593530.727	Y 639785.468 638925.793 638373.708	1 2 3 4 5 6	X 1594927.536 1595047.117 1594739.144 1594306.713 1594018.189 1593905.337	Y 640116.7609 639773.9516 639229.3984 638774.1979 638067.7589	_ · _ · _ · _ · _ · _ · _ · _ · _ · _ ·	THALWEG CONSERVATION EASEMENT CONSERVATION FENCE CONSTRUCTED RIFFLE BEDROCK ROOTWADS
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left	1592661.48           1592653.78           1593604.59           1593740.62           1593740.62           1593748.10           1591172.68           1591141.15           1591364.05           1591364.05           159137.15           1591207.99           1591207.99           1591364.05           1595087.16           1595087.16           1593958.47           1593916.09           1594967.71           1594947.07	636999.11 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634452.31 639683.11 639683.11 639683.48 637698.33 637684.9 639791.11 639745.38	1 2 3 4	X 1594832.530 1593530.727 1594027.413	Y 639785.468 638925.793 638373.708 637215.956	1 2 3 4 5 6 7	X 1594927.536 1595047.117 1594739.144 1594306.713 1594018.189 1593905.337 1593468.981	Y 640116.7609 639773.9516 639229.3984 638774.1979 638067.7589 637640.9700 636908.5423		THALWEG CONSERVATION EASEMENT CONSERVATION FENCE CONSTRUCTED RIFFLE BEDROCK
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Left Xsec MS-1P Left Xsec MS-1P Right	1592661.48           1592653.78           1593604.59           1593740.62           1593748.10           1591172.68           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591207.99           1591370.91           1595087.16           1595085.59           1593958.47           1593916.09           1594967.71	636999.11 636988.71 637247.26 637257.64 637206.8 637227.61 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11 639683.11 639683.48 637698.33 637684.9 639791.11	1 2 3 4	X 1594832.530 1593530.727 1594027.413 1593741.192	Y 639785.468 638925.793 638373.708 637215.956 636534.851	1 2 3 4 5 6 7 8	X 1594927.536 1595047.117 1594739.144 1594306.713 1594018.189 1593905.337 1593468.981 1593199.648	Y 640116.7609 639773.9516 639229.3984 638774.1979 638067.7589 637640.9700 636908.5423 636249.0130		THALWEG CONSERVATION EASEMENT CONSERVATION FENCE CONSTRUCTED RIFFLE BEDROCK ROOTWADS CONTROL POINT
Xsec UT-3 2P Left Xsec UT-3 2P Right Xsec UT-4 4R Left Xsec UT-4 4R Right Xsec UT-4 4P Left Xsec UT-4 4P Right Xsec UT-7 1R Left Xsec UT-7 1R Right Xsec UT-7 2R Left Xsec UT-7 2R Right Xsec UT-7 1P Left Xsec UT-7 1P Right Xsec MS-1R Right Xsec MS-1R Right Xsec MS-2R Right Xsec MS-2R Left Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right Xsec MS-1P Right	1592661.48           1592653.78           1593604.59           1593740.62           1593740.62           1593748.10           1591172.68           1591141.15           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           1591364.05           159137.091           1591207.99           1595087.16           1595087.16           1593958.47           1593916.09           1594967.71           1593963.42	636999.11 637247.26 637257.64 637206.8 637227.61 634681.1 634681.1 634702.2 634289.31 634265.91 634472.87 634452.31 639683.11 639683.48 637698.33 637684.9 639791.11 639745.38 637591.83	1 2 3 4 5 6	X 1594832.530 1593530.727 1594027.413 1593741.192 1593301.355	Y 639785.468 638925.793 638373.708 637215.956 636534.851 637288.329	1 2 3 4 5 6 7 8 9	X 1594927.536 1595047.117 1594739.144 1594306.713 1594018.189 1593905.337 1593468.981 1593199.648 1591104.032	Y 640116.7609 639773.9516 639229.3984 638774.1979 638067.7589 637640.9700 636908.5423 636249.0130 634584.3550		THALWEG CONSERVATION EASEMENT CONSERVATION FENCE CONSTRUCTED RIFFLE BEDROCK ROOTWADS





Photo 1: Mainstem, Reach 1



Photo 2: Mainstem, Reach 4, UT 3



Photo 3: Mainstem. Reach 6

Vegetation Plot Photos



Photo 1: Veg Plot 1, Post Construction Dec 2014



Photo 2: Veg Plot 2, Post Construction Dec 2014



Photo 3: Veg Plot 3, Post Construction Dec 2014



Photo 4: Veg Plot 4, Post Construction Dec 2014



Photo 5: Veg Plot 5, Post Construction Dec 2014



Photo 6: Veg Plot 6, Post Construction Dec 2014


Photo 7: Veg Plot 7, Post Construction Dec 2014



Photo 8: Veg Plot 8, Post Construction Dec 2014



Photo 9: Veg Plot 9, Post Construction Dec 2014



Photo 10: Veg Plot 10, Post Construction Dec 2014



Photo 11: Veg Plot 11, Post Construction Dec 2014



Photo 12: Veg Plot 12, Post Construction Dec 2014

## Appendix C. Vegetation Plot Data

	Common Name	Nursery	Nursery Address	Type	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Plot 12	AB Mean
Scientific Name	Common Name	Nursery	Nursery Address	туре	94147-01-0001	94147-01-0002	94147-01-0003	94147-01-0004	94147-01-0005	94147-01-0006	94147-01-0007	94147-01-0008	94147-01-0009	94147-01-0010	94147-01-0011	94147-01-0012	
			2011 Broadbank Court										Ĩ			Ĩ	
Alnus serrulata	hazel alder	Arborgen	Ridgeville, SC 29472	Shrub Tree	1	1	1		4	2	2	1				1	1.63
Carpinus caroliniana	American hornbeam			Shrub Tree					1	2		1	1	5	1		1.83
Celtis laevigata	sugarberry			Shrub Tree	2	7	6	5	3	1		4	3	1	1	3	3.27
			2011 Broadbank Court														
Cercis canadensis	eastern redbud	Arborgen	Ridgeville, SC 29472	Shrub Tree	4	1										2	2.33
			2011 Broadbank Court														
Fraxinus pennsylvanica	green ash	Arborgen	Ridgeville, SC 29472	Tree	1	1	2	3	3	2			1	1	5		2.11
			2011 Broadbank Court														
Liriodendron tulipifera	tulip tree	Arborgen	Ridgeville, SC 29472	Tree		2	2	3	1	2	5	1	2	2			2.22
			2011 Broadbank Court														
Platanus occidentalis	American sycamore	Arborgen	Ridgeville, SC 29472	Tree				2		3	1	1		2			1.80
			2011 Broadbank Court														
Quercus falcata	southern red oak	Arborgen	Ridgeville, SC 29472	Tree	2			1	1				1			2	1.40
			2011 Broadbank Court														
Quercus michauxii	swamp chestnut oak	Arborgen	Ridgeville, SC 29472	Tree	1			1		2	1	2	3			1	1.57
Viburnum dentatum	aouthern arrowwood			Tree							1		2	2	5		2.50
unknown				Shrub Tree													
		-		Plot Area (acres)	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
				Species Count	7	5	4	6	6	7	5	6	7	6	4	5	5.67
				Stem Count	11	12	11	15	13	14	10	10	13	13	12	9	11.92
				Stems per Acre	440.00	480.00	440.00	600.00	520.00	560.00	400.00	400.00	520.00	520.00	480.00	360.00	476.67

# Appendix D. Stream Measurement and Geomorphology Data

												Stream Data gment/Reac													
Parameter	Gauge ⁻		Regional (	Curve			Pre-Existi	ng Condition			Í	•		Reach(es) Dat	а			Design				Monitorir	ng Baseline		
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)					45.55	56.61	52.02	82.98	14.98	5	43	52		64	8.60	4	36	36	36	35.21	35.21	35.21	35.21		1
Floodprone Width (ft)					67.73	106.50	96.36	177.28	43.15	5						4	>88	>88	>88	>80	>80	>80	>80		1
Bankfull Mean Depth (ft)					0.65	1.18	1.24	1.60	0.35	5	0.98	1.16		1.98	0.44	4	0.96	0.96	0.96	1.23	1.23	1.23	1.23		1
¹ Bankfull Max Depth (ft)					2.54	3.04	2.80	3.83	0.58	5						4	1.5	1.5	1.5	1.79	1.79	1.79	1.79		1
Bankfull Cross Sectional Area (ft ² )					53.58	63.29	59.12	83.09	11.52	5	55	59		65	4.11	4	34.38	34.38	34.38	43.15	43.15	43.15	43.15		1
Width/Depth Ratio					32.51	56.56	40.56	127.66	40.14	5	31	47		64	13.47	4	37.5	37.5	37.5	28.73	28.73	28.73	28.73		1
Entrenchment Ratio					1.49	1.84	1.92	2.17	0.33	5	>2.2	>2.2		>2.2		4	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2		1
'Bank Height Ratio					0.91	1.09		1.37								4	1	1	1	1.00	1.00	1.00	1.00		1
Profile																									
Riffle Length (ft)																	35.00	40.00	50.00	7.73	23.71	22.04	38.44		
Riffle Slope (ft/ft)																	0.003	0.014	0.028	0.000	0.026	0.022	0.076		
Pool Length (ft)																	10.00	20.00	20.00	4.21	25.43	17.55	83.20		
Pool Max Depth (ft)																	1.50	1.81	1.81	1.96	2.71	2.48	3.76		
Pool Spacing (ft)																	80.00	125.00	170.00	29.95	48.64	39.06	91.87		
Pattern																-		-					-		
Channel Belwidth (ft)											1						84.00	84.00	84.00	59.64	105.83	92.68	165.18		
Radius of Curvature (ft)																	57.62	79.30	100.98	72.97	83.15	79.01	97.49		
RC: Bankfull Width (ft/ft)																	35.24	36.00	69.62	27.95	35.60	36.13	46.36		
Meander Wavelength (ft)																									
Meander Width Ratio																	1.21	2.33	2.38	1.29	3.04	2.57	5.91		
Transport Parameters																									
Reach Shear Stress (competency) (lb/f ² )	1						0.	.334			T						I	0.320		T		0.	322		
Max Part Size (mm) Mobilized at Bankfull																									
Stream Power (transport capacity) (W/m ² )																									
Additional Research Parameters	_																								
Rosgen Classification								C4						C4				C4		1		(	C4		
Bankfull Velocity (fps)	-						1	.82										4.36				3	.48		
Bankfull Discharge (cfs)							1	115														-			
Valley Length (ft)								-																	
Channel Thalweg Length (ft)											1							2293.33	3			229	99.79		
Sinuosity (ft/ft)							1	.05			1			1.25			1	1.05		1			.05		
Water Surface Slope (Channel) (ft/ft)							-				1			0.38			1			1					
BF Slope (ft/ft)											1			0.38			1			1					
³ Bankfull Floodplain Area (acres)											1						1	0.45		1		0.3	3959		
⁴ % of Reach with Eroding Banks											1						1								
Channel Stability or Habitat Metric											1														
Biological or Other											1									1					

								Litt	Table Table I I I I I I I I I I I I I I I I I I I			Data Summar each: Mainst												
Parameter	Gauge⁻		Regional (	Curve			Pre-Existing				J		e Reach(es) Dat	а			Design				Monitorin	g Baseline		
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med N	Max SL	n n	Min	Mean	Med	Max	SD	n	Min	Med	Max	Min	Mean	Med	Max	SD°	n
Bankfull Width (ft)					34.42	41.48	41.54	48.48	7.03	3 43	52	2	64	8.60	4	40	40	40	38.31	38.31	38.31	38.31		1
Floodprone Width (ft)					258.20	265.42		272.62	7.21	3					4	>88	>88	>88	>90	>90	>90	>90		1
Bankfull Mean Depth (ft)					1.20	1.47		1.80	0.30	3 0.9	8 1.1	6	1.98	0.44	4	1.58	1.58	1.58	1.26	1.26	1.26	1.26		1
¹ Bankfull Max Depth (ft)					2.47	2.78		3.09	0.31	3					4	2.00	2.00	2.00	1.90	1.90	1.90	1.90		1
Bankfull Cross Sectional Area (ft ² )	-				58.33	59.79		62.09	2.01	3 55			65	4.11	4	63	63	63	48.23	48.23	48.23	48.23		1
Width/Depth Ratio					19.12	29.59		40.40	10.64	3 31			64	13.47	4	39.87	39.87	39.87	30.43	30.43	30.43	30.43		1
Entrenchment Ratio 'Bank Height Ratio					5.33	6.53 2.19		7.71 2.43	1.19	3 >2.	2 >2	.2	>2.2		4	>2.2	>2.2	>2.2	>2.2	>2.2 0.94	>2.2 0.94	>2.2 0.94	-	1
Profile					1.94	2.19		2.43							4	1	1	1	0.94	0.94	0.94	0.94		1
Riffle Length (ft)					1 1		<u>г</u>					-	-	1	1	15	30	65	11.30	18.65	20.99	21.31		T
Riffle Slope (ft/ft)	-															0.017	0.027	0.033	0.018	0.050	0.024	0.134		
Pool Length (ft)																10	15	20	6.32	12.33	10.63	21.53	1	
Pool Max Depth (ft)	-															2	2.25	2.5	0.50	1.13	1.26	1.69	1	
Pool Spacing (ft)															-	70	70	70	36.04	45.42	46.77	53.33		
Pattern							l l									70	70	70	30.04	40.42	40.77	55.55		
Channel Belwidth (ft)			1		1		1 1					<u> </u>	1	1	1	1	1	1	58.77	58.77	58.77	58.77	1	1
Radius of Curvature (ft)																-			83.80	83.80	83.80	83.80	1	
RC: Bankfull Width (ft/ft)																			4.58	15.65	16.52	23.05	1	
Meander Wavelength (ft)																								
Meander Width Ratio																			2.55	5.20	3.56	12.83		
Transport Parameters																								
Reach Shear Stress (competency) (lb/f ² )							0.61	19									0.516				0.1	199		
Max Part Size (mm) Mobilized at Bankfull																_								
Stream Power (transport capacity) (W/m ² )																								
Additional Research Parameters	-				_					-						-	0.1		-					
Rosgen Classification Bankfull Velocity (fps)			-	-	-		C4 2.7									_	C4 3.03					.96		
Bankfull Discharge (cfs)							2.7									_	3.03				3.	.90		
Valley Length (ft)							10,	5								1								
Channel Thalweg Length (ft)																	1030.85				107	9.45		
Sinuosity (ft/ft)							1.1	3									1.05					.01		
Water Surface Slope (Channel) (ft/ft)																1			1					
BF Slope (ft/ft)																1								
³ Bankfull Floodplain Area (acres)																1	0.49		1		0.0	074		
⁴ % of Reach with Eroding Banks																								
Channel Stability or Habitat Metric																								
Biological or Other																								

													ta Summary ent/Reach:												
Parameter	Gauge		Regional Cu	urve			Pre-Exi	sting Condition				,		Reach(es) Dat	a			Design				Monitoring	g Baseline		
Dimension and Substrate - Riffle Only		111	11.11	<b>F</b> -	Min	Maaa	Mad	Mau	ISIN		Mire	Maar	Mad	Mari	ISIN		IM-	Mad	Mau	N.C.	Maar	Med	Mari	ISD®	1-
Bankfull Width (ft)		LL	UL	Eq.	Min	Mean	Med	Max	50	n	Min	Mean	Med	Max	50	n	Min 4.00	Med 4.00	Max 4.00	Min 3.52	Mean 3.52	3.52	Max 3.52	00	n 1
Floodprone Width (ft)				-						-				-	-		7.00	7.00	7.00	8.34	8.34	8.34	8.34	-	1
Bankfull Mean Depth (ft)																	0.47	0.47	0.47	0.52	0.52	0.52	0.54		1
¹ Bankfull Max Depth (ft)																	0.75	0.75	0.75	0.72	0.72	0.72	0.72		1
Bankfull Cross Sectional Area (ft ² )	-		-								-			-			1.88	1.88	1.88	1.82	1.82	1.82	1.82		1
Width/Depth Ratio																	8.51	8.51	8.51	6.82	6.82	6.82	6.82		1
Entrenchment Ratio																	1.75	1.75	1.75	2.37	2.37	2.37	2.37		1
'Bank Height Ratio																	1.00	1.00	1.00	1.01	1.01	1.01	1.01		1
Profile																									
Riffle Length (ft)																	51.74	51.74	51.74	6.98	13.52	13.52	20.07		
Riffle Slope (ft/ft)																	0.024	0.024	0.024	0.010	0.013	0.013	0.016		
Pool Length (ft)																				12.76	12.76	12.76	12.76		
Pool Max Depth (ft)																				0.89	0.89	0.89	0.89		
Pool Spacing (ft)																				30.63	30.63	30.63	30.63		
Pattern																									
Channel Belwidth (ft)																									
Radius of Curvature (ft)											-														
RC: Bankfull Width (ft/ft)																									
Meander Wavelength (ft)					_						_							_							
Meander Width Ratio																									
<b>T</b>																									
Transport Parameters					-						-									T					
Reach Shear Stress (competency) (lb/f ² )					_													0.571				0.2	:49		
Max Part Size (mm) Mobilized at Bankfull Stream Power (transport capacity) (W/m ² )		_															-			-					
Additional Research Parameters																									
											-						1			1		D	<u></u>		
Rosgen Classification Bankfull Velocity (fps)											_											B 1.6			
Bankfull Discharge (cfs)					-																	1.0	00		
Valley Length (ft)											-									-					
Channel Thalweg Length (ft)																				1		951	37		
Sinuosity (ft/ft)											1						1			1		0.9			
Water Surface Slope (Channel) (ft/ft)											1						1			1		0			
BF Slope (ft/ft)																	1			1					
³ Bankfull Floodplain Area (acres)																	1			1					
⁴ % of Reach with Eroding Banks																				1					
Channel Stability or Habitat Metric																				1					
Biological or Other																									

									L			Stream Dat 147) Segme													
Parameter	Gauge		Regional C	urve			Pre-Exi	sting Conditio				, eeg		Reach(es) Dat	ta			Design				Monitoring	Baseline		
Dimension and Substrate - Riffle Only		11	111	Eq.	Min	Mean	Med	Max	SD	In	Min	Mean	Med	Max	SD	In	Min	Med	Max	Min	Mean	Med	Max	SD°	In
Bankfull Width (ft)			02	-4.		moun	iniou	max				mourr	linea	max			4.00			3.50	4.38	3.73	5.91		3
Floodprone Width (ft)																	7.0			6.35	14.65	13.14	24.45		3
Bankfull Mean Depth (ft)																	0.4			0.20	0.34	0.29	0.53		3
¹ Bankfull Max Depth (ft)																	0.7	5 0.75	0.75	0.31	0.58	0.61	0.82		3
Bankfull Cross Sectional Area (ft ² )																	1.8	3 1.88	1.88	0.75	1.43	1.69	1.84		3
Width/Depth Ratio																	8.5		8.51	6.66	15.31	18.61	20.67		3
Entrenchment Ratio																	1.7	5 1.75	5 1.75	5 1.70	3.64	2.22	6.99		3
'Bank Height Ratio																	1.00	1.00	1.00	0.54	0.64	0.64	0.74		3
Profile																									
Riffle Length (ft)																	197.12	355.90	514.68	57.25	107.81	89.01	215.05		
Riffle Slope (ft/ft)																	0.006	0.012	0.044	0.011	0.017	0.014	0.029		
Pool Length (ft)																				1.50	12.97	6.04	31.37		
Pool Max Depth (ft)																				4.14	4.46	4.61	4.62		
Pool Spacing (ft)																				114.27	133.63	143.31	143.31		
Pattern																									
Channel Belwidth (ft)																	50.42	59.15	61.2	13.40	34.20	42.73	46.46		
Radius of Curvature (ft)																				21.64	35.62	35.15	50.55		
RC: Bankfull Width (ft/ft)																				2.38	15.62	14.63	30.84		
Meander Wavelength (ft)																									
Meander Width Ratio																				0.43	5.37	2.44	19.52		
Transport Parameters																									
Reach Shear Stress (competency) (lb/f ² )																		0.285				0.2	90		
Max Part Size (mm) Mobilized at Bankfull																									
Stream Power (transport capacity) (W/m ² )																									
Additional Research Parameters																	-			-					
Rosgen Classification																	1			Τ		В	6		
Bankfull Velocity (fps)				1																		1.4	17		
Bankfull Discharge (cfs)				1	1															1					
Valley Length (ft)																									
Channel Thalweg Length (ft)																						1469	9.07		
Sinuosity (ft/ft)																						0.9	95		
Water Surface Slope (Channel) (ft/ft)											1						1			1		0.0	19		
BF Slope (ft/ft)																				1		0.0	19		
³ Bankfull Floodplain Area (acres)																				1		0.8	34		
⁴ % of Reach with Eroding Banks											1									1					
Channel Stability or Habitat Metric																									
Biological or Other																									

									Li			Stream Dat 147) Segme													
Parameter	Gauge ⁻		Regional C	urve			Pre-Exi	isting Condition			1	,		Reach(es) Da	ita			Desi	gn			Monitoring	g Baseline		
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD°	n	Min	Mean	Med	Max	SD°	n	Min	Med	Max	Min	Mean	Med	Max	SD°	n
Bankfull Width (ft)					_															13.32	13.32	13.32	13.32		1
Floodprone Width (ft)																				>50	>50	>50	>50		1
Bankfull Mean Depth (ft)		_		_	_															0.91	0.91	0.91	0.91		1
¹ Bankfull Max Depth (ft)					_															1.71	1.71	1.71	1.71		1
Bankfull Cross Sectional Area (ft ² )		_	_	_			_				_			_			_			12.13	12.13	12.13	12.13		1
Width/Depth Ratio	_					-	-				_						-			14.63	14.63	14.63	14.63		1
Entrenchment Ratio 'Bank Height Ratio					_															>2.2	>2.2	>2.2	>2.2		1
-																				0.60	0.60	0.60	0.60		1
Profile Riffle Length (ft)		1	1		-	-	1	1	1	1	-	-	1	1	1	1		-	1	4.74	19.81	21.81	30.73	T	1
Riffle Slope (ft/ft)		_												_						0.0121	0.0271	0.0184	0.0738		_
		_												_						6.99	12.56	9.10	26.02		_
Pool Length (ft)																				6.99	2.28	9.10	26.02		
Pool Max Depth (ft) Pool Spacing (ft)							_				_									50.06	2.28	55.31	68.08		_
Pool Spacing (it) Pattern																				50.06	30.72	55.31	66.06		
Channel Belwidth (ft)	-		-		-	-	-	-	-	-		-	-	-	-	1				80.13	98.47	98.47	116.81	T	1
Radius of Curvature (ft)							_				_						_			36.70	98.47	49.01	56.95		
RC: Bankfull Width (ft/ft)							_				_									16.34	19.23	18.89	23.76		_
Meander Wavelength (ft)																				221.95	221.95	221.95	221.95		
Meander Wavelength (it) Meander Width Ratio																				3.37	5.19	4.91	7.15		
Meander Width Ratio																				3.37	5.19	4.91	7.15		
Transport Parameters																									
Reach Shear Stress (competency) (lb/f ² )		1			-						1									1		1.3	50		
Max Part Size (mm) Mobilized at Bankfull																						1.0	50		
Stream Power (transport capacity) (W/m ² )																									
Additional Research Parameters					_																				
Rosgen Classification	1				1						1						1			1		C	4b		
Bankfull Velocity (fps)				1							_									-		4.			
Bankfull Discharge (cfs)		1	-1		1																				
Valley Length (ft)											-														
Channel Thalweg Length (ft)																						830	.01		
Sinuosity (ft/ft)																				1		0.8			
Water Surface Slope (Channel) (ft/ft)																	1			1		0.0			
BF Slope (ft/ft)																	1			1					
³ Bankfull Floodplain Area (acres)																	1			1		0.	03		
⁴ % of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other											1														

											Baseline S														
Parameter	Gauge		Regional C	'UD/A			Pro-Evist	ing Condition	Litt	le Buffalo	Creek (9414	7) Segmen		<b>JT7</b> Reach(es) Data	2		1	Design		1		Monitoring	Baseline		
	J. J. J.		Regionaro	dive			TTO EXIST	ing condition					Ttelefende I	reach(co) Dat				Design				Wormoning	Dusenne		
Dimension and Substrate - Riffle Only		LL	UL	Ea.	Min	Mean	Med	Max	SD°	In	Min	Mean	Med	Max	SD°	In	Min	Med	Max	Min	Mean	Med	Max	SD°	In
Bankfull Width (ft)				- 4.	20.47	26.07	26.81	30.18	4.06	4	43	52		64	8.60	4	25.00	25.00	25.00	18.58	19.65	19.65	20.71	1	2
Floodprone Width (ft)					39.20	54.40	43.82	90.77	24.57	4			1			4	>55	>55	>55	>80			>100	1	2
Bankfull Mean Depth (ft)					0.85	1.00	1.00	1.17	0.13	4	0.98	1.16	1	1.98	0.44	4	0.98	0.98	0.98	0.96	1.07	1.07	1.17	1	2
¹ Bankfull Max Depth (ft)					1.79	2.16	1.94	2.95	0.54	4		-				4	1.13	1.13	1.13	1.17	1.43	1.43	1.69		2
Bankfull Cross Sectional Area (ft ² )					19.96	26.07	26.67	31.00	5.47	4	55	59		65	4.11	4	24.44	24.44	24.44	19.93	20.81	20.81	21.68		2
Width/Depth Ratio					20.89	26.33	26.30	31.81	5.33	4	31	47		64	13.47	4	25.51	25.51	25.51	15.92	18.72	18.72	21.52		2
Entrenchment Ratio					1.45	2.07	1.92	3.01	0.75	4	>2.2	>2.2		>2.2		4	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2		2
'Bank Height Ratio											1	1				4	1.00	1.00	1.00	0.78	0.85	0.85	0.92		2
Profile	-				-				•		-			·	•	·	-		·			•			•
Riffle Length (ft)																	10	35	60	9.79	36.53	37.12	54.31		
Riffle Slope (ft/ft)							1						1				0.008	0.01	0.01	0.001	0.014	0.013	0.039	1	
Pool Length (ft)																	10	10	20	8.16	15.87	13.77	28.95		
Pool Max Depth (ft)																	1.5	2	2	1.00	2.05	2.04	2.85		
Pool Spacing (ft)																	15	55	100	13.27	54.36	56.47	130.67		
Pattern																									
Channel Belwidth (ft)																	201	201.0	201	154.56	209.27	209.27	263.98		
Radius of Curvature (ft)																	50	137.5	686	90.88	194.28	125.65	434.94		
RC: Bankfull Width (ft/ft)																	28	31.5	31	15.71	20.53	21.99	22.62		
Meander Wavelength (ft)																	720	720	720	687.90	687.90	687.90	687.90		
Meander Width Ratio																	6.48	6.38	7.18	9.838	10.191	9.514	11.670		
Transport Parameters																									
Reach Shear Stress (competency) (lb/f ² )							(	).479										0.407				0.3	58		
Max Part Size (mm) Mobilized at Bankfull																									
Stream Power (transport capacity) (W/m ² )																									
Additional Research Parameters																				<u>.</u>					
Rosgen Classification							F	4/C4			T			C4			Τ	C4		Г		C	4		
Bankfull Velocity (fps)								3.7						-				3.93				4.			
Bankfull Discharge (cfs)					1			96										-							
Valley Length (ft)																									
Channel Thalweg Length (ft)											1							1110.53		1		112	6.71		
Sinuosity (ft/ft)														1.25				1.21				1.	23		
Water Surface Slope (Channel) (ft/ft)											1			0.38			1	0.006		1		0.0	06		
BF Slope (ft/ft)											1			0.38			1	0.006		1		0.0	05		
³ Bankfull Floodplain Area (acres)																		0.459				5.	35		
⁴ % of Reach with Eroding Banks											1							_		1					
Channel Stability or Habitat Metric											1														
Biological or Other																									

		Table	10b. B	aseline	Stream		y (Subs [.] Creek (					nent Pa	rameter	r Distrib	ution)						
Parameter		Pre-Ex	isting Co	ondition				Referen	ce Reach	(es) Data				Design				As-	built/Base	eline	
[*] Ri% / Ru% / P% / G% / S%																					
¹ SC% / Sa% / G% / C% / B% / Be%																					
¹ d16 / d35 / d50 / d84 / d95 / di ⁵ / di ⁵ (mm)																					
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																					
Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																					

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes ndicated and provide the percetage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary The intent here is to provide the reader/consumer of fesign and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitaed states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design measurements), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construction distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longiudinal prfile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

		Table	10b. B	aseline	Stream					nks, and nt/Reacl			rameter	Distrib	ution)						
Parameter		Pre-Ex	isting Co	ndition				Reference	e Reach	(es) Data	 			Design		 		As-	built/Base	eline	 _
¹ Ri% / Ru% / P% / G% / S%	I	· · ·					r														
⁺ SC% / Sa% / G% / C% / B% / Be%																					
¹ d16 / d35 / d50 / d84 / d95 / di [×] / di ^{××} (mm)																					
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																					
Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																					

Shaded cells indicate that these will typically not be filled in

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes ndicated and provide the percetage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary

			Table	10b. B	aseline				ry (Subs ) Creek (							ient Pa	rametei	r Distrib	ution)					
Little Buffalo Creek (94147) Segment/Reach: Mainstem Reach 4     meter   Pre-Existing Condition   Reference Reach(es) Data   Design   As-built/Baseline																								
	Pre-Existing Condition Reference Reach(es) Data Design As-built/Baseline																							
¹ Ri% / Ru% / P% / G% / S%																								
'SC% / Sa% / G% / C% / B% / Be%																								
ˈd16 / d35 / d50 / d84 / d95 / di ^{se} (mm)																								
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																								
"Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																								

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes ndicated and provide the percetage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary

The intent here is to provide the reader/consumer of fesign and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitaed states as well as comparisons to the reference distributions.

with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longiudinal prfile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling

			Table	e 10b. B	Baseline	e Stream	Data S		ry (Subs Buffalo							nent Pa	ramete	r Distrib	oution)					
Parameter	Little Buffalo Creek (94147) Segment/Reach: UT2     Atter   Pre-Existing Condition   Reference Reach(es) Data   Design   As-built/Baseline																							
'Ri% / Ru% / P% / G% / S%																								
'SC% / Sa% / G% / C% / B% / Be%																								
¹ d16 / d35 / d50 / d84 / d95 / di [×] / di [×] (mm)																								
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																								
"Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																								

Shaded cells indicate that these will typically not be filled in

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes ndicated and provide the percetage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary

		Table	10b. B	aseline	Stream	Data S	y (Subs Buffalo					ent Pa	ameter	r Distrib	ution)						
Parameter		Pre-Ex	cisting Co	ondition				Referen	ce Reach	(es) Data				Design				As-l	ouilt/Base	eline	
¹ Ri% / Ru% / P% / G% / S%																					
'SC% / Sa% / G% / C% / B% / Be%																					
¹ d16 / d35 / d50 / d84 / d95 / di ⁵ / di ⁵ (mm)																					
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																					
Thcision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																					

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

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Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary

The intent here is to provide the reader/consumer of fesign and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitaed states as well as comparisons to the reference distributions. with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section measurements and the longiudinal prfile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling

		Table	10b. Ba	aseline	e Stream	Data S	y (Subs Buffalo					nent Pa	ramete	r Distrib	ution)						
Parameter		Pre-Ex	isting Co	ndition				Referen	ce Reach	(es) Data				Design				As-	built/Bas	eline	
¹ Ri% / Ru% / P% / G% / S%																					
'SC% / Sa% / G% / C% / B% / Be%																					
¹ d16 / d35 / d50 / d84 / d95 / di ⁵ / di ⁵ (mm)	1																				
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																					
³ Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																					

Shaded cells indicate that these will typically not be filled in

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes ndicated and provide the percetage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary

		Table	10b. Ba	aseline	Stream	Data S	y (Subs Buffalo				-	-	ontainn	ient Pa	rameter	Distrib	ution)						
Parameter		Pre-Ex	isting Co	ondition				Referen	ce Reach	(es) Data						Design				As-	built/Bas	eline	
¹ Ri% / Ru% / P% / G% / S%																							
¹ SC% / Sa% / G% / C% / B% / Be%																							
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																							
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	1																						
³ Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																							

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes ndicated and provide the percetage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2, 3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary

			Cross S	Section 1 (	Pool)-1P					Cross S	ection 2 (F	tiffle)-1R		
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	640.24							640.21						
Bankfull Width (ft)	35.77							35.21						
Floodprone Width (ft)	>80							>80						
Bankfull Mean Depth (ft)	1.11							1.23						
Bankfull Max Depth (ft)	2.48							1.79						
Bankfull Cross Sectional Area (ft ² )	39.80							43.15						
Bankfull Width/Depth Ratio	32.15							28.73						
Bankfull Entrenchment Ratio	>2.2							>2.2						
Bankfull Bank Height Ratio	0.73							1.00						
Cross Sectional Area between end pins (ff)	85.42							77.79						
d50 (mm)	5.00							15.90						

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this must be discussed with NCDENR-DMS. If this cannot be resolved in time for a given years report submission is dontole in this should be included that states: 'It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consisten datum is determined to be necessary'.

Table 11a. Mon	itoring d	ata - Dir	nension	al Morph	ology S	ummary	(Dimens	sional Pa	arameter	s - Cros	s Sectio	ns)		
	L	ittle Buf	falo Cree	ek (9414	7) Segm	ent/Read	ch: Main	stem Re	ach 3					
			Cross S	ection 1 (F	tiffle) -2R					Cross S	Section 2 (	Pool)-2P		
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	630.92							629.80						
Bankfull Width (ft)	38.31							39.59						
Floodprone Width (ft)	>90							>90						
Bankfull Mean Depth (ft)								1.11						
¹ Bankfull Max Depth (ft)	1.90							2.44						
Bankfull Cross Sectional Area (ft ² )	48.23							43.79						
Bankfull Width/Depth Ratio	30.43							35.79						
Bankfull Entrenchment Ratio	>2.2							>2.2						
Bankfull Bank Height Ratio	0.94							0.69						
Cross Sectional Area between end pins (ff)	116.34							89.91						
d50 (mm)	31.00							6.7						

#### Shaded cells indicate that these will typically not be filled in

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this must be discussed with NCDENR-DMS. If this cannot be resolved in time for a given years report submission in a donote in this should be included that states: 'It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum is determined to be necessary.'

Table 11a. Monitoring data - Dimens Parai Little Buffalo Creek (9	meters -	Cross S	ections	)	n Reach		nsionai
			Cross	Section 1 (	Pool)-3P		
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	624.26						
Bankfull Width (ft)	29.35						
Floodprone Width (ft)	>65						
Bankfull Mean Depth (ft)	1.87						
¹ Bankfull Max Depth (ft)	3.12						
Bankfull Cross Sectional Area (ft ² )	54.90						
Bankfull Width/Depth Ratio	15.69						
Bankfull Entrenchment Ratio	>2.2						
Bankfull Bank Height Ratio	0.70						
Cross Sectional Area between end pins (ft ² )	106.25						
d50 (mm)	3.40						

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this must be discussed with NDDENR-DMS. If this cannot be resolved in time for a given years report submission a tootnote in this should be included that states: 'It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in durue submission based on a consisten datum is determined to be necessary."

Table 11a. Monitoring data - Dimens Para Little Buffalo C	neters -	Cross S	Sections)	)	Г2	(Dimer	nsional
			Cross	Section 1	(Riffle)		
Based on fixed baseline bankfull elevation1	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	639.34						
Bankfull Width (ft)	3.52						
Floodprone Width (ft)	8.34						
Bankfull Mean Depth (ft)	0.52						
¹ Bankfull Max Depth (ft)	0.72						
Bankfull Cross Sectional Area (ft ² )	1.82						
Bankfull Width/Depth Ratio	6.82						
Bankfull Entrenchment Ratio	2.37						
Bankfull Bank Height Ratio	1.01						
Cross Sectional Area between end pins (fr ² )	20.73						
d50 (mm)	5.00						

Shaded cells indicate that these will typically not be filled in

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this must be discussed with NCDENR-DMS. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: 'It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a trutre submission based on a consistent datum is determined to be necessary.'

						Table 1	1a. Mon	itoring d			al Morph alo Cree					rameter	s - Cros	s Sectio	ns)									
			Cross S	ection 1 (F	tiffle) -R1					Cross S	ection 2 (F	Pool)- 1P					Cross S	ection 3 (R	iffle)- 2R					Cross S	ection 4 (F	Riffle)-3R		
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	647.14							638.72							632.79							622.92						
Bankfull Width (ft)	3.50							4.06							5.91							3.73						
Floodprone Width (ft)	24.45							8.28							13.14							6.35						
Bankfull Mean Depth (ft)	0.53							0.25							0.29							0.20						
¹ Bankfull Max Depth (ft)	0.82							0.46							0.61							0.31						
Bankfull Cross Sectional Area (ft ² )	1.84							1.01							1.69							0.75						
Bankfull Width/Depth Ratio	6.66							16.32							20.67							18.61						
Bankfull Entrenchment Ratio	6.99							2.04							2.22							1.70						
Bankfull Bank Height Ratio	0.74							0.54							0.57							0.71						
Cross Sectional Area between end pins (ff ² )	13.50							27.61							26.63							15.64						
d50 (mm)	silt/clay							silt/clay							4.50							0.11						

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this mu be discussed with NCDENR-DMS. If this cannot be resolved in time for a given years report submission a foorbuch in this should be included that states : "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated in a based on the based on the based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this mu constant. This should be included that states : "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated in a based on a constant datum is determined to be necessary."

Table 11a. Mon	itoring d						(Dimens nt/Reacl		arameter	s - Cros	s Sectio	ns)		
			Cross S	Section 1 (I	Pool)-1P					Cross S	ection 2 (F	Riffle)-1R		
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	629.84							627.41						
Bankfull Width (ft)	20.38							13.32						
Floodprone Width (ft)	>100							>50						
Bankfull Mean Depth (ft)	1.34							0.91						
¹ Bankfull Max Depth (ft)	2.71							1.71						
Bankfull Cross Sectional Area (ft ² )	27.37							12.13						
Bankfull Width/Depth Ratio	15.18							14.63						
Bankfull Entrenchment Ratio	>2.2							>2.2						
Bankfull Bank Height Ratio	0.63							0.60						
Cross Sectional Area between end pins (ff ² )	54.73							29.20						
d50 (mm)	7.00							8.90						

Shaded cells indicate that these will typically not be filled in

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this must be discussed with NCDENR-DMS. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states : 'It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consisten datum is determined to be necessary.'

		Tal	ble 11a.	Monitori	ng data			orpholog Creek (94		• •			ieters - C	cross Se	ctions)						
			Cross S	ection 1 (F	Riffle)-1R					Cross S	Section 2 (I	Pool)-1P					Cross S	ection 3 (F	tiffle)-2R		
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	615.87							614.93							613.60						
Bankfull Width (ft)	20.71							27.10							18.58						
Floodprone Width (ft)	>100							>80							>80						
Bankfull Mean Depth (ft)	0.96							0.96							1.17						
¹ Bankfull Max Depth (ft)	1.17							1.29							1.69						
Bankfull Cross Sectional Area (ft ² )	19.93							25.98							21.68						
Bankfull Width/Depth Ratio	21.52							28.27							15.92						
Bankfull Entrenchment Ratio	>2.2							>2.2							>2.2						
Bankfull Bank Height Ratio	0.78							0.67							0.92						
Cross Sectional Area between end pins (ff)	66.61							76.83							52.17						
d50 (mm)	23.00							silt/clay							0.50						

1 = Widths and depths for annual measurements will be based on the baseline bankfull datum regardless or dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannt acquire the datum used for prior years this must be discussed with NCDENFX-DMS. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states. "It is uncertain the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confination. Values will be reaculated in a future submission based on a consistent datum for a consistent datum to provide confination. Values will be reaculated values. Consistent datum data for prior experimental to be reaced and the previous for based on the baseline data for the submission tased on a consistent datum the previous for the monitoring data for the previous for the monitoring data for the previous for the monitoring data for the previous for the previous for the monitoring history, which have influence consistent datum the previous for the monitoring data for the previous for the monitoring data for the previous for the previous for the monitoring data for the previous for the previous for the monitoring data for the previous for the pre

												L						Stream F nent/Re																			
Parameter			E	Baseli	ne					Μ	1Y-1						MY-:	-2					MY-3					Ν	1Y-4						MY-5		
Dimension and Substrate - Riffle Only	Min	Mear	Med	Μ	ax SD	⁵ n	Mi	n N	/lean	Med	Max	SD⁵	n	Min	Mea	n Med	I N	_{Max} S	SD⁵ n	Min	Mean	Med	Max	SD⁵	n	Min	Mean	Med	Max	SD⁵	n	Min	Mean	Med	Max	SD⁵	n
Bankfull Width (ft)	35.21	35.2	21 35.2	21	35.21	1	.00																														
Floodprone Width (ft)	>80	>8	0 >80	0	>80	1	.00																														
Bankfull Mean Depth (ft)	1.23	1.2	3 1.2	3	1.23	1	.00																														
¹ Bankfull Max Depth (ft)	1.79	1.7	9 1.7	9	1.79	1	.00																														
Bankfull Cross Sectional Area (ft ² )	43.15	43.1	15 43.1	15	43.15	1	.00																														
Width/Depth Ratio	28.73	28.	73 28.7	73	28.73	1	.00																														
Entrenchment Ratio	>2.2	>2.	2 >2.	2	>2.2	1	.00																														
'Bank Height Ratio	1.00	1.0	0 1.0	0	1.00	1	.00																														
Profile																																					
Riffle Length (ft)	7.73	23.	71 22.0	04	38.44																																
Riffle Slope (ft/ft)	0.000	0.02	26 0.02	22	0.076																																
Pool Length (ft)	4.21	25.4	43 17.5	55	83.20																																
Pool Max Depth (ft)	1.96	2.7	1 2.4	8	3.76																																-
Pool Spacing (ft)	29.95	48.6	64 39.0	06	91.87																																-
Pattern															-																			_		-	
Channel Belwidth (ft)	59.64	105.	83 92.6	58 1	65.18																																
Radius of Curvature (ft)	72.965	83.1	53 79.0	01 9	7.485																																
RC: Bankfull Width (ft/ft)	27.95	35.6	03 36.1	13	46.36																																
Meander Wavelength (ft)																																					
Meander Width Ratio	1.2865	3.03	37 2.56	52 5	5.9098																																
Additional Research Parameters																																					
Rosgen Classification				C4																																	
Channel Thalweg Length (ft)				2299.7																																	
Sinuosity (ft/ft)				1.05																																	
Water Surface Slope (Channel) (ft/ft)																																					
BF Slope (ft/ft)																																					
¹ Ri% / Ru% / P% / G% / S%																																					
¹ SC% / Sa% / G% / C% / B% / Be%																																					
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																																					
² % of Reach with Eroding Banks																	•						•	•									•	•			
Channel Stability or Habitat Metric																																					
Biological or Other																				1																	

1 = The distributions for these parameters can include information from both the cross-section measurements and the longitudinal profile.

2 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data.

3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

													L							m Reacl t/Reach:																					
Parameter				Base	line						MY	′-1							MY-2						MY	-3					ſ	MY-4						M	<i>(</i> -5		
Dimension and Substrate - Riffle Only	Min	Mear	n Mee	d N	Max	SD⁵	n	Min	Me	ean M	ed	Max	SD⁵	n	Min	n I	Mean	Med	Max	SD⁵	n	Min	Mear	n Me	ed N	Max	SD⁵	n	Min	Mean	Med	Max	SD	⁵ n	Mir	n ľ	Mean	Med	Max	SD⁵	n
Bankfull Width (ft)	38.31	38.	31 38	8.31	38.31		1																																		ı
Floodprone Width (ft)	>90	>9	0 >	>90	>90		1																																		
Bankfull Mean Depth (ft)	1.26	1.2	6 1	.26	1.26		1																																		I
¹ Bankfull Max Depth (ft)	1.90	1.9	0 1	.90	1.90		1																																		1
Bankfull Cross Sectional Area (ft ² )	48.23	48.	23 48	8.23	48.23		1																																		1
Width/Depth Ratio	30.43	30.4	43 30	0.43	30.43		1																																		1
Entrenchment Ratio	>2.2	>2	2 >	2.2	>2.2		1																																		1
¹ Bank Height Ratio	0.94	0.9	4 0	).94	0.94		1																																		1
Profile													-		-																										
Riffle Length (ft)	11.30	18.	65 20	0.99	21.31																																				í — — —
Riffle Slope (ft/ft)	0.0182	0.05	02 0.0	0241	0.1345																																				1
Pool Length (ft)	6.32	12.3	33 10	0.63	21.53																																				í
Pool Max Depth (ft)	0.50	1.1	3 1	.26	1.69																																				i
Pool Spacing (ft)	36.04	45.4	42 46	6.77	53.33																																				i
Pattern																																									
Channel Belwidth (ft)	58.77	58.	77 58	8.77	58.77																																				í — — —
Radius of Curvature (ft)	83.8	83	8 8	33.8	83.8																																				í
RC: Bankfull Width (ft/ft)	4.58	15.6	54 16	6.52	23.05																																				í
Meander Wavelength (ft)																																									í
Meander Width Ratio	2.5497	5.19	78 3.5	5575	12.832																																				1
Additional Research Parameters																																									
Rosgen Classification				C4	1																																				
Channel Thalweg Length (ft)				1079	.45																																				
Sinuosity (ft/ft)				1.0	1																																				
Water Surface Slope (Channel) (ft/ft)																																									
BF Slope (ft/ft)																																									
¹ Ri% / Ru% / P% / G% / S%																																									
¹ SC% / Sa% / G% / C% / B% / Be%					_																																				i
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																																									
² % of Reach with Eroding Banks																		-		•										•								-			
Channel Stability or Habitat Metric															1							1																			
Biological or Other															1														1												

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2 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data.

3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

																				n Reach gment/F			ry																
Parameter				Basel	line						MY-	-1						M	(-2						MY-3					١	ЛY-4						MY	5	
Dimension and Substrate - Riffle Only	Min	Mear	n Med	d N	Max	SD⁵	n	Min	Me	an Me	ed N	Max	SD⁵	n	Min	Me	an M	led	Max	SD⁵	n	Min	Mean	Med	Ма	x SD⁵	n	Min	Mean	Med	Max	SD⁵	'n	Min	Me	an M	ed N	lax SI	D⁵ n
Bankfull Width (ft)	3.52	3.5	2 3	.52	3.52		1																																
Floodprone Width (ft)	8.34	8.3	4 8	.34	8.34		1																																
Bankfull Mean Depth (ft)	0.52	0.5	2 0	.52	0.52		1																																
¹ Bankfull Max Depth (ft)	0.72	0.7	2 0	.72	0.72		1																																
Bankfull Cross Sectional Area (ft ² )	1.82	1.8	2 1	.82	1.82		1																																
Width/Depth Ratio	6.82	6.8	2 6	.82	6.82		1																																
Entrenchment Ratio	2.37	2.3	7 2	.37	2.37		1																																
¹ Bank Height Ratio	1.01	1.0	1 1.	.01	1.01		1																																
Profile								-							-																								
Riffle Length (ft)	6.98	13.	52 13	3.52	20.07																																		
Riffle Slope (ft/ft)	0.010	0.0	13 0.	013	0.016																																		
Pool Length (ft)	12.76	12.	76 12	2.76	12.76																																		
Pool Max Depth (ft)	0.89	0.8	9 0	.89	0.89																																		
Pool Spacing (ft)	30.63	30.	63 30	0.63	30.63																																		
Pattern																																							
Channel Belwidth (ft)																																							
Radius of Curvature (ft)																																							
RC: Bankfull Width (ft/ft)																																							
Meander Wavelength (ft)																																							
Meander Width Ratio																																							
Additional Research Parameters																																							
Rosgen Classification				B6	<b>i</b>																																		
Channel Thalweg Length (ft)				951.3	37																																		
Sinuosity (ft/ft)				0.96	6																																		
Water Surface Slope (Channel) (ft/ft)																																							
BF Slope (ft/ft)																																							
¹ Ri% / Ru% / P% / G% / S%																																							
¹ SC% / Sa% / G% / C% / B% / Be%																																							
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																					_																		
² % of Reach with Eroding Banks																										•			•			•							
Channel Stability or Habitat Metric															Ĩ																			1					
Biological or Other															1							1																	

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3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

													Та						eam Re Segme				у																	
Parameter				Basel	ine						MY-1							MY-2							MY-3					I	MY-4						М	Y-5		
Dimension and Substrate - Riffle Only	Min	Mear	n Me	d N	Лах	SD⁵	n	Min	Mear	n Med	Max	SD⁵	n		Min	Mean	Med	Max	x SD	⁵ r	ı	Min	Mean	Med	Max	x SD⁵	n	Min	Mean	Med	Max	SD	° n	М	in	Mean	Med	Max	SD⁵ r	1
Bankfull Width (ft)	3.50	4.3	38 3	8.73	5.91		3																																	
Floodprone Width (ft)	6.35	14.	65 13	3.14	24.45		3																																	
Bankfull Mean Depth (ft)	0.20	0.3	34 0	).29	0.53		3																																	
¹ Bankfull Max Depth (ft)	0.31	0.5	68 0	).61	0.82		3																																	
Bankfull Cross Sectional Area (ft ² )	0.75	1.4	13 1	.69	1.84		3																																	
Width/Depth Ratio	6.66	15.	31 18	8.61	20.67		3																																	
Entrenchment Ratio	1.70	3.6	64 2	2.22	6.99		3																																	
¹ Bank Height Ratio	0.57	0.6	67 0	).71	0.74		3																																	
Profile								-						-																										
Riffle Length (ft)	57.25	107	.81 89	9.01	215.05																																			
Riffle Slope (ft/ft)	0.011	0.0	17 0.	.014	0.029																																			
Pool Length (ft)	1.50	12.	97 6	6.04	31.37																																			
Pool Max Depth (ft)	4.14	4.4	46 4	.61	4.62																																			
Pool Spacing (ft)	114.27	133	.63 14	3.31	143.31																																			
Pattern		<u> </u>				<u> </u>			<u> </u>			<u> </u>							<u> </u>														<u> </u>							
Channel Belwidth (ft)	13.40	34.	20 42	2.73	46.46	1																																		
Radius of Curvature (ft)	21.64	35.	62 35	5.15	50.55																																			
RC: Bankfull Width (ft/ft)	2.38	15.	62 14	4.63	30.84																																			
Meander Wavelength (ft)																																								
Meander Width Ratio	0.43	5.3	37 2	2.44	19.52																																			
Additional Research Parameters																																								
Rosgen Classification				B6																																				
Channel Thalweg Length (ft)				1469.	.07																																			
Sinuosity (ft/ft)				0.9	5																																			
Water Surface Slope (Channel) (ft/ft)				0.01	9																																			
BF Slope (ft/ft)				0.01	9																																			
¹ Ri% / Ru% / P% / G% / S%																																								
¹ SC% / Sa% / G% / C% / B% / Be%																																								
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																																								
² % of Reach with Eroding Banks																																								
Channel Stability or Habitat Metric																																								
Biological or Other																																								

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2 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data.

3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

																				m Reacl egment/			ary																		
Parameter				Baseli	ine						M	Y-1							MY-2						MY	Y-3						MY-4						М	Y-5		
Dimension and Substrate - Riffle Only	Min	Mear	n Mec	d N	Лах	SD⁵	n	Min	Ν	/lean N	led	Max	SD⁵	n	Mir	n I	Mean	Med	Max	SD⁵	n	Min	Mea	in M	led	Max	SD⁵	n	Min	Mean	Med	Max	SE	° n	n i	Min	Mean	Med	Max	SD⁵	n
Bankfull Width (ft)	13.32	13.	32 13	3.32	13.32		1																																		
Floodprone Width (ft)	>50	>5	0 >	50	>50		1																																		
Bankfull Mean Depth (ft)	0.91	0.9	01 0.	.91	0.91		1																																		
¹ Bankfull Max Depth (ft)	1.71	1.7	'1 1.	.71	1.71		1																																		
Bankfull Cross Sectional Area (ft ² )	12.13	12.	13 12	2.13	12.13		1																																		
Width/Depth Ratio	14.63	14.0	63 14	.63	14.63		1																																		
Entrenchment Ratio	>2.2	>2	.2 >2	2.2	>2.2		1																																		
¹ Bank Height Ratio	0.60	0.6	i0 0.	.60	0.60		1																																		
Profile								-							-																										
Riffle Length (ft)	4.74	19.	81 21	.81	30.73					T					Т																		Τ								
Riffle Slope (ft/ft)	0.012	0.0	27 0.0	018	0.074																																				
Pool Length (ft)	6.99	12.	56 9.	.10	26.02																																				
Pool Max Depth (ft)	1.89	2.2	.8 2.	.32	2.70																																				
Pool Spacing (ft)	50.06	56.	72 55	i.31	68.08																																				
Pattern																																									
Channel Belwidth (ft)	80.13	98.4	47 98	3.47	116.81										1																1										
Radius of Curvature (ft)	36.70	47.	23 49	0.01	56.95																																				
RC: Bankfull Width (ft/ft)	16.34	19.:	23 18	8.89	23.76																																				
Meander Wavelength (ft)	221.95	221.	.95 22	1.95	221.95																																				
Meander Width Ratio	3.37	5.1	9 4.	.91	7.15																																				
Additional Research Parameters																																									
Rosgen Classification				C4b	2																																				
Channel Thalweg Length (ft)				830.0	01																																				
Sinuosity (ft/ft)				0.81	1																																				
Water Surface Slope (Channel) (ft/ft)																																									
BF Slope (ft/ft)																																									_
¹ Ri% / Ru% / P% / G% / S%							_																																		
¹ SC% / Sa% / G% / C% / B% / Be%											_																													1	
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																			1												1										
² % of Reach with Eroding Banks																				1													1								
Channel Stability or Habitat Metric																													1												
Biological or Other																																									

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																	ream Reach ) Segment/			ry																
Parameter			Ba	aseline						MY-1						MY-2						MY-3					N	IY-4					N	IY-5		
Dimension and Substrate - Riffle Only	Min	Mean	Med	Ma	ax SD⁵	n	Min	Mean	Med	Max	SD⁵	n	Min	Mean	Med	Max	ax SD ⁵	n	Min	Mean	Med	Ma	IX SD⁵	n	Min	Mean	Med	Max	SD ⁵	n	Min	Mean	Med	Max	SD⁵n	
Bankfull Width (ft)	18.58	19.65	19.65	20.7	.71	2																														
Floodprone Width (ft)	>80			>10	00	2																														
Bankfull Mean Depth (ft)	0.96	1.07	1.07	1.1	17	2																														
¹ Bankfull Max Depth (ft)	1.17	1.43	1.43	1.6	69	2																														
Bankfull Cross Sectional Area (ft ² )	19.93	20.81	20.81	21.6	.68	2																														
Width/Depth Ratio	15.92	18.72	18.72	21.5	.52	2																														
Entrenchment Ratio	>2.2	>2.2	>2.2	>2.	2.2	2																														
¹ Bank Height Ratio	0.78	0.85	0.85	0.9	92	2																														
Profile							-						-																							
Riffle Length (ft)	9.79	36.53	37.12	54.3	.31																															
Riffle Slope (ft/ft)	0.001	0.014	0.013	0.03	)39																															
Pool Length (ft)	8.16	15.87	13.77	28.9	.95																															
Pool Max Depth (ft)	1.00	2.05	2.04	2.8	85																															
Pool Spacing (ft)	13.27	54.36	56.47																																	
Pattern																<u> </u>												<u> </u>								
Channel Belwidth (ft)	154.56	209.27	209.27	7 263.	.98							1	T					1																		
Radius of Curvature (ft)	90.88	194.28	125.65	5 434.	.94																															
RC: Bankfull Width (ft/ft)	15.71	20.53	21.99	22.6	.62																															
Meander Wavelength (ft)	687.90		687.90																																	
Meander Width Ratio	9.8383		9.5145																																	
																				1	1			ė			1									
Additional Research Parameters																																				
Rosgen Classification				C4																																
Channel Thalweg Length (ft)			11	126.71																																
Sinuosity (ft/ft)				1.23																																
Water Surface Slope (Channel) (ft/ft)			0	0.006																																
BF Slope (ft/ft)			0	0.005																																
¹ Ri% / Ru% / P% / G% / S%																																				
¹ SC% / Sa% / G% / C% / B% / Be%																																				
¹ d16 / d35 / d50 / d84 / d95 / di ^P / di ^{SP} (mm)																		_															1			
² % of Reach with Eroding Banks																																	•			
Channel Stability or Habitat Metric							1						1						1						1											
Biological or Other																									1											

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3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-1P
Drainage Area (sq mi):	2.99
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	641.15
0.219	640.24
1.695	639.91
2.776	639.65
4.355	639.53
7.311	639.54
9.854	639.49
12.346	639.28
13.669	638.86
14.543	638.42
15.544	638.02
18.338	637.76
21.28	638.09
23.335	638.47
24.378	639.01
25.412	639.37
26.627	639.46
29.304	639.6
32.257	639.6
34.327	639.49
35.476	639.9
36.121	640.33
39.169	640.28
43.769	640.25
47.545	640.15
50.119	640.38
50.166	641.16

SUMMARY DATA	
Bankfull Elevation:	640.24
Bankfull Cross-Sectional Area:	39.80
Bankfull Width:	35.77
Flood Prone Area Elevation:	645.20
Flood Prone Width:	>80
Max Depth at Bankfull:	2.48
Mean Depth at Bankful:	1.11
W/D Ratio:	32.15
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.73



Stream Type C4

Station and description 23+38.19 MS-1P Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-1R
Drainage Area (sq mi):	2.99
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	641.4
0.043	640.27
0.839	640.22
2.358	639.96
3.454	639.48
4.371	639.08
6.76	639.08
9.755	638.95
10.99	638.77
12.277	638.54
13.81	638.51
16.079	638.48
17.614	638.43
19.581	638.45
21.6	638.42
23.432	638.42
25.423	638.79
27.987	639.26
31.095	639.3
33.642	639.42
34.731	639.8
36.137	640.21
36.574	640.92

SUMMARY DATA	
Bankfull Elevation:	640.21
Bankfull Cross-Sectional Area:	43.15
Bankfull Width:	35.21
Flood Prone Area Elevation:	643.79
Flood Prone Width:	>80
Max Depth at Bankfull:	1.79
Mean Depth at Bankful:	1.23
W/D Ratio:	28.73
Entrenchment Ratio:	>2.2
Bank Height Ratio:	1.00



Stream Type C4

Station and description 24+91.17 MS-1R Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-2R
Drainage Area (sq mi):	2.82
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	632.07
0.233	631.42
1.694	631
3.826	630.45
5.749	630.14
7.006	629.84
8.015	629.34
10.035	629.27
12.676	629.47
14.4	629.45
15.347	629.21
18.736	629.17
21.728	629.02
24.808	629.13
27.966	629.13
29.1	629.64
30.115	629.84
32.846	629.96
36.356	630.29
37.559	630.52
39.491	630.55
40.275	630.92
42.626	631.08
43.628	631.61
44.363	632.11
44.458	632.93

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SUMMARY DATA	
Bankfull Elevation:	630.92
Bankfull Cross-Sectional Area:	48.23
Bankfull Width:	38.31
Flood Prone Area Elevation:	634.72
Flood Prone Width:	>90
Max Depth at Bankfull:	1.90
Mean Depth at Bankful:	1.26
W/D Ratio:	30.43
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.94





Disco Design	Madlin Day Day Birra
River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-2P
Drainage Area (sq mi):	2.82
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	630.46
0.35	629.8
1.583	629.38
4.933	629.27
7.132	628.94
8.358	628.84
9.263	628.72
12.574	628.86
14.01	628.75
14.991	628.12
17.487	627.63
19.911	627.36
21.338	627.38
23.639	627.74
25.15	627.86
27.713	628.11
28.7	628.76
29.52	629.27
34.925	629.57
37.252	629.34
39.223	629.58
40.915	630.1
43.25	630.09
45.501	630.29
45.541	631.25

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SUMMARY DATA	
Bankfull Elevation:	629.80
Bankfull Cross-Sectional Area:	43.79
Bankfull Width:	39.59
Flood Prone Area Elevation:	634.68
Flood Prone Width:	>90
Max Depth at Bankfull:	2.44
Mean Depth at Bankful:	1.11
W/D Ratio:	35.79
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.69





River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	MS-3P
Drainage Area (sq mi):	4.01
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	625.57
0.168	624.54
1.295	624.26
2.105	623.68
3.062	623.15
5.449	622.63
6.71	622.34
7.331	622.08
8.524	621.92
9.616	621.87
11.355	621.38
12.668	621.28
14.262	621.27
15.592	621.14
17.481	621.36
18.951	621.71
20.154	621.9
21.64	622.35
24.433	622.92
26.557	623.45
29.144	623.84
31.416	624.48
33.255	624.84
34.227	626.05
34.275	625.08

SUMMARY DATA	
Bankfull Elevation:	624.26
Bankfull Cross-Sectional Area:	54.90
Bankfull Width:	29.35
Flood Prone Area Elevation:	630.50
Flood Prone Width:	>65
Max Depth at Bankfull:	3.12
Mean Depth at Bankful:	1.87
W/D Ratio:	15.69
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.70



Stream Type C4

Station and description 6433.12 MS-3P Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT2-1R
Drainage Area (sq mi):	0.3
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	641.95
0.061	641.06
1.69	640.08
3.369	639.34
3.668	638.8
4.28	638.82
4.91	638.62
5.543	638.64
6.047	638.76
7.104	639.49
7.949	640.06
8.648	640.69
9.284	640.96
9.431	641.83

SUMMARY DATA	
Bankfull Elevation:	639.34
Bankfull Cross-Sectional Area:	1.82
Bankfull Width:	3.52
Flood Prone Area Elevation:	640.78
Flood Prone Width:	8.34
Max Depth at Bankfull:	0.72
Mean Depth at Bankful:	0.52
W/D Ratio:	6.82
Entrenchment Ratio:	2.37
Bank Height Ratio:	1.01



Stream Type B6

Station and description 1391.34 UT2-1R Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-1R
Drainage Area (sq mi):	0.097
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	648.65
0.152	647.95
2.109	647.42
3.295	646.93
3.813	646.61
4.17	646.44
4.855	646.33
5.159	646.32
5.736	646.47
6.296	647.14
6.964	647.51
8.586	648.13
8.819	648.93

SUMMARY DATA	
Bankfull Elevation:	647.14
Bankfull Cross-Sectional Area:	1.84
Bankfull Width:	3.50
Flood Prone Area Elevation:	648.78
Flood Prone Width:	24.45
Max Depth at Bankfull:	0.82
Mean Depth at Bankful:	0.53
W/D Ratio:	6.66
Entrenchment Ratio:	6.99
Bank Height Ratio:	0.39



Stream Type

1166.28 UT3-1R Looking Upstream Station and description



## UT3 to Little Buffalo Creek Mainstem

River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-2P
Drainage Area (sq mi):	0.097
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	641.63
0.116	640.83
3.12	639.54
4.798	638.72
5.66	638.52
6.679	638.26
7.423	638.27
7.868	638.51
8.966	638.75
10.536	639.46
12.848	640.13
12.944	641.25

SUMMARY DATA	
Bankfull Elevation:	638.72
Bankfull Cross-Sectional Area:	1.01
Bankfull Width:	4.06
Flood Prone Area Elevation:	639.64
Flood Prone Width:	8.28
Max Depth at Bankfull:	0.46
Mean Depth at Bankful:	0.25
W/D Ratio:	16.32
Entrenchment Ratio:	2.04
Bank Height Ratio:	0.43





River Basin:	Yadkin-Pee Dee River	
Watershed:	Little Buffalo Creek	
XS ID:	UT3-2R	
Drainage Area (sq mi):	0.097	
Date:	6/5/2015	
Field Crew:	David Turner, Turner Land Surveying	

Station	Elevation
0	634.55
0.249	634.43
2.808	633.59
5.22	632.53
5.717	632.25
6.499	632.18
7.14	632.34
8.914	632.64
10.557	632.79
12.635	633.48
13.999	633.78
15.322	634.24
15.455	635.29

SUMMARY DATA	
Bankfull Elevation:	632.79
Bankfull Cross-Sectional Area:	1.69
Bankfull Width:	5.91
Flood Prone Area Elevation:	634.01
Flood Prone Width:	13.14
Max Depth at Bankfull:	0.61
Mean Depth at Bankful:	0.29
W/D Ratio:	20.67
Entrenchment Ratio:	2.22
Bank Height Ratio:	0.46





River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT3-3R
Drainage Area (sq mi):	0.097
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	624.92
0.215	624.1
1.609	623.5
2.611	623.07
3.217	622.83
3.915	622.61
4.484	622.61
5.113	622.65
5.664	622.71
6.718	622.92
7.828	623.52
8.738	624.08
9.055	625.01

SUMMARY DATA	
Bankfull Elevation:	622.92
Bankfull Cross-Sectional Area:	0.75
Bankfull Width:	3.73
Flood Prone Area Elevation:	623.54
Flood Prone Width:	6.35
Max Depth at Bankfull:	0.31
Mean Depth at Bankful:	0.20
W/D Ratio:	18.61
Entrenchment Ratio:	1.70
Bank Height Ratio:	0.68



Stream Type B6

Station and description 2426.03 UT3-3R Looking Upstream


River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT4-1P
Drainage Area (sq mi):	0.4
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	631.02
0.185	629.84
2.663	629.48
4.388	628.48
6.318	628.12
7.638	627.84
8.873	627.36
10.639	627.13
12.106	627.35
12.886	627.83
13.576	628.14
14.426	628.63
16.518	628.93
18.789	629.18
20.905	629.97
22.273	630.34
22.416	631.16

SUMMARY DATA	
Bankfull Elevation:	629.84
Bankfull Cross-Sectional Area:	27.37
Bankfull Width:	20.38
Flood Prone Area Elevation:	635.26
Flood Prone Width:	>100
Max Depth at Bankfull:	2.71
Mean Depth at Bankful:	1.34
W/D Ratio:	15.18
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.63

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629 -628 -627 -626 -0



As-built 10/2014

18

20

✗ Top of Rebar

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22

24



6

8

10

12

Distance (ft)

14

River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT4-1R
Drainage Area (sq mi):	0.4
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	628.37
0.04	627.41
2.026	627.03
4.124	626.56
4.924	626.39
6.105	626.36
7.184	625.98
8.564	625.74
9.5	625.70
10.389	626.05
11.253	626.45
12.27	626.86
13.902	627.66
14.888	628
14.994	628.81

SUMMARY DATA	
Bankfull Elevation:	627.41
Bankfull Cross-Sectional Area:	12.13
Bankfull Width:	13.32
Flood Prone Area Elevation:	630.83
Flood Prone Width:	>50
Max Depth at Bankfull:	1.71
Mean Depth at Bankful:	0.91
W/D Ratio:	14.63
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.60



Stream Type C4b

Station and description 1727.36 UT4-1R Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT7-1R
Drainage Area (sq mi):	1.91
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	617.35
0.363	616.44
4.299	616.48
6.438	616.19
7.683	615.71
8.803	614.95
9.379	614.69
14.168	614.92
18.89	614.7
20.937	614.81
25.368	614.85
26.738	614.96
27.25	615.62
27.95	615.87
29.887	616.13
34.651	616.27
37.874	617.31
37.934	617.31

SUMMARY DATA	
Bankfull Elevation:	615.87
Bankfull Cross-Sectional Area:	19.93
Bankfull Width:	20.71
Flood Prone Area Elevation:	618.21
Flood Prone Width:	>100
Max Depth at Bankfull:	1.17
Mean Depth at Bankful:	0.96
W/D Ratio:	21.52
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.78



Stream Type C4

Station and description 1345.64 UT7-1R Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT7-1P
Drainage Area (sq mi):	1.91
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	616.11
0.1	615.18
2.82	614.93
5.726	614.51
8.059	614.07
10.188	613.76
18.394	613.69
22.713	613.64
27.409	613.99
28.947	614.6
30.345	615.09
33.239	615.2
38.568	615.42
41.907	615.55
42.395	616.4

SUMMARY DATA	
Bankfull Elevation:	614.93
Bankfull Cross-Sectional Area:	25.98
Bankfull Width:	27.1
Flood Prone Area Elevation:	617.51
Flood Prone Width:	>80
Max Depth at Bankfull:	1.29
Mean Depth at Bankful:	0.96
W/D Ratio:	28.27
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.67



Stream Type C4

Station and description 1592.61 UT7-1P Looking Upstream



River Basin:	Yadkin-Pee Dee River
Watershed:	Little Buffalo Creek
XS ID:	UT7-2R
Drainage Area (sq mi):	1.91
Date:	6/5/2015
Field Crew:	David Turner, Turner Land Surveying

Station	Elevation
0	614.72
0.265	613.75
3.147	613.6
4.878	613.18
6.016	612.57
6.725	612.04
7.73	611.95
9.116	611.95
11.31	611.91
12.912	612.17
14.091	612.07
16.683	612.34
18.738	612.58
19.923	612.61
20.224	613.01
21.248	613.5
22.761	613.89
26.532	614
26.726	614.91

-	
SUMMARY DATA	
Bankfull Elevation:	613.6
Bankfull Cross-Sectional Area:	21.68
Bankfull Width:	18.58
Flood Prone Area Elevation:	616.98
Flood Prone Width:	>80
Max Depth at Bankfull:	1.69
Mean Depth at Bankful:	1.17
W/D Ratio:	15.92
Entrenchment Ratio:	>2.2
Bank Height Ratio:	0.92



Stream Type C4

Station and description 1846.19 UT7-2R Looking Upstream



	Project Name: Little Buffalo Creek												Cur	nulat	ive P	ercei	nt								
	Cross-S	ection: MS-	-1P				10	00%																	
	Fea	ture: Pool					ç	90%															$\square$		
				2015			5	30%																	
Description	Material	Size (mm)	Total #	Item %	Cum %	nt		70%																	
Silt/Clay	silt/clay	0.062	11	21%	21%	erce																			
	very fine sand	0.125	0	0%	21%	Cumulative Percent	6	50%											/						
	fine sand	0.250	1	2%	23%	nulat	4	50%											/	_		_			
Sand	medium sand	0.50	1	2%	25%	Cun	2	40%									$\nearrow$					_			
	coarse sand	1.00	1	2%	26%		3	30%					_									_			
	very coarse sand	2.0	6	11%	38%		2	20%																	
	very fine gravel	4.0	5	9%	47%		1	0%																	
	fine gravel	5.7	2	4%	51%																				
	fine gravel	8.0	4	8%	58%			0% +			6.7				~					\$				100	
	medium gravel	11.3	2	4%	62%			0																	
Gravel	medium gravel	16.0	4	8%	70%								Pa	rticle S	Size (m	m)									
	coarse gravel	22.3	4	8%	77%									— му	70 - 3/20	15									
	coarse gravel	32.0	4	8%	85%																				
	very coarse gravel	45	2	4%	89%									1.0											
	very coarse gravel	64	4	8%	96%			25%				Ind	11V1d1		lass F	erce	nt								
	small cobble	90	2	4%	100%			2370																	
Cobble	medium cobble	128	0	0%	100%			200/																	
Cobble	large cobble	180	0	0%	100%	tuent	n	20% —																	_
	very large cobble	256	0	0%	100%	e Det	S LG																		
	small boulder	362	0	0%	100%	Sel	Clas	15% —																	_
Boulder	small boulder	512	0	0%	100%	Individual Class Percent	Ind																		
Doulder	medium boulder	1024	0	0%	100%	l  ivi6		10% — —																	—
	large boulder	2048	0	0%	100%	1	=																		
Bedrock	bedrock	40096	0	0%	100%			5%					╉			-		<u> </u>							_
TOTAL %	6 of whole count		53	100%	100%																				
		•						0%		Ļ.,	2 1				, <b>,</b>			Ļ							_
Sum	nmary Data							0,962 0.125	0.3 <i>0</i> .5	``	י עי	* 5 [?]	* *	, <i>i</i> o	22.3	54 0	x 6x	op .	₹ <u>₹</u>	182 7	50 362	512 1	92 ^A 294	* x00%	,

Particle Size (mm) MY0 - 3/2015

Summary Data								
D16	0							
D35	1.75							
D50	5							
D84	31							
D95	60							
D100	89							

Project Name: Little Buffalo Creek											
	Cros	s-Section: N	AS-1R								
	F	Feature: Rif	fle								
				2015							
Description	Material	Size (mm)	Total #	Item %	Cum %						
Silt/Clay	silt/clay	0.062	5	5 10%							
	very fine sand	0.125	0	0%	10%						
	fine sand	0.250	2	4%	14%						
Sand	medium sand	0.50	1	2%	16%						
	coarse sand	1.00	0	0%	16%						
	very coarse sand	2.0	0	0%	16%						
	very fine gravel	4.0	2	4%	20%						
	fine gravel	5.7	1	2%	22%						
	fine gravel	8.0	3	6%	29%						
	medium gravel	11.3	5	10%	39%						
Gravel	medium gravel	16.0	6	12%	51%						
Cross-Section: MSFeature: RiffleDescriptionMaterialSize (mm)7Silt/Claysilt/clay0.0627Silt/Claysilt/clay0.0627fine sand0.1256fine sand0.2507Sandmedium sand0.50coarse sand1.00very fine gravel2.0very fine gravel4.0fine gravel5.7fine gravel8.0medium gravel11.3	coarse gravel	22.3	8	16%	67%						
	coarse gravel	32.0	4	8%	76%						
	2	4%	80%								
	very coarse gravel	64	1	2%	82%						
	small cobble	90	0	0%	82%						
Cabbla	medium cobble	128	0	0%	82%						
Gravel Cobble Boulder	large cobble	180	0	0%	82%						
	very large cobble	256	0	0%	82%						
	small boulder	362	0	0%	82%						
Roulder	small boulder	512	0	0%	82%						
	medium boulder	1024	0	0%	82%						
	large boulder	2048	0	0%	82%						
Bedrock	bedrock	40096	9	18%	100%						
TOTAL %	of whole count		49	100%	100%						





Sum	mamy Data
Sum	mary Data
D16	0.50
D35	10.00
D50	15.90
D84	100.00
D95	800.00
D100	Bedrock

	Project Na	me: Little B	uffalo Cre	ek	
	Cros	s-Section: I	MS-2P		
	]	Feature: Po	ol		
				2015	
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	4	8%	8%
	very fine sand	0.125	3	6%	14%
	fine sand	0.250	5	10%	24%
Sand	medium sand	0.50	0	0%	24%
	coarse sand	1.00	0	0%	24%
	very coarse sand	2.0	4	8%	32%
	very fine gravel	4.0	5	10%	42%
	fine gravel	5.7	2	4%	46%
	fine gravel	8.0	4	8%	54%
	medium gravel	11.3	3	6%	60%
Gravel	medium gravel	16.0	4	8%	68%
Cross-Section: MSFeature: PoolTeature: PoolDescriptionMaterialSize (mm)TSilt/Claysilt/clay0.0621Silt/Claysilt/clay0.0621Sandvery fine sand0.1251Sandfine sand0.2501Coarse sand1.001very coarse sand2.01Very fine gravel4.01fine gravel5.71fine gravel8.011.3	coarse gravel	22.3	4	8%	76%
	coarse gravel	32.0	10	20%	96%
	0	0%	96%		
	very coarse gravel	64	1	2%	98%
	small cobble	90	0	0%	98%
Cabbla	medium cobble	128	1	2%	100%
Cobble	Feature: PoolnMaterialSize (mm)'silt/clay0.062'very fine sand0.125'fine sand0.250'medium sand0.50'coarse sand1.00'very coarse sand2.0'very fine gravel4.0'fine gravel5.7'fine gravel8.0'medium gravel11.3'medium gravel16.0'coarse gravel22.3'coarse gravel32.0'very coarse gravel45'very coarse gravel64'small cobble90'medium cobble128'large cobble256'small boulder362'small boulder512'medium boulder1024large boulder2048bedrock40096	0	0%	100%	
	very large cobble	256	0	0%	100%
	small boulder	362	0	0%	100%
Douldar	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL %	of whole count		50	100%	100%

Sum	mary Data
D16	0.15
D35	2.50
D50	6.70
D84	26.00
D95	31.00
D100	128.00





	•	ame: Little		reek								Cumu	lative	Perce	ent						
	Cit	Feature: R					100% -											/			
				2015			90% -														
Description	Material	Size (mm)	Total #	Item %	Cum %	.	80% - E											/			
Silt/Clay	silt/clay	0.062	0	0%	0%		- 70% -										/	/			
	very fine sand	0.125	0	0%	0%		- 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000							_			-				
	fine sand	0.250	0	0%	0%	1-1-1	ulati 50% -										+				
Sand	medium sand	0.50	0	0%	0%	ť	40% ·										$\vdash$				
	coarse sand	1.00	0	0%	0%		30% -									_/					
	very coarse sand	2.0	2	4%	4%		20% -														
	very fine gravel	4.0	1	2%	6%		10% -								$ \land$						
	fine gravel	5.7	1	2%	8%									$\sim$							
	fine gravel	8.0	4	8%	16%		- %0 0,9		0	+ .>		1			10			100	,		1000
	medium gravel	11.3	1	2%	18%																N ²
Gravel	medium gravel	16.0	3	6%	24%							Partic	le Size	(mm)							
	coarse gravel	22.3	6	12%	36%								- MY0 -	3/2015							
	coarse gravel	32.0	8	16%	52%						Inc	lividual	Class	Perc	ent						
	very coarse gravel	45	7	14%	66%		18%	1				iiviuua	Class		CIII						
	very coarse gravel	64	7	14%	80%		16%							_							
	small cobble	90	7	14%	94%		t 14%														
Cobble	medium cobble	128	2	4%	98%		ercel														
CODDIC	large cobble	180	1	2%	100%		Individual Class Percent % % % % % % % % % % % % % % % % % % %														
	very large cobble	256	0	0%	100%		Ü ^{10%}														
	small boulder	362	0	0%	100%		idua %							_							
Boulder	small boulder	512	0	0%	100%		vipu 6%														
Douldel	medium boulder	1024	0	0%	100%		4%														
	large boulder	2048	0	0%	100%		2%														
Bedrock	bedrock	40096	0	0%	100%		0%	ļ	<i>.</i>							Ļ	Ļ.				
TOTAL %	o of whole count		50	100%	100%			0,062 0,125 0,25	05	× ` ۲	* 5?	° 1,?	16 22.3	ેઝે	\$~~ (	90 4	\$ ²	80 250	3 ⁶² 55	1024 -	1048 H0096

Particle Size (mm) MY0 - 3/2015

Sum	mary Data
D16	8
D35	22.5
D50	31
D84	71
D95	100
D100	180

	Project Na	me: Little I	Buffalo Cro	eek		]
	Cro	ss-Section:	MS-3P			
		Feature: Po	ool			
				2015		
Description	Material	Size (mm)	Total #	Item %	Cum %	
Silt/Clay	silt/clay	0.062	8	14%	14%	1
	very fine sand	0.125	6	10%	24%	0000
	fine sand	0.250	5	9%	33%	D
Sand	medium sand	0.50	3	5%	38%	Cumulative Dercent
	coarse sand	1.00	1	2%	40%	
	very coarse sand	2.0	3	5%	45%	I
	very fine gravel	4.0	4	7%	52%	
	fine gravel	5.7	1	2%	53%	T
	fine gravel	8.0	3	5%	59%	I
	medium gravel	11.3	4	7%	66%	Ī
Gravel	medium gravel	16.0	4	7%	72%	I
	coarse gravel	22.3	4	7%	79%	I
	coarse gravel	32.0	2	3%	83%	I
	very coarse gravel	45	1	2%	84%	Г
	very coarse gravel	64	0	0%	84%	]
	small cobble	90	0	0%	84%	
Cobble	medium cobble	128	1	2%	86%	I
CODDIE	large cobble	180	4	7%	93%	Ī
	very large cobble	256	0	0%	93%	II
	small boulder	362	0	0%	93%	
Boulder	small boulder	512	0	0%	93%	I
Douider	medium boulder	1024	0	0%	93%	
	large boulder	2048	0	0%	93%	
Bedrock	bedrock	40096	4	7%	100%	
TOTAL %	of whole count		58	100%	100%	

Summary Data					
D16	0.07				
D35	0.35				
D50	3.4				
D84	40				
D95	340				
D100	Bedrock				





Project Name: Little Buffalo Creek									
Cross-Section: UT2-1R									
		Feature: Ri	iffle						
				2015					
Description	Material	Size (mm)	Total #	Item %	Cum %				
Silt/Clay	silt/clay	0.062	5	9%	9%				
	very fine sand	0.125	0	0%	9%				
	fine sand	0.250	4	7%	16%				
Sand	medium sand	0.50	1	2%	18%				
	coarse sand	1.00	1	2%	20%				
	very coarse sand	2.0	5	9%	29%				
	very fine gravel	4.0	8	15%	44%				
	fine gravel	5.7	5	9%	53%				
	fine gravel	8.0	2	4%	56%				
	medium gravel	11.3	3	5%	62%				
Gravel	medium gravel	16.0	2	4%	65%				
	coarse gravel	22.3	0	0%	65%				
	coarse gravel	32.0	11	20%	85%				
	very coarse gravel	45	5	9%	95%				
	very coarse gravel	64	2	4%	98%				
	small cobble	90	1	2%	100%				
Cobble	medium cobble	128	0	0%	100%				
CODDIE	large cobble	180	0	0%	100%				
	very large cobble	256	0	0%	100%				
	small boulder	362	0	0%	100%				
Boulder	small boulder	512	0	0%	100%				
Douidel	medium boulder	1024	0	0%	100%				
	large boulder	2048	0	0%	100%				
Bedrock	bedrock	40096	0	0%	100%				
TOTAL %	of whole count		55	100%	100%				





Sum	mary Data
D16	0.25
D35	2.7
D50	5
D84	30
D95	45
D100	90

Project Name: Little Buffalo Creek									 		Cumu	lative	Perce	nt	
Cross-Section: UT3-1R						100%									
	Feature: Riffle						90% -								
				2015			80% -								
Description	Material	Size (mm)	Total #	Item %	Cum %	t t									
Silt/Clay	silt/clay	0.062	25	83%	83%	Cumulative Percent	70% -								
	very fine sand	0.125	1	3%	87%	ve P	60% -		 _						
	fine sand	0.250	1	3%	90%	ulati	50% -			_					
Sand	medium sand	0.50	1	3%	93%	Cum	40% -		 	 					
	coarse sand	1.00	1	3%	97%	Ĭ	30% -								
	very coarse sand	2.0	1	3%	100%										
	very fine gravel	4.0	0	0%	100%		20% -								
	fine gravel	5.7	0	0%	100%		10% -								
	fine gravel	8.0	0	0%	100%		0%				0.7				
	medium gravel	11.3	0	0%	100%		001				0.				
Gravel	medium gravel	16.0	0	0%	100%							Particl	e Size (	mm)	
	coarse gravel	22.3	0	0%	100%								- MY0 - 3	3/2015	
	coarse gravel	32.0	0	0%	100%										
	very coarse gravel	45	0	0%	100%	1									
	very coarse gravel	64	0	0%	100%						Inc	lividua	al Clas	s Pero	ent
	small cobble	90	0	0%	100%	1	9	0%	 	 					
Cobble	medium cobble	128	0	0%	100%	1	8	0% -	 	 					
Cobble	large cobble	180	0	0%	100%	1	ent 7	0% -							
	very large cobble	256	0	0%	100%		Perc	0% -							
	small boulder	362	0	0%	100%	1	lass	0% -							
Doulder	small boulder	512	0	0%	100%	1	ual C								
Boulder	medium boulder	1024	0	0%	100%	1	Individual Class Percent	0% —		 					
	large boulder	2048	0	0%	100%	1	Ind. 3	0% -	 	 					
Bedrock	bedrock	40096	0	0%	100%	1	2	0% -	 	 					
TOTAL %	of whole count		30	100%	100%	1	1	0% -		 					
		-		-	-	-									

100%							
90%						 	 
80%	-						
80%							
70%							
60%						 	
50%							
30%							
40%					 		 
30%						 	
20%							
10%							
0%							
0.01		0,1			`		
			Particle ?	Size (mm)			
			<u> </u>	MY0 - 3/2015			



	Sum	nary Data
	D16	0.00
	D35	0.00
	D50	0.00
	D84	0.00
ſ	D95	0.70
ſ	D100	2.00

Project Name: Little Buffalo Creek										
	Cro	ss-Section:	UT3-1P							
Feature: Pool										
2015										
Description	Material	Size (mm)	Total #	Item %	Cum %					
Silt/Clay	silt/clay	0.062	28	55%	55%					
	very fine sand	0.125	1	2%	57%					
	fine sand	0.250	8	16%	73%					
Sand	medium sand	0.50	2	4%	76%					
	coarse sand	1.00	2	4%	80%					
	very coarse sand	2.0	5	10%	90%					
	very fine gravel	4.0	3	6%	96%					
	fine gravel	5.7	0	0%	96%					
	fine gravel	8.0	0	0%	96%					
	medium gravel	11.3	1	2%	98%					
Gravel	medium gravel	16.0	1	2%	100%					
	coarse gravel	22.3	0	0%	100%					
	coarse gravel	32.0	0	0%	100%	L				
	very coarse gravel	45	0	0%	100%					
	very coarse gravel	64	0	0%	100%					
	small cobble	90	0	0%	100%					
Cobble	medium cobble	128	0	0%	100%					
Cobble	large cobble	180	0	0%	100%					
	very large cobble	256	0	0%	100%					
	small boulder	362	0	0%	100%					
Boulder	small boulder	512	0	0%	100%					
Douider	medium boulder	1024	0	0%	100%					
	large boulder	2048	0	0%	100%					
Bedrock	bedrock	40096	0	0%	100%					
TOTAL %	of whole count		51	100%	100%					





Summary Data					
D16	0.00				
D35	0.00				
D50	0.00				
D84	1.30				
D95	3.50				
D100	16.00				

Project Name: Little Buffalo Creek											
	Cross-Section: UT3-2R										
Feature: Riffle											
2015											
Description	Material	Size (mm)	Total #	Item %	Cum %						
Silt/Clay	silt/clay	0.062	5	9%	9%						
	very fine sand	0.125	0	0%	9%						
	fine sand	0.250	5	9%	18%						
Sand	medium sand	0.50	0	0%	18%						
	coarse sand	1.00	1	2%	20%						
	very coarse sand	2.0	5	9%	29%						
	very fine gravel	4.0	9	16%	45%						
	fine gravel	5.7	8	15%	60%						
	fine gravel	8.0	9	16%	76%						
	medium gravel	11.3	3	5%	82%						
Gravel	medium gravel	16.0	7	13%	95%						
	coarse gravel	22.3	1	2%	96%						
	coarse gravel	32.0	1	2%	98%						
	very coarse gravel	45	0	0%	98%						
	very coarse gravel	64	1	2%	100%						
	small cobble	90	0	0%	100%						
Cobble	medium cobble	128	0	0%	100%						
Cobble	large cobble	180	0	0%	100%						
	very large cobble	256	0	0%	100%						
	small boulder	362	0	0%	100%						
Boulder	small boulder	512	0	0%	100%						
Douider	medium boulder	1024	0	0%	100%						
	large boulder	2048	0	0%	100%						
Bedrock	bedrock	40096	0	0%	100%						
TOTAL %	of whole count		55	100%	100%						





Sum	mary Data
D16	0.18
D35	2.55
D50	4.50
D84	12.00
D95	18.00
D100	64.00

	Project Na	ame: Little	Buffalo Cr	eek		
	Cro	ss-Section:	UT3-3R			
		Feature: R	iffle			
				2015		
Description	Material	Size (mm)	Total #	Item %	Cum %	
Silt/Clay	silt/clay	0.062	17	33%	33%	Cumulative Percent
	very fine sand	0.125	10	20%	53%	e Pe
	fine sand	0.250	5	10%	63%	lativ
Sand	medium sand	0.50	0	0%	63%	nmu
	coarse sand	1.00	0	0%	63%	0
	very coarse sand	2.0	2	4%	67%	
	very fine gravel	4.0	3	6%	73%	
	fine gravel	5.7	3	6%	78%	
	fine gravel	8.0	7	14%	92%	
	medium gravel	11.3	1	2%	94%	
Gravel	medium gravel	16.0	2	4%	98%	
	coarse gravel	22.3	0	0%	98%	
	coarse gravel	32.0	1	2%	100%	
	very coarse gravel	45	0	0%	100%	ſ
	very coarse gravel	64	0	0%	100%	
	small cobble	90	0	0%	100%	
Cobble	medium cobble	128	0	0%	100%	
CODDIE	large cobble	180	0	0%	100%	
	very large cobble	256	0	0%	100%	
	small boulder	362	0	0%	100%	
Boulder	small boulder	512	0	0%	100%	
Douider	medium boulder	1024	0	0%	100%	
	large boulder	2048	0	0%	100%	
Bedrock	bedrock	40096	0	0%	100%	
TOTAL %	of whole count		51	100%	100%	





Sum	mary Data
D16	0.00
D35	0.07
D50	0.11
D84	6.50
D95	13.00
D100	32.00

Project Name: Little Buffalo Creek							
	Cross-Section: UT4-1P						
	Feature: Pool						
2015							
Description	Material	Size (mm)	Total #	Item %	Cum %		
Silt/Clay	silt/clay	0.062	1	2%	2%		
	very fine sand	0.125	0	0%	2%		
	fine sand	0.250	3	6%	6%		
Sand	medium sand	0.50	0	0%	6%		
	coarse sand	1.00	2	4%	9%		
	very coarse sand	2.0	8	15%	21%		
	very fine gravel	4.0	3	6%	26%		
	fine gravel	5.7	7	13%	40%		
	fine gravel	8.0	4	8%	47%		
	medium gravel	11.3	7	13%	60%		
Gravel	medium gravel	16.0	2	4%	64%		
	coarse gravel	22.3	3	6%	70%		
	coarse gravel	32.0	4	8%	77%		
	very coarse gravel	45	1	2%	79%		
	very coarse gravel	64	3	6%	85%		
	small cobble	90	2	4%	89%		
Cobble	medium cobble	128	1	2%	91%		
Cobble	large cobble	180	1	2%	92%		
	very large cobble	256	0	0%	92%		
Boulder	small boulder	362	0	0%	92%		
	small boulder	512	0	0%	92%		
Doulder	medium boulder	1024	1	2%	94%		
	large boulder	2048	0	0%	94%		
Bedrock	bedrock	40096	0	0%	94%		
TOTAL %	of whole count		53	100%	100%		

Summary Data		
D16	1.30	
D35	4.40	
D50	7.00	
D84	40.00	
D95	100.00	
D100	1024.00	





	Project Name: Little Buffalo Creek					
	Cros	ss-Section:	UT4-1R			
		Feature: Ri	iffle			
2015						
Description	Material	Size (mm)	Total #	Item %	Cum %	
Silt/Clay	silt/clay	0.062	5	10%	10%	
	very fine sand	0.125	1	2%	12%	
	fine sand	0.250	2	4%	16%	
Sand	medium sand	0.50	0	0%	16%	
	coarse sand	1.00	0	0%	16%	
	very coarse sand	2.0	2	4%	20%	
	very fine gravel	4.0	6	12%	32%	
	fine gravel	5.7	3	6%	38%	
	fine gravel	8.0	5	10%	48%	
	medium gravel	11.3	4	8%	56%	
Gravel	medium gravel	16.0	6	12%	68%	
	coarse gravel	22.3	7	14%	82%	
	coarse gravel	32.0	3	6%	88%	
	very coarse gravel	45	4	8%	96%	
	very coarse gravel	64	0	0%	96%	
	small cobble	90	1	2%	98%	
Cobble	medium cobble	128	1	2%	100%	
CODDIE	large cobble	180	0	0%	100%	
	very large cobble	256	0	0%	100%	
	small boulder	362	0	0%	100%	
Boulder	small boulder	512	0	0%	100%	
Douider	medium boulder	1024	0	0%	100%	
	large boulder	2048	0	0%	100%	
Bedrock	bedrock	40096	0	0%	100%	
TOTAL %	of whole count		50	100%	100%	

100%		Cumulati	ve Percent		
100%					
90%					
80%			/		
70%			/		
و Be وه			/		
00%         00%           00%         00%           00%         00%			/		
40%					
30%					
20%					
10%					
0%					
0.01	0,	~	<i>\$</i> 0	100	1005
		Particle S	ize (mm)		
		—— M	Y0 - 3/2015		



Summary Data		
D16	0.25	
D35	4.80	
D50	8.90	
D84	26.00	
D95	44.00	
D100	128.00	

Project Name: Little Buffalo Creek					
Cross-Section: UT7-1P					
		Feature: P	ool		
				2015	
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	31	60%	60%
	very fine sand	0.125	0	0%	60%
	fine sand	0.250	3	6%	65%
Sand	medium sand	0.50	2	4%	69%
	coarse sand	1.00	2	4%	73%
	very coarse sand	2.0	1	2%	75%
	very fine gravel	4.0	2	4%	79%
	fine gravel	5.7	3	6%	85%
	fine gravel	8.0	1	2%	87%
	medium gravel	11.3	2	4%	90%
Gravel	medium gravel	16.0	0	0%	90%
	coarse gravel	22.3	1	2%	92%
	coarse gravel	32.0	0	0%	92%
	very coarse gravel	45	2	4%	96%
	very coarse gravel	64	0	0%	96%
	small cobble	90	1	2%	98%
Cobble	medium cobble	128	1	2%	100%
Cooble	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
	small boulder	362	0	0%	100%
Boulder	small boulder	512	0	0%	100%
Doulder	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL %	of whole count		52	100%	100%





Sum	Summary Data		
D16	0.00		
D35	0.00		
D50	0.00		
D84	3.90		
D95	36.00		
D100	128.00		

Project Name: Little Buffalo Creek					
	Cros	s-Section: U	U <b>T7-1R</b>		
	]	Feature: Ri	ffle		
				2015	
Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	0	0%	0%
	very fine sand	0.125	0	0%	0%
	fine sand	0.250	8	15%	15%
Sand	medium sand	0.50	4	8%	23%
	coarse sand	1.00	3	6%	28%
	very coarse sand	2.0	1	2%	30%
	very fine gravel	4.0	1	2%	32%
	fine gravel	5.7	1	2%	34%
	fine gravel	8.0	3	6%	40%
	medium gravel	11.3	2	4%	43%
Gravel	medium gravel	16.0	1	2%	45%
	coarse gravel	22.3	2	4%	49%
	coarse gravel	32.0	8	15%	64%
	very coarse gravel	45	5	9%	74%
	very coarse gravel	64	7	13%	87%
	small cobble	90	4	8%	94%
Cobble	medium cobble	128	0	0%	94%
Cobble	large cobble	180	3	6%	100%
	very large cobble	256	0	0%	100%
	small boulder	362	0	0%	100%
Boulder	small boulder	512	0	0%	100%
Doulder	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL %	of whole count		53	100%	100%

Summary Data		
D16	0.27	
D35	6.10	
D50	23.00	
D84	60.00	
D95	95.00	
D100	180.00	





Project Name: Little Buffalo Creek						
Cross-Section: UT7-2R						
Feature: Riffle						
				2015		
Description	Material	Size (mm)	Total #	Item %	Cum %	
Silt/Clay	silt/clay	0.062	21	41%	41%	
	very fine sand	0.125	0	0%	41%	
	fine sand	0.250	4	8%	49%	
Sand	medium sand	0.50	0	0%	49%	
	coarse sand	1.00	1	2%	51%	
	very coarse sand	2.0	0	0%	51%	
	very fine gravel	4.0	1	2%	53%	
	fine gravel	5.7	0	0%	53%	
	fine gravel	8.0	0	0%	53%	
	medium gravel	11.3	1	2%	55%	
Gravel	medium gravel	16.0	0	0%	55%	
	coarse gravel	22.3	3	6%	61%	
	coarse gravel	32.0	0	0%	61%	
	very coarse gravel	45	6	12%	73%	
	very coarse gravel	64	5	10%	82%	
	small cobble	90	4	8%	90%	
Cobble	medium cobble	128	1	2%	92%	
Cooble	large cobble	180	4	8%	100%	
	very large cobble	256	0	0%	100%	
	small boulder	362	0	0%	100%	
Boulder	small boulder	512	0	0%	100%	
Douldel	medium boulder	1024	0	0%	100%	
	large boulder	2048	0	0%	100%	
Bedrock	bedrock	40096	0	0%	100%	
TOTAL %	of whole count		51	100%	100%	

			Cumulati	ve Percent		
1	100% ]					
	90% -					
	80% -				/	
rcent	70% -					
e Pe	60% -					
Cumulative Percent	50% -					
Cum	40% -					
	30% -					
	20% -					
	10% -					
	0%					
	0.01	0,1	$\mathbf{x}$	10	100	1000
	Particle Size (mm)					
			M	Y0 - 3/2015		



Summary Data		
D16	0.00	
D35	0.00	
D50	0.50	
D84	69.00	
D95	150.00	
D100	180.00	





















## **UT8 to UT7** Longitudinal Profile, As-built Stationing 10+19.08 to 10+80.78



# Appendix E. As-built Plan Sheets



ME: \$FILEL\$

	INDEX OF SHE
/	TITLE SH
2	LEGEND & S
3 - //	AS BUILT / DE
12 - 13	AS BUILT PF

300'	0'	30	)0'	600	
	_· 1"—	300'	$\bigcirc$	22221	

EXISTING	<u>Plan legend</u>	
	PROPERTY LINE	
	TREE LINES / WOODS	
순	SINGLE TREE	
Ę	SHRUB	1
EIP O	EXISTING IRON PIPE	
eir o	EXISTING IRON ROD	
٩	POLE	
	CULVERT	
	FENCE	
$\bigtriangleup$	CONCRETE MONUMENT	

MAINSTEM RESTORATION PLAN INDEX			TRIBUTARY RESTORATION PLAN INDEX					
ALIGNMENT	MITIGA	TION ACTIVITY	START STATION	END STATION	ALI GNMENT	MITIGATION ACTIVITY	START STATION	END STATION
MAINSTEM	ENHANCI	EMENT LEVEL 2	1 Ø+ØØ	22+00.00	UT-1	ENHANCEMENT LEVEL 2	$1 \emptyset + \emptyset \emptyset$	11+1Ø.63
	RESTOR	ATION	22+00.00	25+77.37	UT-2	PRESERVATION	$1 \varnothing + \oslash \oslash$	13+34.67
	ENHANCI	EMENT LEVEL 2	25+77.37	33+Ø4.88	UT-2	ENHANCEMENT LEVEL 2	13+34.67	13+78.56
	ENHANCI	EMENT LEVEL 2	33+66.34	48+12.45	UT-2	RESTORATION	13+78.56	14+27.35
	RESTOR	ATION	48+12.45	5Ø+56.51	UT-2	ENHANCEMENT LEVEL 2	14+27.35	19+50.70
	ENHANCI	EMENT LEVEL 2	5Ø+56.51	63+7Ø.48	UT-3	RESTORATION	$1 \emptyset + \emptyset \emptyset$	12+15.05
	ENHANCI	EMENT LEVEL 1	63+7Ø.48	65+21.37	UT-3	ENHANCEMENT LEVEL 2	12+15.Ø5	14+66.62
	ENHANCI	EMENT LEVEL 2	65+21.37	74+87.83	UT-3	ENHANCEMENT LEVEL 1	14+66.62	16+6Ø
	PRESER	VATION	75+19.23	82+55.35	UT-3	RESTORATION	16+6Ø	16+79
	PRESER	VATION	91 + 88. 65	104+96.09	UT-3	ENHANCEMENT LEVEL 1	16+79	2Ø+21.97
		]	UT-3	ENHANCEMENT LEVEL 2	2Ø+21.97	21+29		
MITIGATION A	CTIVITY	GENERAL DESCRI	PTION		UT-3	RESTORATION	21 + 29	21 + 55
		CHANNEL RE-ALIG	CHANNEL RE-ALIGNMENT AND CREATION.		UT-3	ENHANCEMENT LEVEL 2	21 + 55	24+Ø5
RESTORATION		DITCH PLUG INSTALLATION. IN-STREAM STRUCTURE INSTALLATION, INCLUDING LOG VANES, ROCK CROSS VANES, STEP POOLS AND ROOT WADS. STREAM BANK RE-GRADING. PLANTING AND INVASIVE PLANT REMOVAL.			UT-3	RESTORATION	24+Ø5	24+5Ø
					UT-3	ENHANCEMENT LEVEL 2	24+50	24+74.9Ø
					∪⊤−4	ENHANCEMENT LEVEL 2	$1 \varnothing + \oslash \oslash$	14+21.25
					UT-4	ENHANCEMENT LEVEL 1	14+21.25	18+3Ø.57
		STREAM RANK CRADING			UT-5	ENHANCEMENT LEVEL 2	$1 \emptyset + \emptyset \emptyset$	11+84.46
(F1)		STREAM BANK GRADING. MINOR CHANNEL REGRADING.			UT-6	ENHANCEMENT LEVEL 2	$1 \varnothing + \oslash \oslash$	11+51.33
			CONCRETE REMOVAL FROM CHANNEL.		UT-7	ENHANCEMENT LEVEL 1	$1 \varnothing + \oslash \oslash$	11+46.8Ø
ENHANCEMENT I		I LANTING AND INVA	PLANTING AND INVASIVE PLANT REMOVAL.		UT-7	RESTORATION	11+46.8Ø	21 + 26. 71
		PLANTING AND INVASIVE PLANT REMOVAL.			UT-8	RESTORATION	1 Ø+1 9. Ø8	10+80.78
(E2)								,

NOTE: REFER TO PROPOSED CONDITIONS AND PLANTING PLANS FOR SPECIFIC ACTIVITIES AS PART OF THIS PROJECT. ADDITIONAL PROJECT COMPONENTS INCLUDE REMOVAL OF EXISTING FENCING, FENCE INSTALLATION, INSTALLATION OF TWO CATTLE CROSSINGS AND FLOOD GATES AS SHOWN ON THE PLANS.





CONSTRUCTED RIFFLE







ilename: \$FILEL\$







Filename: \$FILEL\$





PLAN

SIGN

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JULY 2015

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8 OF 13

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NDEX		TRIBUTARY RESTO	KATIUN PLAN I
END STATION	ALIGNMENT	MITIGATION ACTIVITY	START STATION
22+ØØ.ØØ	UT-1	ENHANCEMENT LEVEL 2	1 Ø+ØØ
25+77.37	UT-2	PRESERVATION	$1 \emptyset + \emptyset \emptyset$
33+Ø4.88	UT-2	ENHANCEMENT LEVEL 2	13+34.67
48+12.45	UT-2	RESTORATION	13+78.56
5Ø+56.51	UT-2	ENHANCEMENT LEVEL 2	14+27.35
63+7Ø.48	UT-3	RESTORATION	$1 \emptyset + \emptyset \emptyset$
65+21.37	UT-3	ENHANCEMENT LEVEL 2	12+15.05
74+87.83	UT-3	ENHANCEMENT LEVEL 1	14+66.62
82+55.35	UT-3	RESTORATION	16+6Ø
104+96.09	UT-3	ENHANCEMENT LEVEL 1	16+79
	UT-3	ENHANCEMENT LEVEL 2	2Ø+21.97
	UT-3	RESTORATION	21 + 29
	UT-3	ENHANCEMENT LEVEL 2	21 +55
	UT-3	RESTORATION	24+Ø5
<b>,</b>	UT-3	ENHANCEMENT LEVEL 2	24+5Ø
	UT-4	ENHANCEMENT LEVEL 2	$1 \emptyset + \emptyset \emptyset$
	UT-4	ENHANCEMENT LEVEL 1	14+21.25
	UT-5	ENHANCEMENT LEVEL 2	1 Ø+ØØ
	UT-6	ENHANCEMENT LEVEL 2	1 Ø+ØØ
	UT-7	ENHANCEMENT LEVEL 1	$1 \emptyset + \emptyset \emptyset$
	UT-7	RESTORATION	11+46.8Ø
	UT-8	RESTORATION	10+19.08

IGURE

A1