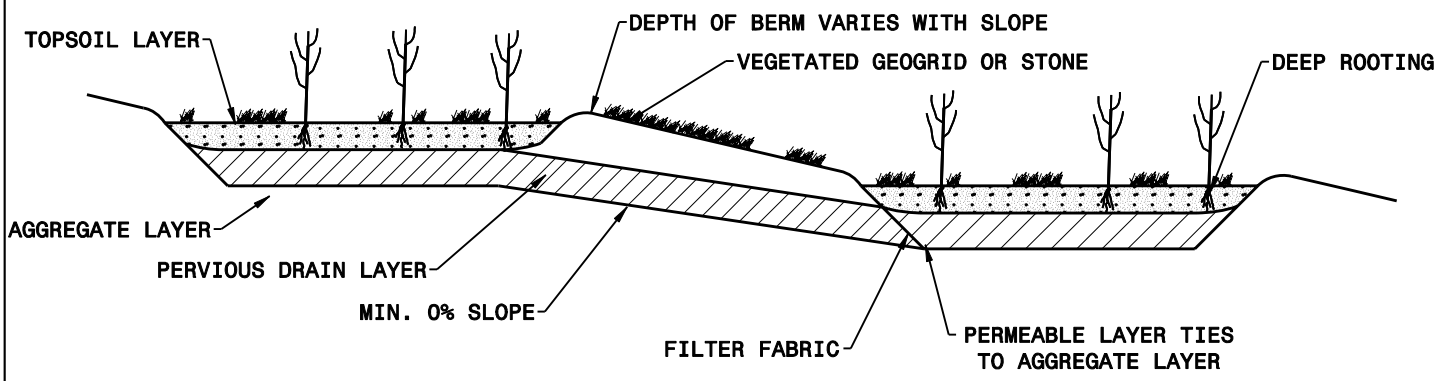
APPENDIX A

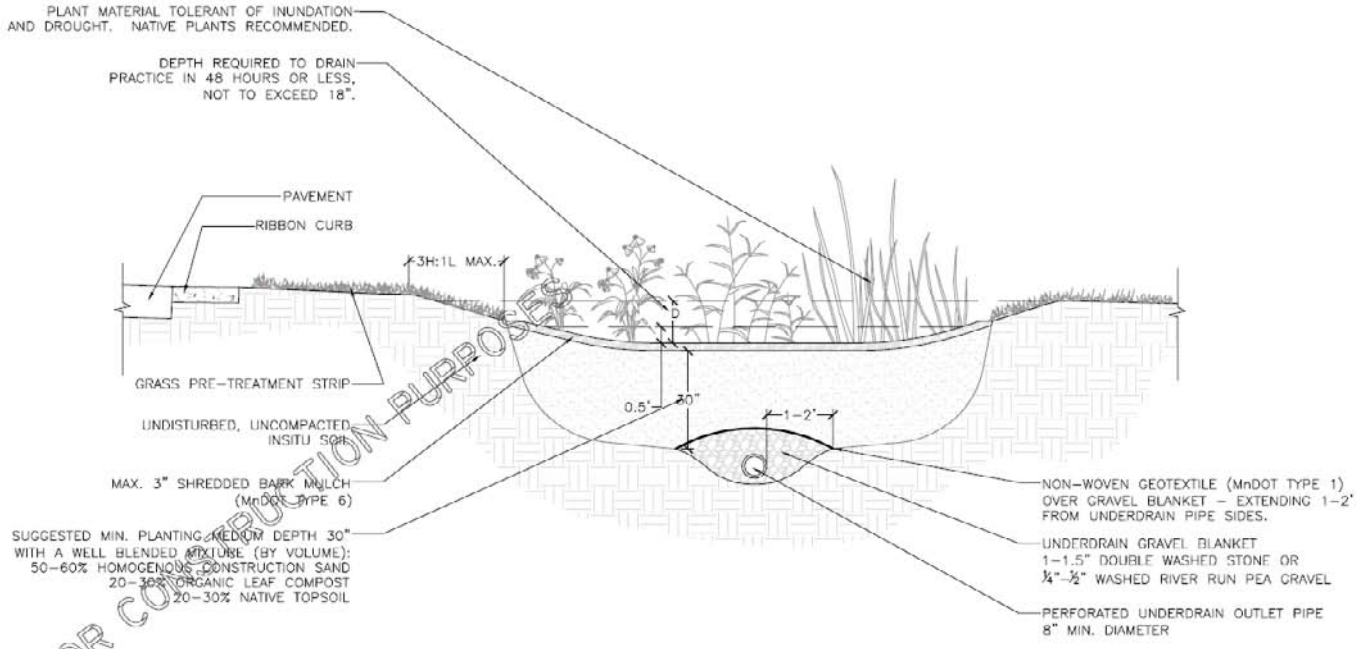
Details

STORMWATER BMP DETAILS



BIO-GRADE STEP

SCALE: NTS



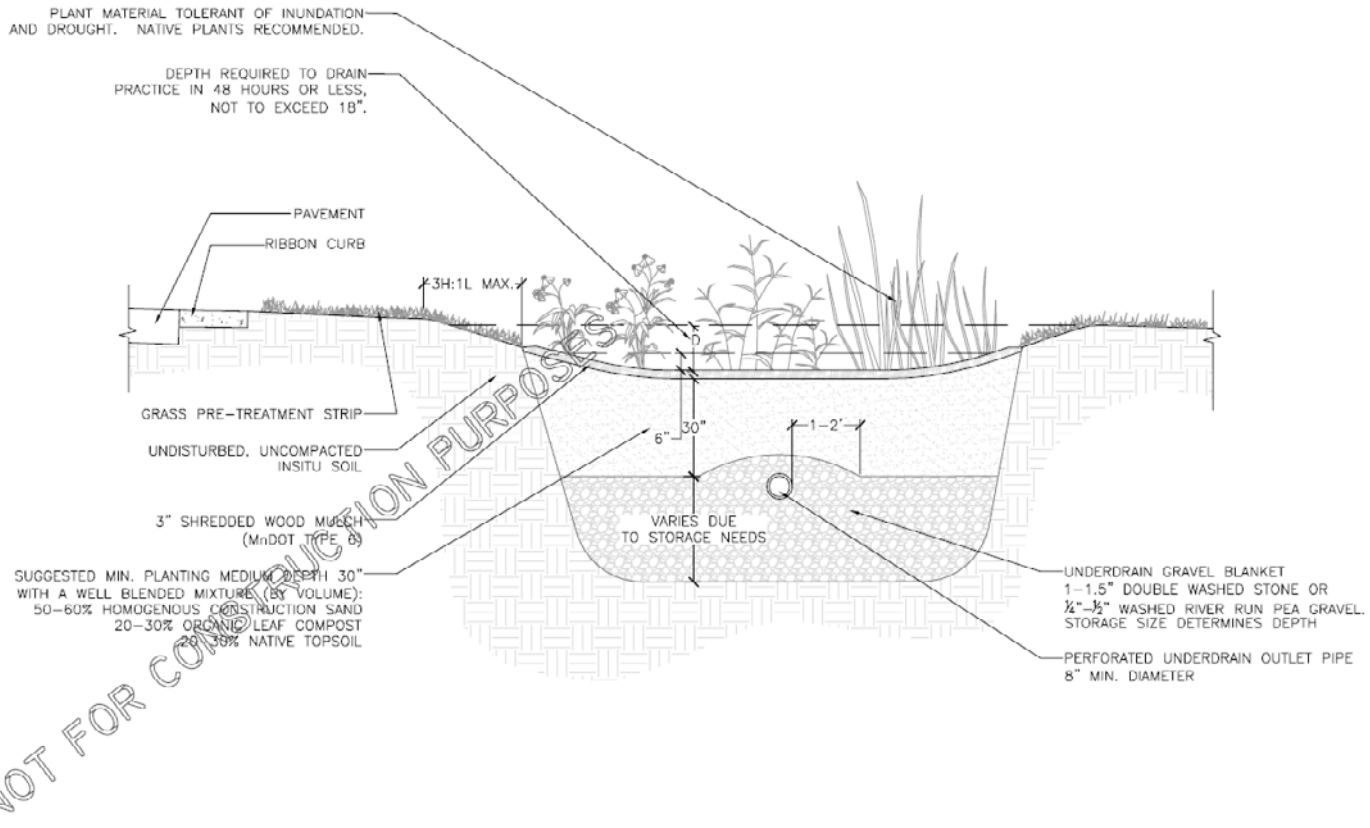
NOTE: NORTH CAROLINA SPECIFICATIONS MAY VARY

BIORETENTION AREA- FILTRATION AND PARTIAL RECHARGE

SCALE: NTS

Source: Minnesota Stormwater Manual. Version 1.1
Minnesota Pollution Control Agency

STORMWATER BMP DETAILS



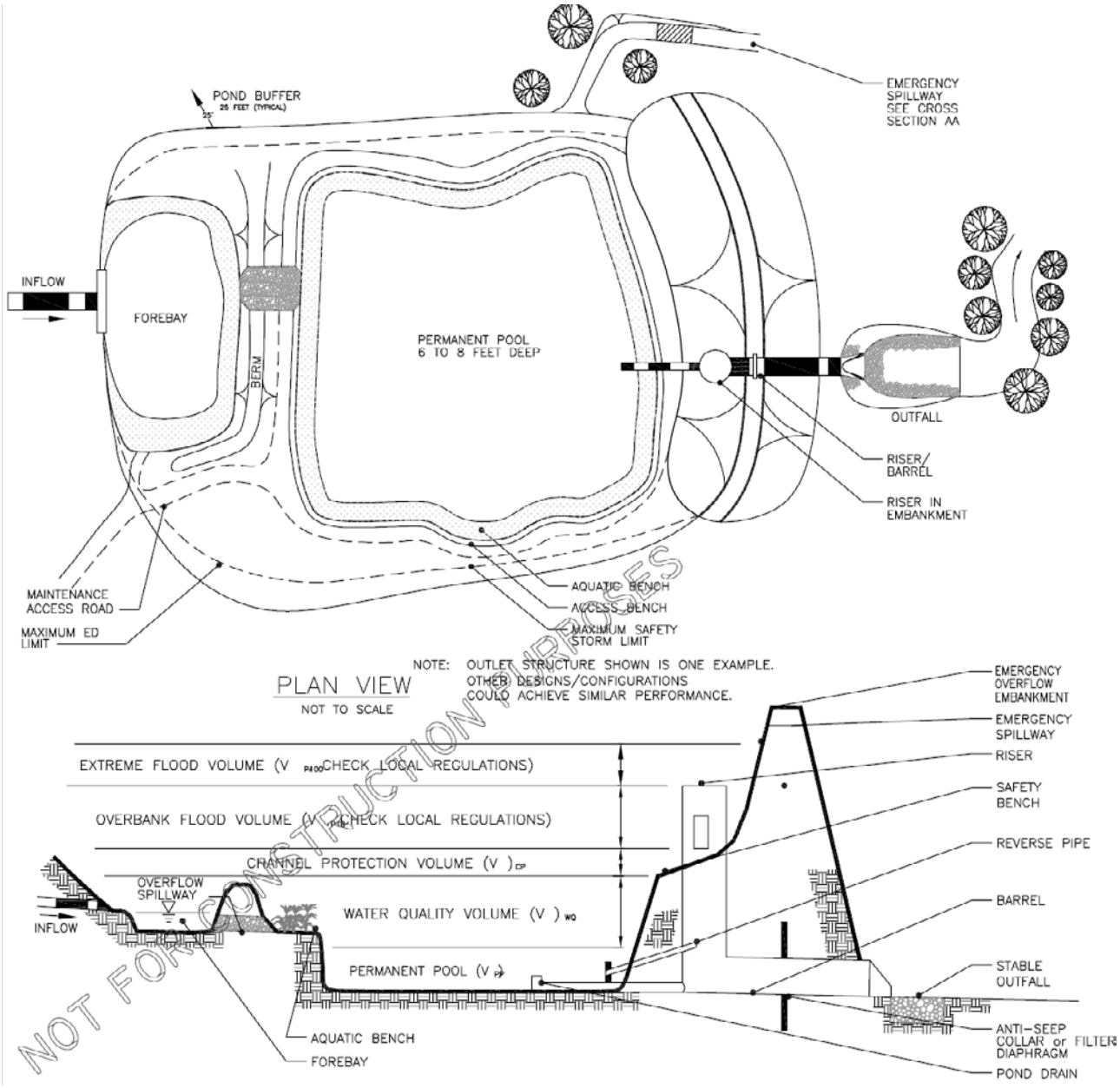
NOTE: NORTH CAROLINA SPECIFICATIONS MAY VARY

BIORETENTION AREA- FILTRATION/INFILTRATION/RECHARGE

SCALE: NTS

Source: Minnesota Stormwater Manual. Version 1.1
Minnesota Pollution Control Agency

STORMWATER BMP DETAILS

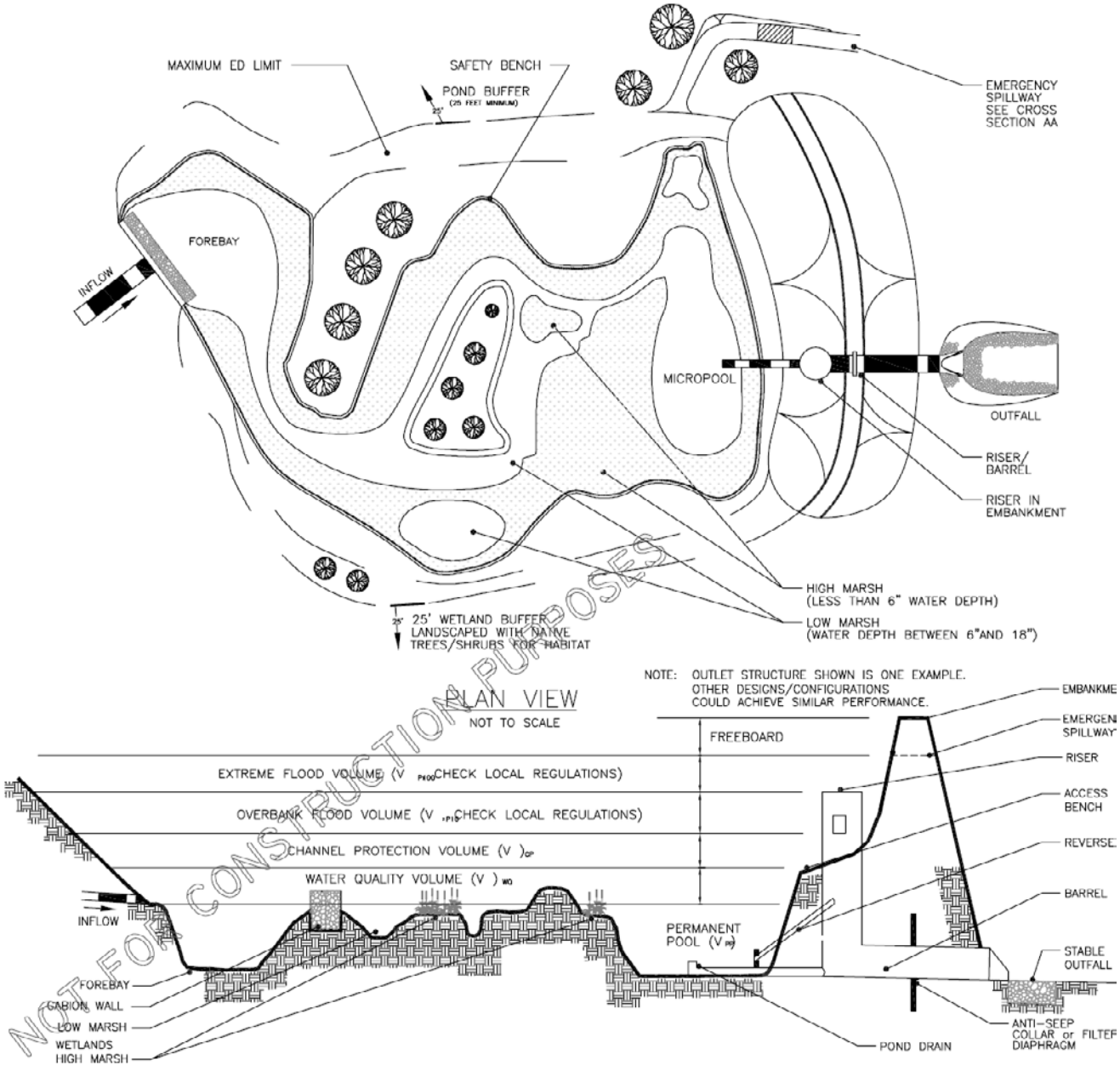


EXAMPLE WET DETENTION POND

SCALE: NTS

Source: Minnesota Stormwater Manual, Version 1.1
Minnesota Pollution Control Agency

STORMWATER BMP DETAILS

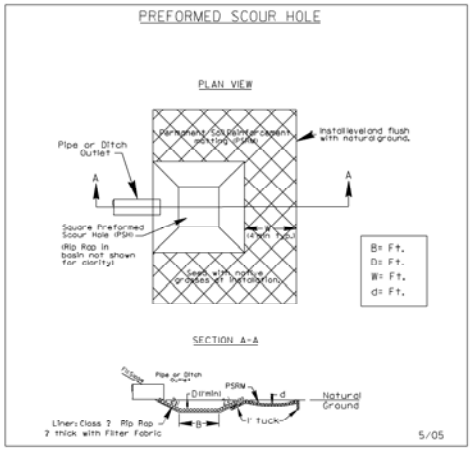


EXAMPLE STORMWATER WETLAND

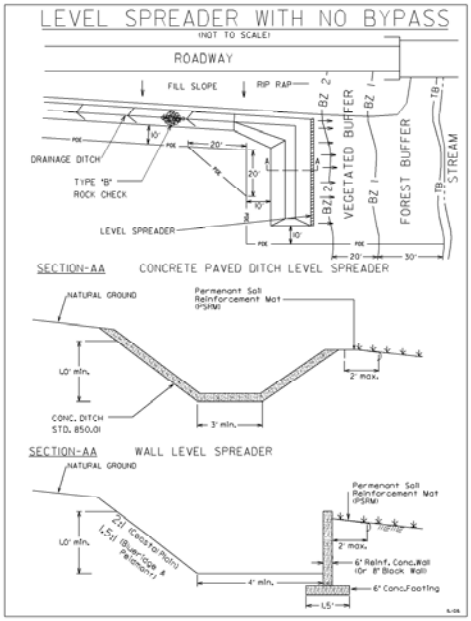
SCALE: NTS

Source: Minnesota Stormwater Manual, Version 1.1
Minnesota Pollution Control Agency

BMP COMPONENT DETAILS



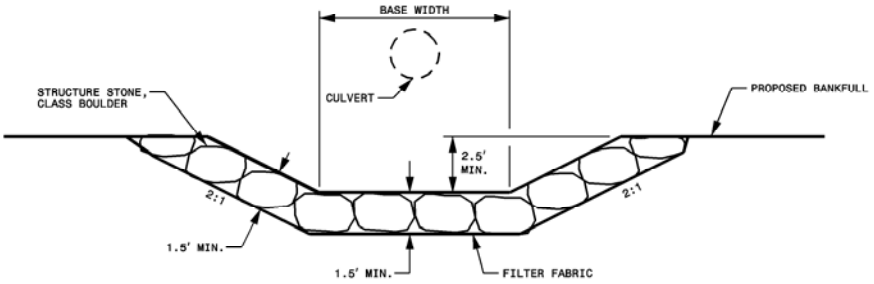
STA.



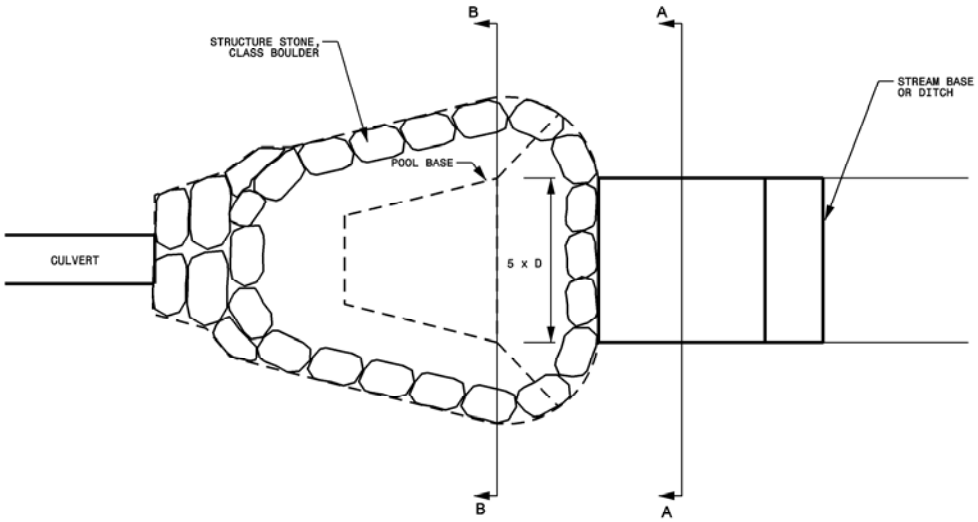
FROM STA. TO STA.

Note: Use concrete berm crest on all level spreaders.

Source: North Carolina Department of Transportation



SECTION B-B



NOTE:

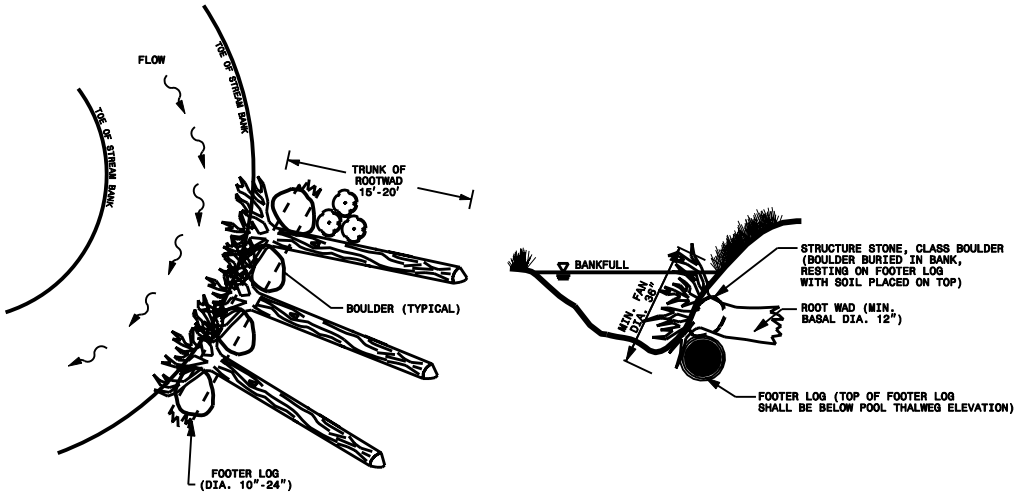
BASIN BOULDERS NOT SHOWN FOR CLARITY.
INCIDENTIAL RIP RAP AND FILL MATERIAL MAY BE REQUIRED AROUND FOOTER ROCKS FOR PROPER EMBEDMENT.

PLAN

BOULDER DISSIPATOR BASIN

SCALE: NTS

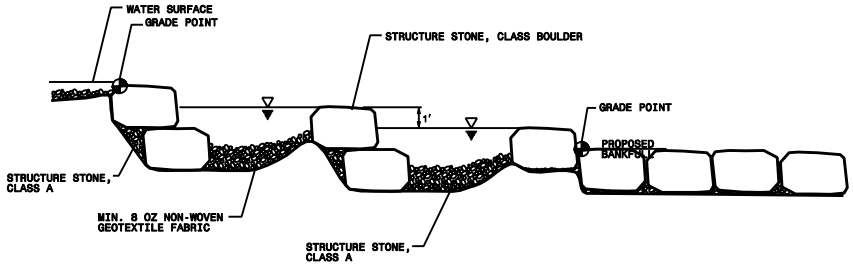
STREAM RESTORATION DETAILS



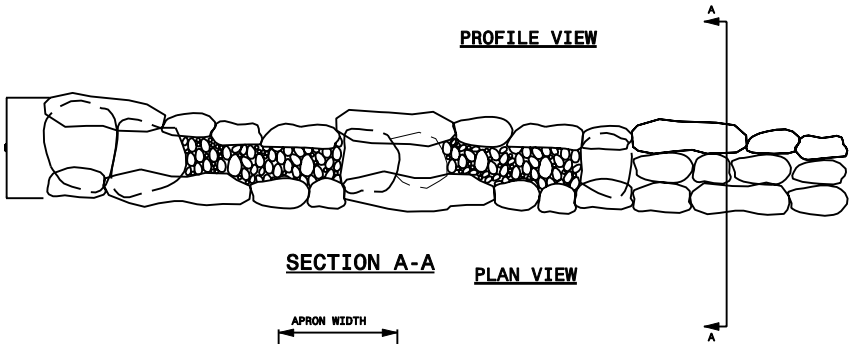
PLAN CROSS-SECTION

ROOT WAD

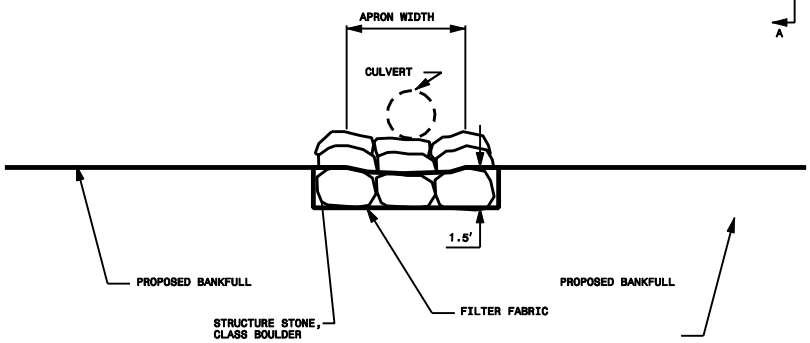
SCALE: NTS



PROFILE VIEW



SECTION A-A PLAN VIEW



STEP-POOL OUTFALL W/APRON

SCALE: NTS

BANK STABILIZATION DETAILS

Figure 1

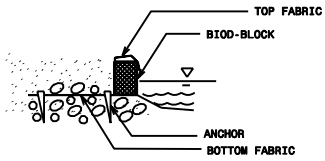


Figure 2

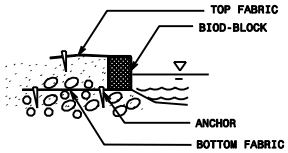


Figure 2a

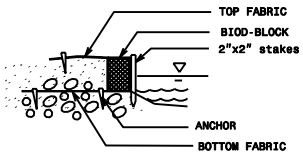


Figure 3

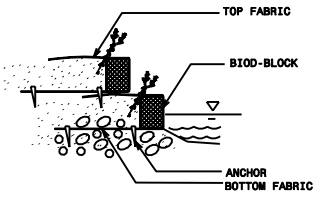
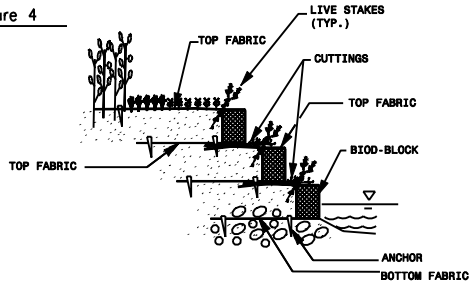
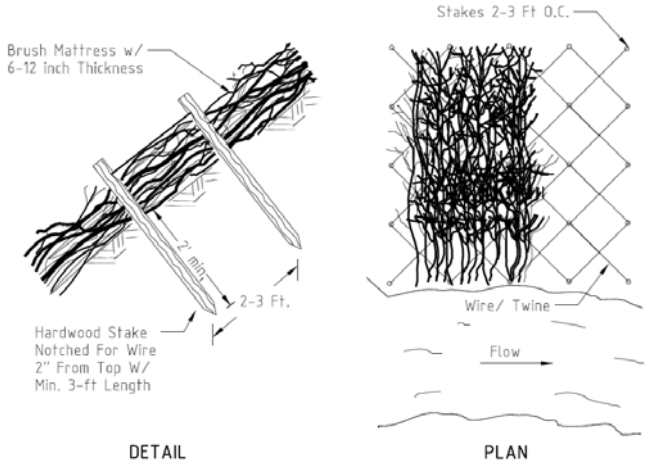
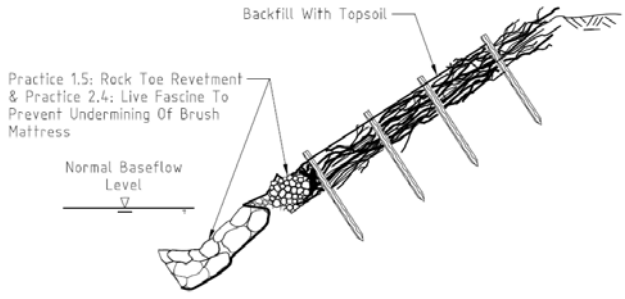


Figure 4



MUTILAYER BioD-BLOCK COIR BLOCK SYSTEM
INSTALLATION GUIDE (vertically placed blocks)





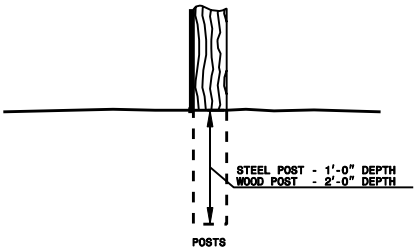
Adapted From USDA-SCS (1994)

BRUSH MATRESS

SCALE: NTS

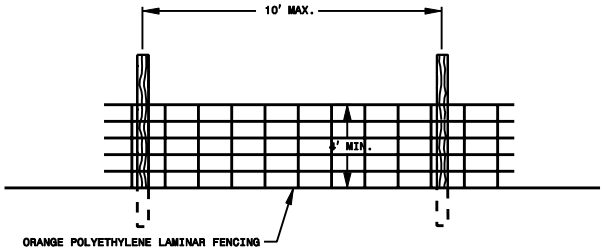
Source: Virginia Stream Restoration & Stabilization
Best Management Practices Guide, 2004
Virginia Department of Conservation and Recreation

SITE PREPARATION DETAILS



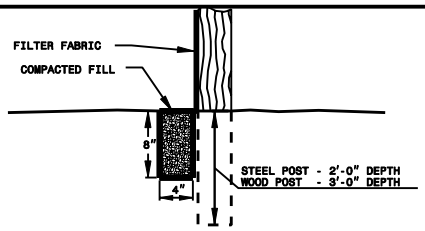
NOTES:

1. STEEL POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
2. WOOD POST SHALL BE 6'-0" IN HEIGHT AND 3" MINIMUM IN DIAMETER.



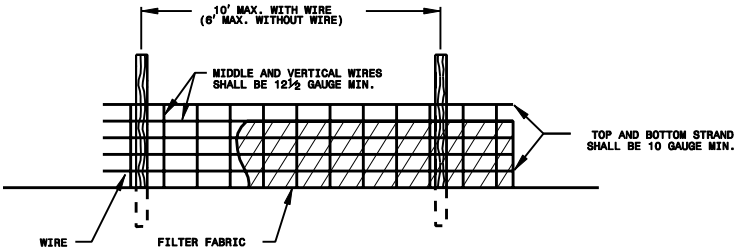
SAFETY FENCE/TREE PROTECTION FENCE

SCALE: NTS



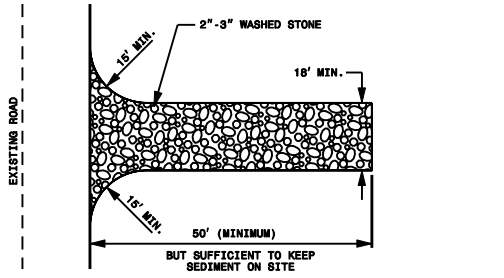
NOTES:

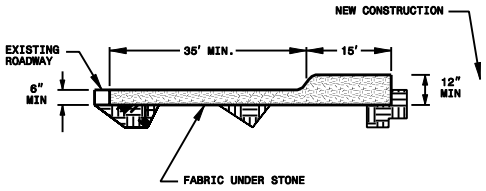
1. WIRE SHALL BE A MINIMUM OF 32" IN WIDTH AND SHALL HAVE A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.
2. FILTER FABRIC SHALL BE A MINIMUM OF 36" IN WIDTH AND SHALL BE FASTENED ADEQUATELY TO THE WIRE AS DIRECTED BY THE DESIGNER.
3. STEEL POSTS SHALL BE 5'-0" IN HEIGHT AND BE OF THE SELF-FASTENER ANGLE STEEL TYPE.
4. WOOD POST SHALL BE 6'-0" IN HEIGHT AND 3" MINIMUM IN DIAMETER.



TEMPORARY SILT FENCE

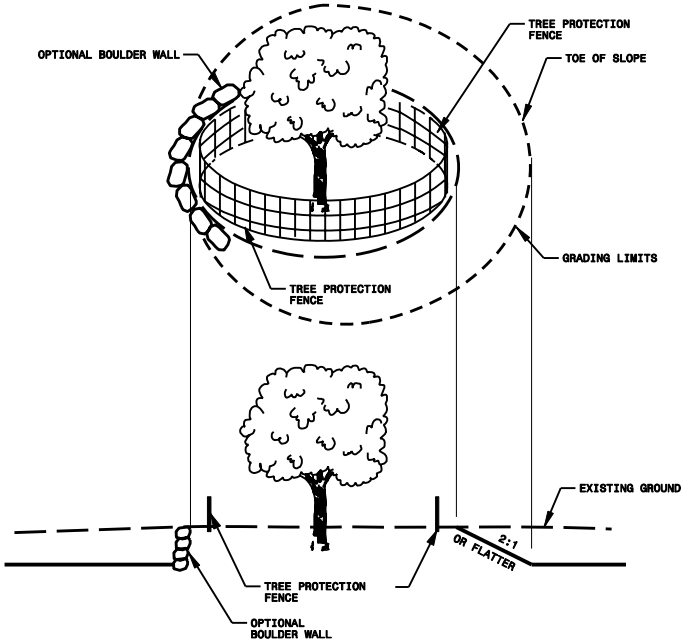
SCALE: NTS





TEMPORARY CONSTRUCTION ENTRANCE

SCALE: NTS



TREE ISLAND

SCALE: NTS

APPENDIX B

Photo Log

Site 1

A degraded and eroding spillway on Bolin Creek just below the pond dam. Facing upstream towards the dam.

Downstream of the spillway, sediment has accumulated in the bed of Bolin Creek. Facing downstream.

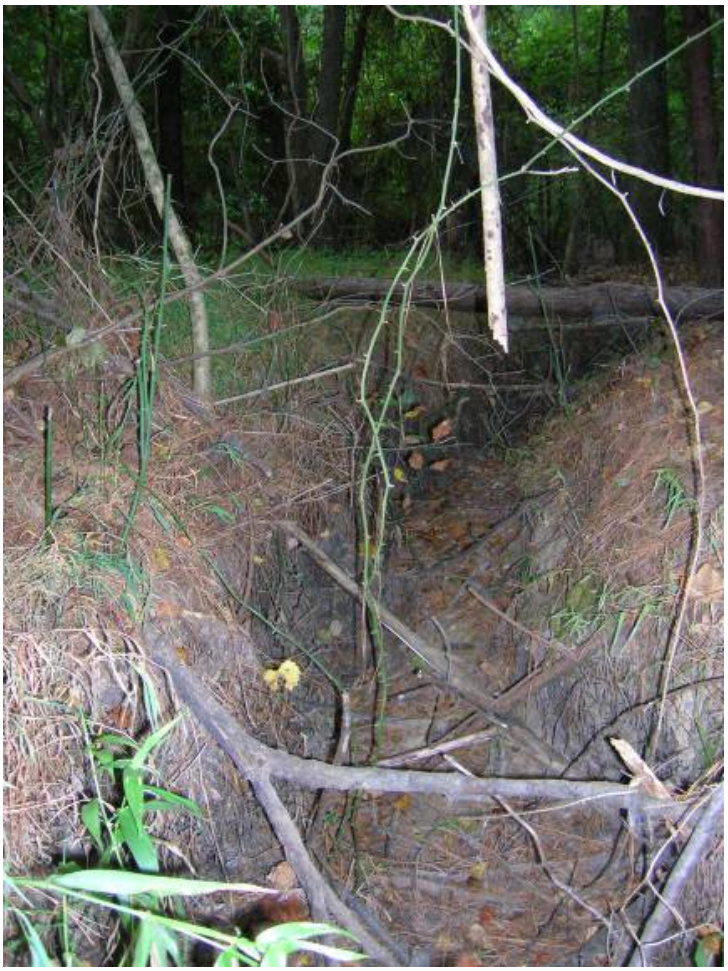
Site 2

The existing stormwater basin. Note the lack of vegetation and the close proximity of the inlet pipe to the outlet structure.

Site 3

Upstream of the headcut at Site 3. Facing downstream.

Downstream of the headcut, the channel is much more incised. Facing downstream.



Downstream of the headcut. Facing upstream.

The actively eroding headcut. Note the difference in elevation of the stream bed upstream and downstream. Facing upstream.

Site 4

Facing uphill towards the outlet pipe that discharges into a rip-rap lined ditch.

The stream into which the ditch at Site 4 leads. The ditch is on the left side of the photo. Facing upstream.

The concrete flow dissipation structure at Site 4.

Facing downsream where the ditch from the dissipating structure meets the stream. Note the eroding, partially caused by the flow discharging from the ditch.

Looking upstream at the ditch.

Sites 5 through 7

Site 5. The sediment basin outlet structure, facing northwest.

Another sediment basin at Site 6. Note the eroding grassy swale leading into the basin. Facing east.

An eroding grassy swale, facing west.

The stormwater outfall of the sediment basin at Site 5. Facing south.

The second sediment basin at Site 6. The pipe outfall is only feet away from the stream, which is located at the bottom of the photo. Facing North.

The private alley at Site 7. The potential area for bioretention is on the left side of the photo. Facing north.

Facing south from the same location as above.

The current pipe and outlet at Site 7. Facing east.

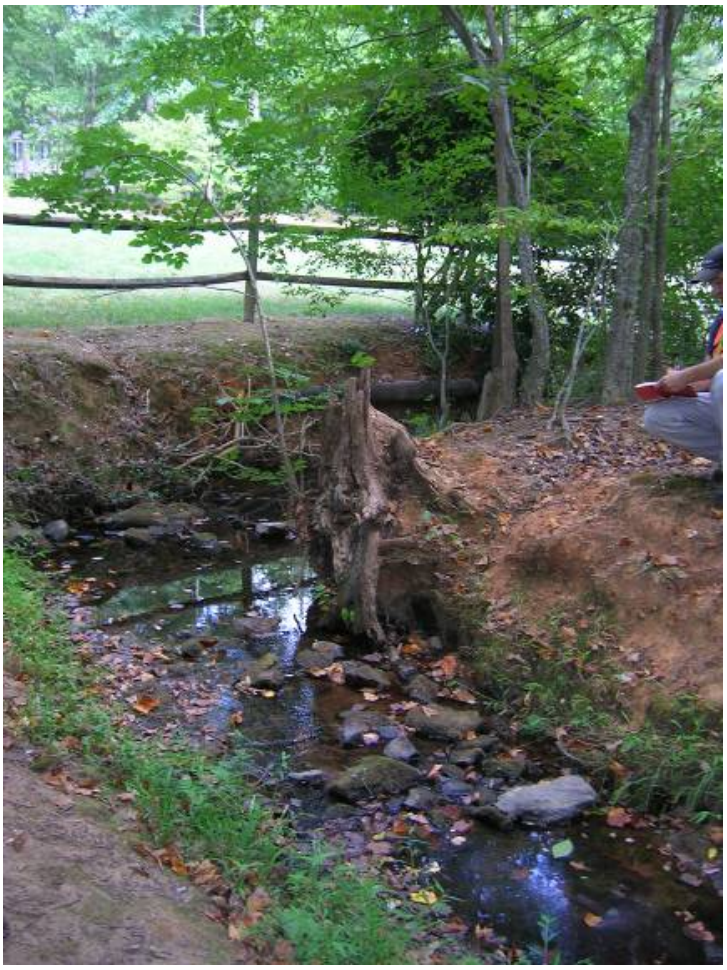
An eroding bank at Site 6. Facing north.

Site 8

An existing stormwater basin at Site 8. Facing northeast.

The stormwater basin one month later. The berm has been removed and the site re-seeded with grass.

Site 9



Eroding stream banks upstream of the Cobblestone Drive crossing. Facing downstream.

A utility line runs parallel with the streambank, just upstream of Cobblestone Drive crossing.

Eroding streambanks downstream of the road crossing. Facing towards right bank.

Site 10

Scour areas are present across from a utility easement, behind the backyard of several houses. Facing west towards the houses.

Where the flow has concentrated, an eroding channel and headcut has formed. Facing downstream.

Sites 11 through 14

A drop inlet at the middle school. Each of these could be converted into a bioretention area.

The pipe outlet discharging stormwater from the middle school. Facing south towards the middle school.

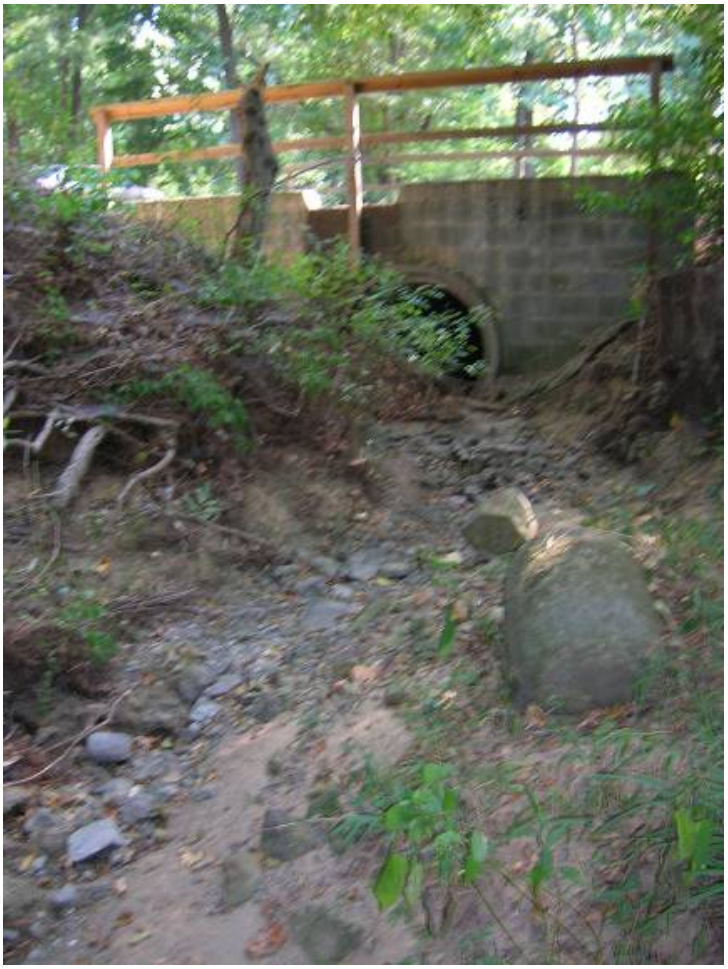
Site 15

An existing sediment basin below a gravel driveway and culvert. Facing north towards the driveway.

A view of the rip-rap berm around the basin. An eroding channel has formed below the basin. Facing north.

An eroding channel and headcut have formed in the floodplain of Jolly Branch.

Site 16



A driveway to an apartment complex crosses the stream. Facing downstream.

The stream is severely incised, and has degraded below the roots of several large trees. Facing upstream.

What was observed to be an ephemeral stream joins the main channel after flowing under Estes Drive Ext. Facing downstream.

The ephemeral tributary facing upstream towards Estes Drive Ext.

Site 17

An eroding hillside at Site 17. Facing upstream.

Site 18

A view of the erosion occurring adjacent to a railroad trestle. Facing north.

The erosion consists of two headcuts eroding uphill. Facing north.

Stormwater flows past the railroad trestle footers and directly into Bolin Creek. Facing south.

Site 19

A view of the stream and surrounding park. Note the lack of riparian vegetation. Facing downstream.

Mass wasting is occurring along this reach. Facing upstream.

Facing downstream.

Site 20

Severe bank erosion is occurring along this reach. Facing upstream.

Another view of the incised channel and bank erosion. Kudzu dominates the floodplain of the stream. Facing downstream.

Site 21

The gulley at Site 21. Facing west towards Hillsborough Street.

A view from the top of the gulley looking downhill. Facing east.

The stormwater outfall pipe from Hillsborough Street is almost completely buried. Facing northwest.

Site 22

An eroding hillside along Bolin Creek is the primary feature at Site 22. The bank is approximately 18 feet high.

Site 23

An existing sediment basin in-line with what was observed to be an ephemeral channel. The basin has filled with sediment and trees have become established. Facing south and downstream.

The stormwater outfall at Site 23, which flows into the existing basin. Facing north and upstream.

The basin provides a good location for a stormwater BMP retrofit. Facing northeast.

Site 24

The stream channel at site 24 is incised as it flows towards Bolin Creek and the Bolin Creek Greenway. Facing downstream.

A headcut along the channel. Facing upstream.

Sites 25 through 28

Cole Springs Branch is incised with undercut banks near Site 25. Facing downstream.

An eroding bank on Cole Springs Branch near Site 25. Facing downstream.

Fill has been placed in an ephemeral channel near Site 26.

An old spring-head improvement near Site 26.

A relic stream channel in the floodplain near Site 27. This floodplain area provides a good location for side-channel BMPs.

The stream channel near Site 27.

What was observed to be an ephemeral stream at Site 28. This could serve as the location for a bio-retention area.

A utility crossing near Site 28 has caused mass wasting on the stream banks.

Site 29

One of the headcuts present at Site 29. Looking upstream.

Another headcut area. Looking downstream

After flowing downhill, the stream flows across a utility easement road. Facing upstream and west.

Site 30

A view of Hotelling Ct, which comprises part of the drainage area of the basin at Site 30. The existing BMP is downhill and to the left of the photo. Facing northwest.

The stormwater outfall pipe below Hotelling Ct. Facing northeast.

Flow from the stormwater outfall is causing hill erosion before flowing into the existing BMP. Facing northeast.

The existing BMP has filled in since its construction. Facing southeast.

Site 31

A ditch was dug in the floodplain of Battle Branch. On the right side of the photo is a residential backyard. The left side of the photo is the floodplain and utility easement along Battle Branch. Facing downstream.

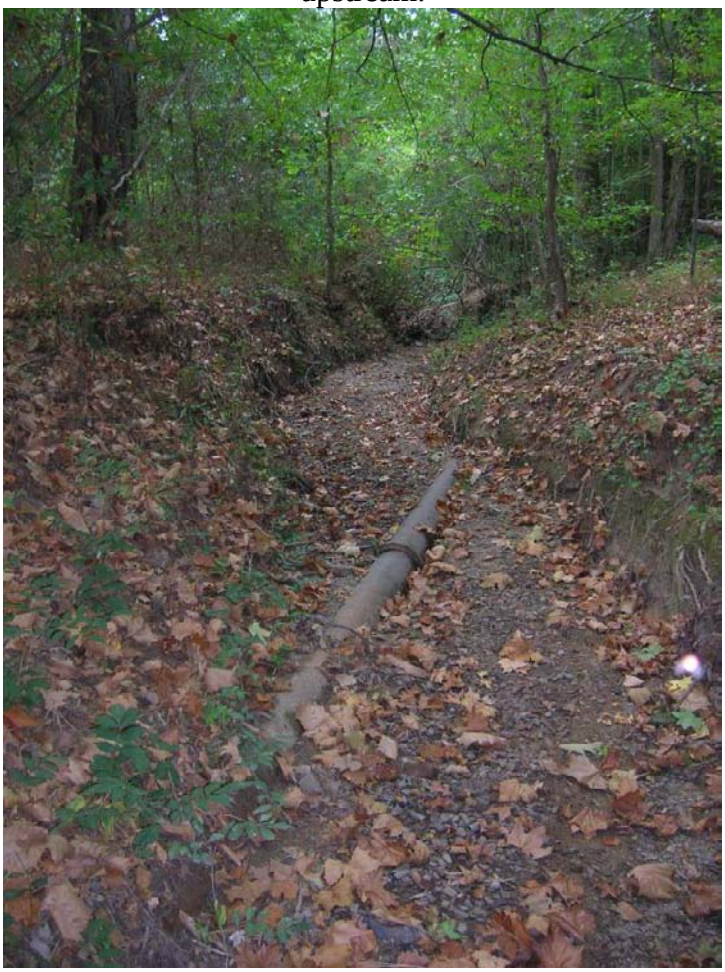
A view of a stormwater scour area flowing from the paved roads of a residential area into the floodplain ditch.

The confluence of the floodplain ditch with Battle Branch. Facing upstream.

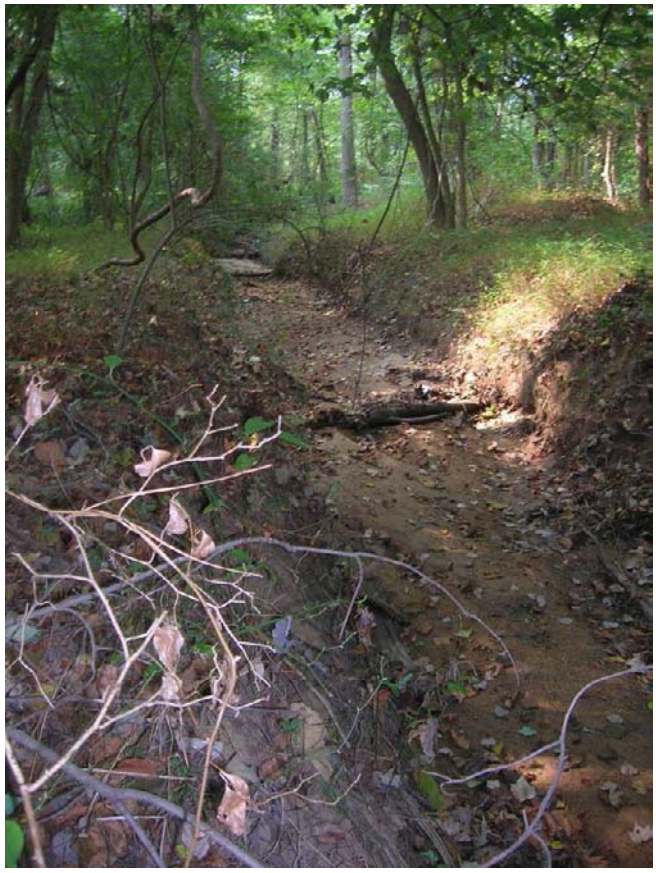
The upstream end of the floodplain ditch, where it is met by stormwater flowing from the nearby road.

Site 32

The upstream end of a channelized stream, where a stormwater outfall discharges into a large pool. Facing upstream.



A utility line crosses the bed of the stream. Facing downstream.



The stream has been straightened for most of its course. Spoil piles are present in the floodpain. Facing upstream.

Eroding banks along the stream. Facing downstream.

APPENDIX C

Raw Data Forms for Final Sites

STREAM NAME: BOLIN CREEK	DATE: 5/30/07	MAP SHEET #: 4
PHOTO NUMBERS:	LANDMARK: LAKE WEST OF OLD NC 86	SKETCH ON BACK

GPS ID START: IJ04
DESCRIPTION:

GPS ID END: IJ04
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential ☐ Suburban/Res X Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear XTurbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank ___5___(ft)
Width: Bottom ___3_____(ft)
Top ____3____(ft)
Water Surface ____0.5____(ft)
Depth: Max BKF _____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☒ Downcutting
☐ Widening
☒ Headcutting
☐ Aggrading
☐ Bed scour
☒ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES

-HAVE POND OUTFALL- LARGE AMOUNTS OF BANK EROSION OCCURING AND DEEPLY INCISED- COULD DO POSSIBLE OUTFALL REPAIR

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate X Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT	DATE: 5/31/07	MAP SHEET #: 7
PHOTO NUMBERS: 1118-1122	LANDMARK: ROGERS AND EUBANKS	SKETCH ON BACK

GPS ID START: BD 27
DESCRIPTION:

GPS ID END: BD 28
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential ☐ Suburban/Res X Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes) **NA**

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank __4.1_____(ft)
Width: Bottom __6_____(ft)
Top __6.5_____(ft)
Water Surface ___0.1____(ft)
Depth: Max BKF ____NA_(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence HEAD CUTS
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☐ Downcutting ☐ Bed scour ☐ Slope failure
☐ Widening ☐ Bank failure ☐ Channelized
☒ Headcutting ☐ Bank scour ☐ Unknown
☐ Aggrading ☐ Sed. deposition

NOTES
SOME FLOW FROM YARDS MAY BE CAUSING HEADCUTS ALSO SIGNS OF RILLS

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT	DATE: 6/5/07	MAP SHEET #: 9
PHOTO NUMBERS: 1087	LANDMARK: UP STRM CIRCADIAN WAY	SKETCH ON BACK

GPS ID START: TA 1
DESCRIPTION: BRIDGE OVER CIRCADIAN WAY

GPS ID END: TA 4
DESCRIPTION: FOOT BRIDGE

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential X Suburban/Res ☐ Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☐ 25-50 %
☐ 50%-75%
X 75-100%

WATER CLARITY X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
1 Sand (gritty)
2 Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 3.5_____(ft)
Width: Bottom 4.5 _____(ft)
Top 10.0_____(ft)
Water Surface 3.5_____(ft)
Depth: Max BKF 1.0_____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☒ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other - Incision

CHANNEL DYNAMICS
☒ Downcutting
☒ Widening
☒ Headcutting
☐ Aggrading
☐ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
TA 2 - TA 4 INCISED CHANNEL
TA 3- STORMWATER DRAINAGE DITCH

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** X **III** X **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT BELOW GATES FARM RD	DATE: 6/5/07	MAP SHEET #: 14
PHOTO NUMBERS: 1093-1095	LANDMARK: GATES FARM RD	SKETCH ON BACK

GPS ID START: TA-5
DESCRIPTION: NEAR GATES FARM RD

GPS ID END:
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential X Suburban/Res ☐ Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☐ 25-50 %
☐ 50%-75%
X 75-100%

WATER CLARITY X Clear X Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
1 Sand (gritty)
☐ Gravel (0.1-2.5")
2 Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 3.5_____(ft)
Width: Bottom 7.0_____(ft)
Top 11.0_____(ft)
Water Surface 7.0_____(ft)
Depth: Max BKF 1.1_____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☒ Impacted buffer – **Cat litter dump site**
☐ Stream crossing
☐ Channel mod
☒ Utility impacts
☐ Beaver
☒ Other- scour from increased SW

CHANNEL DYNAMICS
☐ Downcutting
☒ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES

QUALITATIVE IMPAIRMENT RATING: X Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** X **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT	DATE: 6/6/07	MAP SHEET #: 15
PHOTO NUMBERS: 1098-1099	LANDMARK: COBBLESTONE DR	SKETCH ON BACK

GPS ID START: TA 12
DESCRIPTION:

GPS ID END: TA 13
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain X Steady rain ☐ None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential X Suburban/Res ☐ Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes) NA

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 0.3_____(ft)
Width: Bottom 1.0_____(ft)
Top 1.0_____(ft)
Water Surface 0.0_____(ft)
Depth: Max BKF 0.3_____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☒ Other- R/O from Cobblestone Dr

CHANNEL DYNAMICS
☒ Downcutting ☐ Widening ☐ Headcutting ☐ Aggrading
☒ Bed scour ☐ Bank failure ☐ Bank scour ☐ Sed. deposition
☐ Slope failure ☐ Channelized ☐ Unknown

NOTES
POTENTIAL FOR SWALE OR RAIN GARDEN

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** X **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT TO JOLLY BRANCH	DATE: 6/5/07	MAP SHEET #: 16
PHOTO NUMBERS: 0418	LANDMARK: SMITH MIDDLE SCHOOL	SKETCH ON BACK

GPS ID START: IJ 34
DESCRIPTION:

GPS ID END: IJ 34
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
☐ Clear ☐ Trace ☐ Overcast X Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential X Suburban/Res X Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☐ 25-50 %
X 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear XTurbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
X Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 2_____(ft)
Width: Bottom 2.5_____(ft)
Top 2.75_____(ft)
Water Surface 2.1_____(ft)
Depth: Max BKF 0.5_____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☒ Other – Pipe outlet

CHANNEL DYNAMICS
☒ Downcutting
☐ Widening
☒ Headcutting
☐ Aggrading
☒ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
RCP AT MIDDLE SCHOOL NEEDS ENERGY DISSIPATION BEING UNDERCUT BY FLOW
GOOD BMP POTENTIAL

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** X **III** X **IV** ☐ **V** ☐ **VI** *(Simon et. al., 2003)*

STREAM NAME: JOLLY BRANCH	DATE: 6/5/07	MAP SHEET #: 16
PHOTO NUMBERS: NO PHOTO	LANDMARK: HIGH SCHOOL TRACK	SKETCH ON BACK

GPS ID START: IJ 24
DESCRIPTION:

GPS ID END:
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
☐ Clear ☐ Trace ☐ Overcast X Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential ☐ Suburban/Res X Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes) **NA-NO FLOW**

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 3_____(ft)
Width: Bottom 1.5_____(ft)
Top 4_____(ft)
Water Surface NA_____(ft)
Depth: Max BKF NA_____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☒ Other – CULVERT OUTLETS

CHANNEL DYNAMICS
☒ Downcutting
☒ Widening
☐ Headcutting
☐ Aggrading
☒ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☒ Channelized
☐ Unknown

NOTES
CULVERT OUTLETS FROM TRACK FLOWING INTO STREAM – JOLLY BRANCH- COULD HAVE STORMWATER BMPs HERE

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** X **III** X **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT JOLLY BRANCH	DATE: 6/5/07	MAP SHEET #: 17
PHOTO NUMBERS: 396-398	LANDMARK:	SKETCH ON BACK

GPS ID START: IJ 26
DESCRIPTION:

GPS ID END:
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
☐ Clear ☐ Trace ☐ Overcast X Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential ☐ Suburban/Res X Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☐ 25-50 %
X 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear X Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 3_____(ft)
Width: Bottom 3_____(ft)
Top 3_____(ft)
Water Surface NA_____(ft)
Depth: Max BKF NA_____(ft)
B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☒ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☒ Downcutting
☒ Widening
☐ Headcutting
☒ Aggrading
☒ Bed scour
☐ Bank failure
☒ Bank scour
☒ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
OUTLET OF CULVERT IS CAUSING OVERLAND EROSION AND SEDIMENT DEPOSITION
INCISION OF STREAM
OLD BMP IS FAILING

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ I ☐ II ☐ III ☐ IV ☐ V ☐ VI *(Simon et. al., 2003)*

STREAM NAME: UT	DATE: 6/6/07	MAP SHEET #: 20
PHOTO NUMBERS: 1111- 1112 (TONY)	LANDMARK: ESTES	SKETCH ON BACK

GPS ID START: BD 44
DESCRIPTION:

GPS ID END: BD 47
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☒ Steady rain ☐ None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent ☒ Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☒ Urban/Residential ☐ Suburban/Res ☐ Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☒ 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☒ Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☒ Silt/clay (fine or slick)
☐ Sand (gritty)
☒ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 4.2_____(ft)
Width: Bottom 6_____(ft)
Top 10 _____(ft)
Water Surface 2_____(ft)
Depth: Max BKF 1.0 _____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☒ Impacted buffer- YARD WORK
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☐ Downcutting
☒ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☐ Bank failure
☐ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
MASS BANK FAILURE

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT BOLIN	DATE: 5/8/07	MAP SHEET #: 20
PHOTO NUMBERS: 23	LANDMARK:	SKETCH ON BACK

GPS ID START: BD 11
DESCRIPTION:

GPS ID END:
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain ☐ None ☐ Intermittent X Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent ☐ Clear ☐ Trace X Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential X Suburban/Res X Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
X Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank ___3.2_____(ft)
Width: Bottom ___13_____(ft)
Top ___17_____(ft)
Water Surface ___1.4_____(ft)
Depth: Max BKF ____0.6____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☒ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☐ Downcutting
☐ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☒ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** *(Simon et. al., 2003)*

STREAM NAME: UT	DATE:	MAP SHEET #: 20
PHOTO NUMBERS: 1105	LANDMARK: OFF CARDIFF PL	SKETCH ON BACK

GPS ID START: TA 19
DESCRIPTION: SCOUR OF RR FILL

GPS ID END:
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain X Steady rain ☐ None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential X Suburban/Res ☐ Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes) NA-NO FLOW

DOMINANT SUBSTRATE
1 Silt/clay (fine or slick)
☐ Sand (gritty)
2 Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank _____(ft)
Width: Bottom _____(ft)
Top _____(ft)
Water Surface _____(ft)
Depth: Max BKF _____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☒ Other- SW r/o

CHANNEL DYNAMICS
☒ Downcutting
☒ Widening
☒ Headcutting
☐ Aggrading
☒ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
SIGNIFICANT SCOUR OF RR FILL SITE FOR POTENTIAL RETENTION SEWER SMELL

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** X **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT	**DATE: 6/7/07**	**MAP SHEET #: 23**
PHOTO NUMBERS: 1117- PIPED CH 1118-11120 DEGRADED	**LANDMARK: BROAD ST.**	**SKETCH ON BACK**

GPS ID START: TA 29 **DESCRIPTION: PIPED ST NO GPS**	**GPS ID END: TA 30** **DESCRIPTION: DEGRADED STR NO GPS**
RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain X None ☐ Intermittent ☐ Trace	**PRESENT CONDITIONS** ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential ☐ Suburban/Res ☐ Forested ☐ Institutional ☐ Golf course X Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH ☐ 0-25% ☐ 25-50 % X 50%-75% ☐ 75-100%	**WATER CLARITY** X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)* ☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE

☐ Silt/clay (fine or slick)
2 Sand (gritty)
1 Gravel (0.1-2.5")
3 Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE

Height: Low bank 1.3 (ft)
Width: Bottom 4.0 (ft)
Top 5.0 (ft)
Water Surface 3.0 (ft)
Depth: Max BKF 1.3 (ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS

☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS

☒ Downcutting
☒ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES- UPSTREAM OF BROAD ST STREAM IS PIPED AND COULD BE DAYLIGHTED TA 29
- DOWN STR OF BROAD ST STREAM IS DEGRADED AND COULD USE RESTORATION

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ I ☐ II ☐ III X IV ☐ V ☐ VI *(Simon et. al., 2003)*

STREAM NAME: UT	DATE: 6/7/07	MAP SHEET #: 24
PHOTO NUMBERS:1124-1125	LANDMARK:	SKETCH ON BACK

GPS ID START: TA 33
DESCRIPTION:

GPS ID END: TA 34
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential ☐ Suburban/Res ☐ Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☐ 25-50 %
X 50%-75%
☐ 75-100%

WATER CLARITY X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
3 Sand (gritty)
1 Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
2 Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 10.0 (ft)
Width: Bottom 10.0 (ft)
Top 20.0 (ft)
Water Surface 8.0 (ft)
Depth: Max BKF 1.4 (ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☒ Utility impacts
☐ Beaver
☒ Other- SCOUR from SW

CHANNEL DYNAMICS
☒ Downcutting
☒ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☒ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
ENTIRE REACH HAS APPROX 5 TO 6 FT.ERODING VERTICAL BANK FROM SW DOWNCUTIING

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** X **IV** ☐ **V** ☐ **VI** *(Simon et. al., 2003)*

STREAM NAME: UT MILL RACE	DATE: 5/21/07	MAP SHEET #: 25-24
PHOTO NUMBERS: 2976-2979	LANDMARK: HILLSBOROUGH ST	SKETCH ON BACK

GPS ID START: IJ 43
DESCRIPTION:

GPS ID END: IJ 43
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain ☐ None X Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential X Suburban/Res X Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
X 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear X Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank ___3-10___(ft)
Width: Bottom ___3-6____(ft)
Top ___3-6____(ft)
Water Surface ___0.5____(ft)
Depth: Max BKF ___0.2____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☐ Downcutting ☐ Widening ☐ Headcutting ☐ Aggrading
☐ Bed scour ☐ Bank failure ☐ Bank scour ☐ Sed. deposition
☐ Slope failure ☐ Channelized ☐ Unknown

NOTES: BURIED PIP IS CAUSING MASSIVE EROSION ON HILLSIDE
DEEP GULLY FORMED
POSSIBLE STEP-POOL OR ENERGY DISSIPATION
EVEN CULVERT REPLACEMENT

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate X Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** X **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: BOLIN CREEK	DATE: 2/21/07	MAP SHEET #: 25
PHOTO NUMBERS: 3015-3016	LANDMARK: BOLINWOOD DR	SKETCH ON BACK

GPS ID START: IJ53
DESCRIPTION:

GPS ID END: IJ53
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain ☐ None X Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential ☐ Suburban/Res X Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☐ 25-50 %
☐ 50%-75%
X 75-100%

WATER CLARITY X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
X Sand (gritty)
X Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
X Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank ___5-20_(ft)
Width: Bottom ____20__(ft)
Top ____20__(ft)
Water Surface ____20__(ft)
Depth: Max BKF ____2.5__(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☒ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☐ Downcutting
☐ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☒ Bank failure
☐ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
MAJOR BANK FAILURE ON BOLIN CREEK
POSSIBLE BANK STABILIZATION

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT	DATE: 6/21/07	MAP SHEET #: 26
PHOTO NUMBERS: 1162-1165	LANDMARK: YMCA	SKETCH ON BACK

GPS ID START: BD 58
DESCRIPTION:

GPS ID END: BD 59
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain X Steady rain ☐ None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial X Commercial X Urban/Residential ☐ Suburban/Res ☐ Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
X Sand (gritty)
☐ Gravel (0.1-2.5")
X Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank __2.1___(ft)
Width: Bottom __7.1___(ft)
Top __9_____(ft)
Water Surface __2_____(ft)
Depth: Max BKF __0.5____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence NA- development=high flow
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☒ Downcutting
☐ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☐ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
THIS NEEDS HELP. ACTIVE, GETS WORSE DS.
SEE BD 59-60.

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** X **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** *(Simon et. al., 2003)*

STREAM NAME: COLE SPRINGS BR.	DATE: 6/21/07	MAP SHEET #: 26
PHOTO NUMBERS: 1231,1232	LANDMARK:	SKETCH ON BACK

GPS ID START: BD 75
DESCRIPTION:

GPS ID END:
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☒ Steady rain ☐ None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent ☒ Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☒ Urban/Residential ☐ Suburban/Res ☐ Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
☒ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank 4 _____(ft)
Width: Bottom 4_____(ft)
Top 14_____(ft)
Water Surface 2_____(ft)
Depth: Max BKF 1.8_____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☒ Downcutting
☒ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☒ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
CULVERT FOR UTILITY ROADWAY ALONG SS LINE CAUSES CONTRACTION

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☒ Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☒ **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: UT BATTLE BRANCH	DATE: 6/22/07	MAP SHEET #: 30
PHOTO NUMBERS:NO PHOTO	LANDMARK:	SKETCH ON BACK

GPS ID START: IJ 64
DESCRIPTION:

GPS ID END: IJ 64
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain ☐ None X Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial X Urban/Residential X Suburban/Res X Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
X 0-25%
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear X Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
X Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank ___3-4_____(ft)
Width: Bottom ___3_____(ft)
Top __5_____(ft)
Water Surface ___NA_____(ft)
Depth: Max BKF _____NA___(ft)

B:H Ratio: Low bank/Max BKF=____NA___

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☒ Other

CHANNEL DYNAMICS
☒ Downcutting
☐ Widening
☒ Headcutting
☐ Aggrading
☒ Bed scour
☒ Bank failure
☐ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
SERIES OF HEADCUTS PROGRESSING UP STEEP CHANNEL
LOTS OF SILT AND SEDIMENT FROM BANK FAILTURE
ORIGINATES AT PARTIALLY BURIED PIPE UPSTREAM

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate X Severe

CHANNEL EVOLUTIUON STAGE: ☐ I ☐ II ☐ III ☐ IV ☐ V ☐ VI (*Simon et. al., 2003)*

STREAM NAME: UT TO BOLIN CR	DATE: 6/21/07	MAP SHEET #: 30
PHOTO NUMBERS: 3032-3034	LANDMARK: STEEP HILLSIDE	SKETCH ON BACK

GPS ID START: IJ 60
DESCRIPTION:

GPS ID END: IJ 60
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain ☐ None X Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent X Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential X Suburban/Res X Forested ☐ Institutional ☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25% NA-hillside
☐ 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY ☐ Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes) NA

DOMINANT SUBSTRATE
2 Silt/clay (fine or slick)
1 Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank _____(ft)
Width: Bottom _____(ft)
Top _____(ft)
Water Surface _____(ft)
Depth: Max BKF _____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☒ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☒ Other- old BMP

CHANNEL DYNAMICS
☐ Downcutting
☐ Widening
☐ Headcutting
☒ Aggrading
☐ Bed scour
☐ Bank failure
☐ Bank scour
☐ Sed. deposition
☒ Slope failure
☐ Channelized
☐ Unknown

NOTES
OLD BMP – MAYBE LEVEL SPREADER ;COULD EASILY RETROFIT
GULLY FORMATION ABOVE ROCK CHECK DAMS BELOW

QUALITATIVE IMPAIRMENT RATING: ☐ Low X Moderate ☐ Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** (*Simon et. al., 2003)*

STREAM NAME: BATTLE BR	DATE: 6/22/07	MAP SHEET #: 34
PHOTO NUMBERS: 1271-1279	LANDMARK:	SKETCH ON BACK

GPS ID START: BD 87
DESCRIPTION:

GPS ID END: BD 88
DESCRIPTION:

RAIN IN LAST 24 HOURS ☐ Heavy rain ☐ Steady rain
X None ☐ Intermittent ☐ Trace

PRESENT CONDITIONS ☐ Heavy rain ☐ Steady rain ☐ Intermittent
☐ Clear ☐ Trace ☐ Overcast ☐ Partly cloudy

SURROUNDING LAND USE: ☐ Industrial ☐ Commercial ☐ Urban/Residential ☐ Suburban/Res ☐ Forested ☐ Institutional
☐ Golf course ☐ Park ☐ Crop ☐ Pasture ☐ Other:

BASE FLOW WIDTH AS % CHANNEL WIDTH
☐ 0-25%
X 25-50 %
☐ 50%-75%
☐ 75-100%

WATER CLARITY X Clear ☐Turbid *(suspended matter)* ☐ Stained *(clear, naturally colored)* ☐ Opaque *(milky)*
☐ Other (chemicals, dyes)

DOMINANT SUBSTRATE
☐ Silt/clay (fine or slick)
☐ Sand (gritty)
☐ Gravel (0.1-2.5")
☐ Cobble (2.5 –10")
☐ Boulder (>10")
☐ Bed rock

CHANNEL DIMENSIONS AT RIFFLE
Height: Low bank _____(ft)
Width: Bottom _____(ft)
Top _____(ft)
Water Surface _____(ft)
Depth: Max BKF _____(ft)

B:H Ratio: Low bank/Max BKF=_____

OBSERVED IMPACTS
☐ Outfall
☐ Confluence
☐ Impacted buffer
☐ Stream crossing
☐ Channel mod
☐ Utility impacts
☐ Beaver
☐ Other

CHANNEL DYNAMICS
☐ Downcutting
☐ Widening
☐ Headcutting
☐ Aggrading
☐ Bed scour
☒ Bank failure
☒ Bank scour
☐ Sed. deposition
☐ Slope failure
☐ Channelized
☐ Unknown

NOTES
SEE PHOTOS

DITCH BUILT BY SS LINE

QUALITATIVE IMPAIRMENT RATING: ☐ Low ☐ Moderate X Severe

CHANNEL EVOLUTIUON STAGE: ☐ **I** ☐ **II** ☐ **III** ☐ **IV** ☐ **V** ☐ **VI** *(Simon et. al., 2003)*

APPENDIX D

Raw Data Maps

4,500 2,250 0 4,500 Feet

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Legend

Bolin Creek Watershed

Map Index

600 300 0 600 Feet

1

MAPLE RIDGE DR

Start Ephemeral

Probably Ephemeral

Looses surface water

Probably Ephemeral

Good

Parked Here- Began 5/7

Leaf-clogged

Good

POSSIBLE BMP

Gulleys

Begins mild incision

BD 12

Headcutting

Stable

Headcutting

TALBRYN WAY

2

BD 13

Minor Scour

1

DESERET LN

UNION GROVE CHURCH RD

Good

Good

Beaver Dams

BOLIN BROOK FARM RD

Probably ephemeral

Probably Ephemeral

Probably Ephemeral

Probably Ephemeral

BOLIN CREEK

Probably ephemeral

IJ07

Probably ephemeral

IJ06

5

Dry spillway from pond, banks are scoured, wetland/beaver pond below spillway

4

Beaver pond wetland

N

DEER RIDGE DR

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours

Text General stream note

Text Stream problem area note

TEXT BMP Note

Map Pages

600 300 0 600 Feet

2

WOOD SAGE DR

MAPLE RIDGE DR

egan 5/7

eaf-clogged

Some riparian disturbance

Probably Ephemeral

Gulleys

Old Crossing Caused Headcut

Upstream Instablility caused by road crossing

BD 12

Stable

BD 15

BD 14

BD 13

1

POSSIBLE BMP RETENTION AREA

Culvert caused sediment deposition, loss of main channel and wasting 5 24" CMPs

Good

Probably Ephemeral

Incision-some wasting

Mostly Stable

BD 18

BD 17

Beaverdam

BD 16

BOLIN CREEK

Upstream endpoint of incision

BD 15

Incision-some wasting

TALBRYN WAY

Culvert caused sediment deposition ,loss of main channel and wasting

3

BRITTON DR

BUCKHORN BRANCH

5

6

N

OLD N

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

3

IJ10

Scour from culvert

Probably ephemeral

LAMBERTH LN

2

3

LUCY LN

Stable- Slightly Incised "E"

KAREN WOODS RD

HICKORY FOREST RD

OLD SPRING RD

IJ09

Scour from culvert

Slightly incised- some fine material in stream

OLD NC 86

EUBANKS RD

DUBLIN RD

6

7

JONES CREEK

N

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- *Text* General stream note
- *Text* Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

1

4

Beaver pond wetland

Ephemeral

IJ05

Recent clearcut, but no incision

UNION GROVE CHURCH RD

BOLIN CREEK

Pond outfall- clear water discharge
Large amounts of bank erosion and highly incised below outfall

TRIB

IJ04

POTENTIAL BMP

IJ03

Upstream end erosion

5

IJ02

POTENTIAL BMP

No incision

IJ01

Bank erosion past fence
Likely caused by cow access to stream

OXFORD CT

GIBBON DR

VILLA DR

Ephemeral

4

DAIRYLAND RD

OLD NC 86

STONY HILL RD

IJ11

CHEEKIE BOY LN

IJ12

Deeply incised

Looks good- probably perennial

HOMESTEAD RD

HARDEE LN

10

Stable

N

9

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

IJ07

Probably ephemeral

1

2

5

BRITTON DR

Ephemeral

DEER RIDGE DR

Incised

HARMONY FARMS

LATEGAN LN

5

6

OLD NC 86

DAIRY GLEN RD

BMP RETROFIT

Beaver Pond

4

LONG MEADOWS DR

Ephem

BLOCKER RD

HOGAN RIDGE CT

HOGAN HILLS RD

SHADOW RIDGE PL

DAIRY CT

HOGAN GLEN CT

Ephemeral

BAY VIEW DR

NORTH FIELD CIR

S FIELDS CIR

LONG MEADOWS RD

BOLIN CREEK

N

11

10

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text — General stream note
- Text — Stream problem area note
- TEXT — BMP Note
- Map Pages

600 300 0 600 Feet

2 3 6 5 7 12 11

JONES CREEK

DUBLIN RD

KELLY CT

DROMOLAND RD

EUBANKS RD

OLD NC 86

BRITTON DR

looks good

Old trash dump against stream

POTENTIAL BMP SITE
RETENTION AREA

Ongoing development

Probably ephemeral

Some existing retention areas at development site discharging into incised ephemeral- very little buffer

IJ13

Stream becomes slightly incised

Trib is incised here and upstream- bu
appears to be stable

Incised

Probably Ephem

Probably ephemeral

Incised

Pond

Ephemeral

Probably ephemeral

BUCKHORN BRANCH

Incised

Incised

BD 24

BD 23

LEAK LN

JONES CREEK PL

TOWNE RIDGE LN

Incised "F" channel with debris jams,
low base-flow and chute cut-offs

BD 22

BD 21

KIT LN

TALLYHO TRL

Beavers

TALLYHO TRL

N

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

3

7

DROMOLAND RD

Ongoing development

BMP SITE
N AREA

Probably ephemeral

Some existing retention areas at development site discharging into incised ephemeral- very little buffer

IJ13

Trib is incised here and upstream- but appears to be stable

JONES CREEK

Probably Ephemeral

7

6

EUBANKS RD

Stable

8

Begin incision- appears to be old

BD 25

B

End incision

BD 26

Big (>3ft) headcut

LEAK LN

Incised

BD27

Looks good

BD

Widen

aggradation

BD 29

Stable

Some flow from yards may be causing headcuts (observed rills)

Incision

12

MEADOW RUN CT

ROGERS RD

13

N

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

8

7

8

ROGERS RD

Looks good

EUBANKS RD

N

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

13

600 300 0 600 Feet

4

9

JOHNS WOODS RD

OLD NC 86

HOMESTEAD RD

Probably ephemeral

Reference-reach quality "E" stream
But with high amounts of sediment

AIRFIELD RD

Looks good

BMP POSSIBILITY
RETROFIT CONCRETE OUTFALL

TA4

BMP POSSIBILITY
RESTORATION

TA3

FARM HOUSE DR

SUNSET CREEK CIR

Incision

TRAMORE DR

TA2

CIRCADIAN WAY

9

POSSIBLE BMP
RETENTION POND

Active incision

POSSIBLE BMP
RETROFIT

BD 30

BD 31

TA1

Observed a lot of flow here

OLD FAYETTEVILLE RD

RUSSELLS FORD RD

HILLSBOROUGH RD

CANTON CT

AUTUMN DR

Looks good

STRATFORD DR

BRUTON DR

POSSIBLE BANK
STABILIZATION

BARINGTON HILLS RD

Stable

Utility Easement Impacts

HORNE HOLLOW

Looks good

Bank scour

ROCKGARDEN RD

AUTUMN DR

Stable

15

Looks good

CATES FARM RD

N

WYNDHAM DR

14

Probably ephemeral

TA5

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text — General stream note
- Text — Stream problem area note
- TEXT — BMP Note
- Map Pages

600 300 0 600 Feet

4

5

10

11

15

16

Stable

BOLIN CREEK

STONY HILL RD

S FIELDS CIR

LAKE RIDGE PL

LAKE MANOR RD

LAKE HOGAN FARM RD

HOGAN WOODS CIR

DREW LN

HOMESTEAD RD

LAKE HOGAN LN

Ephemeral

Ephemeral

Ephemeral

Ephemeral

Incision starts

Channelized

Aggradation and loss of definition

Fill brought in

STRATFORD DR

TRAMORE DR

SWORTH PL

OHAM DR

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

6

11

BD 20

JONES CREEK

Beavers

KIT LN

TALLY HO TRL

S FIELDS CIR

LONG MEADOWS RD

LAKE HOGAN FARM RD

Existing BMP below road- seems to overflow and flow diffusely across floodplain

Beaverdams and culvert scour

BD 19

REYNARD RD

TURTLEBACK CROSSING DR

Nice wetland and greenspace

IJ19

IJ20

POSSIBLE BMPS ALONG GREENWAY

IJ18

Development occuring close to Bolin Creek, possible future stormwater inputs

N HOUND CT

COMMONS WAY DR

ARBOR CREEK CT

Probably ephemeral

HOGAN WOODS CIR

RANDOLPH CT

Existing wetland

Incision

Incision

12

11

10

Probably ephemeral

BOLIN CREEK

LOCH LAVEN LN

CLAYMORE RD

INVERNESS WAY

Bedrock- Mostly Stable

POSSIBLE BMP HERE

CAMDEN LN

BALMORAL PL

SKYE DR

GLOUCESTER CT

Looks good

Channelized but mostly stable

Old stone dam and filled pond behind it
Stream is extremely incised here

IJ21

17

16

POTENTIAL BMP
STREAM RESTORATION/WETLANDS
IN OLD, AGGRADED POND

HOMESTEAD RD

BOLIN CREEK

N

Legend

- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
- Text Stream problem area note
- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

6 7 12

MEADOW RUN CT

POTENTIAL BMP LOCATION
BELOW CULVERT

IJ15

Incision

Triple 36" CMP culvert blows out into incised stream
Floodplain is wide enough for off-channel BMP

Probably ephemeral

IJ16

N HOUND CT

REYNARD RD

Stream in and out of incision, some bedrock

Beavers

Looks good

Headcut working upstream

IJ17

LAIR CT

12
11

POTENTIAL BMP
BELOW POWERLINE CROSSING
STREAM HAS BEEN PUSHED AGAINST VALLEY
WALL AND RELIC INCISION

13

PUREFOY DR

ZIEGER LN

HUNTSMAN CT

BRENDAN CT

RUSCH RD

CATTAIL LN

LOCH LAVEN LN

STAFFIELD LN

TALLYHO TRL

ROGERS RD

BURNS PL

WHITMORE CIR

JUBILEE DR

Looks good

CLAYMORE RD

IJ22

BMP POSSIBILITY
UPSTREAM OR DOWNSTREAM OF CULVERT

Incised channel

SHAWICK CT

SYLVAN WAY

Incised channel

Stream crossing impact
Billabong Ln

hannelized and overwidened

JA6 JA7

Channelized

JA8

BILLABONG LN

JA4

Channelized stream

JA 5

17

18

POSSIBLE BMP

N

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- Map Pages

600 300 0 600 Feet

7

8

13

ROGERS RD

EUBANKS RD

12

13

EDGAR ST

PUREFOY DR

ZIEGER LN

CATTAIL LN

Looks good

Legend

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N

600 300 0 600 Feet

9

14

15

19

20

TA5

TA6

TA7

TA8

TA15

TA16

TA17

Probably ephemeral

Moderate to low incision

Exposed sewer

Sewer encroaching on street
causing buffer impacts and bank failure

Channel scour

POTENTIAL FOR BMP

POTENTIAL BMP
RETENTION AREA

Road/trail erosion along sewer

Incised

Probably ephemeral

POTENTIAL BMP
STORMWATER WETLAND

Former attempted erosion control
Considerable amounts of stormwater runoff

CATES FARM RD

GARDEN GATE DR

THE HOLLOW

HILLSBOROUGH RD

BUCK TAYLOR TRL

PATHWAY DR

QUAIL ROOST DR

DEER ST

COBBLESTONE DR

COBBLESTONE PL

PARKVIEW AVE

TOMS CREEK

WRENN PL

JAMES ST

DOVE ST

RAINBOW DR

TRIPP FARM RD

RICHLAND CT

HANFORD RD

WAVERLY FOREST LN

DRAYTON CT

GRACEWOOD PL

CAROL ST

DAPHNE CT

LORRAINE ST

WEBB DR

ROCK SPRING CT

BLUERIDGE RD

ABERDEEN CT

CALUMET CT

MORNINGSIDE DR

SPRING VALLEY RD

BRAMBLEBUSH DR

N GREENSBORO ST

ROBERT HUNT DR

N

Legend

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600 300 0 600 Feet

10

15

9

AUTUMN DR

WYNDHAM DR

TRAMORE DR

COLFAX DR

Looks good

Looks good

Looks good

Looks good

POSSIBLE BMP HERE
GRASSY SWALE, RAIN GARDEN OR
LEVEL SPREADERS

POSSI
FLOODPL

Good preservation area

TA12

Scour in channel in backyards and
probably epehemeral channel

COBBLESTONE DR

Beaver pond wetlands
backwater influence from beaver dam

Beaver influence ends

TA11

TA13

Channelized

Channelized

IP

TA9

High incision

neral

TA10

14

16

15

Bedrock channel with waterfall

Probably ephemeral

Probably ephemeral

Old mill race

Looks good

Stable "Bc" channel
Good bankfull features

Probably ephemeral

Looks good

Probably ephemeral

Looks good

WATERSIDE DR

BOLIN CREEK

Looks good

CREEKVIEW CIR

TA20

SEAWELL SCHOOL RD

N

21

20

BOLIN CREEK

Legend

- GPS Points
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600 300 0 600 Feet

POTENTIAL BMP
STREAM RESTORATION/WETLANDS IN OLD, AGGRADED POND

POSSIBLE BMP
FLOODPLAIN DIVERSION TO WETLANDS

Incision begins on Jolly Branch active erosion

Slight bank erosion where powerline easement crosses

POSSIBLE BMP
SWALE OR RETENTION AREA FOR PIPE DISCHARGE

nfluence ends

Incision ends

POSSIBLE BMP
RETENTION AREA FOR PIPE OUTLET FROM SCHOOL

48" RCP is undercut by flow, causing bank scour downstream

cised and channelized

Incised

POSSIBLE BMP
RETENTION AREA FOR PIPE DISCHARGE FROM SCHOOL

Probably ephemeral

HOMESTEAD RD

CHAPEL HILL HIGH SCHOOL RD

BOLIN CREEK

JOLLY BRANCH

Nice "C" stream

Looks good

piped

SEAWELL SCHOOL RD

IJ23 IJ24 IJ32 IJ33 IJ34

10 11 15 16 17 22

Legend

- GPS Points
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600 300 0 600 Feet

IJ21

11 12 17 18 16 22

Channelized and overwidened

JA4 JA 5 JA6 JA7 JA8

Channelized stream

ROGERS RD

POSSIBLE BMP
SIDE CHANNEL DISCHARGE

Probably ephemeral

Probably ephemeral

End of incision

POSSIBLE BMP

HOMESTEAD RD

CELTIC CIR

HIGH SCHOOL RD

JA3 JA2 JA1

Start of incision

Begins anerobic conditions

Debris clogs

Stormwater outfall

SEAWELL SCHOOL RD

CHESAPEAKE WAY

HEARTHSTONE LN

BRUNSWICK CT

SAVANNAH TER

Impacts from 4 wheeler trail

PORTSMITH PL

IJ27

Old retention basin beneath gravel driveway is silted in

POSSIBLE BMP
REPAIR OR EXPAND EXISTING, FAILING BMP

JOLLY BRANCH

Incised

IJ31 IJ25 IJ26 IJ28

Channelized

POSSIBLE BMP
RAIN GARDEN OR SILT TRAP IN PARKING LOT OF CHURCH

IJ29 IJ30

Blowout beneath railroad tracks

CROW BRANCH CREEK

N

Legend

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600 300 0 600 Feet

12

13

18

17

E BMP
EL DISCHARGE

Probably ephemeral

Probably ephemeral

BILLABONG LN

MERIN RD

HOMESTEAD RD

SONOMA WAY

WEAVER DAIRY RD

CHATEAU PL

BERINGER PL

CAITLIN CT

LAURENS WAY

CHRISTINE CT

NAPA VALLEY WAY

CABERNET DR

VINTAGE WAY

WORSHAM DR

HOMESTEAD PARK DR

BOOKER CREEK

N

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600 300 0 600 Feet

19

14

PHIPPS

SPRING VALLEY RD

MORNINGSIDE DR

JOHN MARTIN CT

PINE HILL DR

WOODS WALK CT

ROCKY PT

ROBERT HUNT DR

BEL ARBOR LN

HUNTER PL

JASMINE CT

BOLIN FOREST DR

STABLE RD

DILLARD ST

GOLDSTON DR

WEATHERVANE DR

HARVEST CT

MILTON DR

HIGH ST

CHESWICK CT

CHEEK ST

HANNA ST

OAK ST

HILLSBOROUGH RD

W MAIN ST

WATTERS RD

20

POSSIBLE BMP
NEED ENERGY DISSIPATION FROM PIPE OUTLET

TA28

Incised

PINE ST

THOMAS LN

BLACKWOOD DR

Stable

Incised

SUE ANN CT

Need buffer and bankfull bench along this section

WILLIAMS ST

SHELTON ST

W POPLAR AVE

TODD ST

TA27

POTENTIAL BMP
STORMWATER BASIN

RB13

ESTES DR EXT

Incised

RB15

N GREENSBORO ST

BD47

BD46

RB11 RB12

Incised- appears to be mechanically straightened channel

BD45

FIDELITY ST

LINDSAY ST

RB10

MERRITT ST

ASHE ST

ELM ST

OAK AVE

23

POPLAR AVE

W WEAVER ST

PLEASANT DR

N

Legend

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600 300 0 600 Feet

14 15 20 19 21 24

BRAMBLEBUSH DR
ROBERT HUNT DR
PATHWAY DR
JOHN MARTIN CT
BOLIN CREEK DR
FOREST CT
WILD OAK LN
BOLIN FOREST DR
STABLE RD
AMBER CT
MILLROCK CT
HANNA ST
WATTERS RD
THOMAS LN
WILLIAMS ST
ESTES DR EXT
ESTES PARK APT
VILLAGE DR
FAIR OAKS CIR
OAKLAND LN
HILLCREST ST
CREST ST
RIDGE TRL
CARDIFF PL
IRONWOODS DR
EDGEHILL PL
BIRCHCREST PL
VILLAGE DR
MEAD DR

Stable
Erosion from sewer easement
Looks good
Intermittent bank failures
"F" Channel
JA14
JA16
JA17
Rock "dam" built 2' high
JA15
POTE
CONSTR
JA13
Wasting along these banks
JA11
JA12
JA10
JA9
Incised
BD 11
Overly wide
POSSIBLE BMP
POTENTIAL WETLAND
BD 10
Overly wide
Probably ephemeral
Piped
NEED BMPS HERE
POSSIBLE BMP
RETENTION AREA OR STABILIZATION NEEDED
TA18
Needs rip-rap or grade control
TA19
Stable "Bc" Channel
Stormwater scour near RR Trestle
Sewer smell in air
TA25
TA20
Scour
Service road erosion- needs turnouts
TA21
Scour
Scour and downcut
TA24
TA23
Looks good -bedrock/boulder
Sheared banks- Low Bank Height is 3'
BOLIN CREEK
BD48
Heavily incised
BD40
Scour
POSSIBLE BMP
BD46
POSSIBLE BMP
Looks good -"B" stream
Looks good -"B" stream
BD41
Culvert
Pipe outfall
BD44
BD43
Mass wasting scour
BD42
Extreme wasting
Old building foundation above
RB19
Incised chan
POSSIBLE BMP

Legend
GPS Points
Sidewalk
Orange County Roads
Planimetrics
Waterbodies
Streams
Bolin Creek Subbasins
2 Foot Contours
Text General stream note
Text Stream problem area note
TEXT BMP Note
Map Pages

N

600 300 0 600 Feet

16

21

15

TA20

Incised

Head cut

Probably ephemeral

Some stable and some incised reaches along this stream

Erosion from dirt road

Erosion from sewer easement

"F" Channel

Looks good

Looks good- probably intermittent

TA26

vegetation removal causing significant erosion along RR grade

SEAWELL SCHOOL RD

JA18

Looks good- probably epehmeral

Looks good- probably epehmeral

POTENTIAL BMP
CONSTRUCTED WETLAND

TA21

POTENTIAL BMP
OUTFALL CAUSING SCOUR IN CHANNEL

MAGNOLIA CT

WOODLEAF DR

NORTH HAVEN DR

22

21

20

HAMPSHIRE PL

IRONWOODS DR

EMERYWOOD PL

MARIGOLD CT

Probably intermittent

EASTRIDGE PL

BOLTON PL

CARDIFF PL

Incision due to headcut

Trestle

HARDWICK PL

TA25

THETFORD PL

BIRCHCREST PL

ESTES DR EXT

WARD ST

Storm sewer impacts

BD48

Probably intermittent

Needs basic stabilization

Roadway outfall

POTENTIAL BMP
NOT NEEDED DIRECTLY

POWELL ST

Boulder dominated

BD49

BD50

undercut bank and scour from sewer impacts

HARTIG ST

25

24

SEVERIN ST

WEINER ST

BARCLAY RD

BD 50

N

Legend

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- Text: Stream problem area note
- TEXT: BMP Note
- Map Pages

600 300 0 600 Feet

16

17

22

CROW BRANCH CREEK

21

22

26

25

ESTES DR EXT

ESTES DR

AIRPORT DR

ANIMAL SHELTER DR

MARTIN LUTHER KING JR BLVD

N

Legend

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- TEXT BMP Note
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600 300 0 600 Feet

BD43

23

20

19

24

28

POSSIBLE BMP

POTENTIAL BMP
NEED STORMWATER DISSIPATION STRUCTURE

TA29

TA31

TA32

Piped- possible daylighting

Degraded

Headcut

Head cut

Incised

TANBARK BRANCH

Probably ephermeral

ELM ST
OAK AVE
POPLAR AVE
LINDSAY ST
EVANS CT
CENTER ST
SHORT ST
W WEAVER ST
W MAIN ST
E WEAVER ST
E MAIN ST
SHELTON ST
N GREENSBORO ST
PARKER ST
MULBERRY ST
HILLVIEW ST
CREST ST
PLEASANT DR
HILL ST
LLOYD ST
BROAD ST
FOWLER ST
HOSIERY ST
B ST
COBB ST
STARLITE DR
BYNUM ST
GOMAINS AVE
SYKES ST
NUNN ST
CRAIG ST
WHITAKER ST
SUNSET DR
N GRAHAM ST
MAPLE AVE EXT
ROBERSON ST
MAPLE AVE
SWEET BAY PL
PADGETT LN
BOYD ST
EUGENE ST
WESLEY ST
HARGRAVES ST
GUTHRIE AVE
BREWER LN
N MERRITT MILL RD
S MERRITT MILL RD
GRAHAM ST
ROBERSON ST
MITCHELL LN
W ROSEMARY ST
DAWSON PL
W FRANKLIN ST
BASNIGHT LN
YATES ALY
KENAN ST
MALLETTE ST
CAMERON CT
W CAMERON AVE
KNOLLS ST
CREST ST

Legend
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N

600 300 0 600 Feet

POSSIBLE BMP

HILLCREST ST

Looks good -"B" stream

Looks good -"B" stream

BD41

OAKLAND LN

wasting scour

Culvert

Pipe outfall

20

Extreme wasting
Old building foundation above

RIDGE TRL

POSSIBLE BMP

Low Bank Height is 3'

BOLIN CREEK

Incised c

undercut bank and scour from sewer impacts

24

21

RB19

RB18

Incised channel

VILLAGE DR

UMSTEAD DR

RB16

Probably ephemeral

Elevated FES with no outlet protection

BLUFF TRL

POTENTIAL BMP

NEED BMP HERE TO REDUCE STRESS
ON BANKS AND REDUCE STORWMATER VOLUME

lots of bank scour

WESLEY DR

TANBARK BRANCH

JAY ST

TA35

TA36

TA37

POTENTIAL BMP

Probably ephemeral

Buffer impacts from vegetation removal, greenway impacts

TA38

TA39

Bank scour at sewer crossing
need cross vane for bank protection

Severely entrenched "G" channel

MASON ST

CARVER ST

TRINITY CT

Probably ephemeral

Road fill contributing to incision

SYKES ST

TA34

EDWARDS ST

Channel widening and incision
kudzu covering banks

MCMASTERS ST

25

24

GOMAINS AVE

23

CRAIG ST

TA33

MITCHELL LN

PRITCHARD AVE EXT

CALDWELL ST EXT

STINSON ST

Piped

Probably ephemeral

Heavy sediment load

E LONGVIEW ST

COTTON ST

BROOKS ST

CHAPEL ST

CHURCH ST

CALDWELL ST

STINSON ST

ISLEY ST

NOBLE ST

LINDSAY ST

MCDADE ST

MARTIN LUTHER KING JR BLVD

STEPHENS ST

PRITCHARD AVE

CARR ST

SHORT ST

Piped

Incised

Incised

IJ52

N

NORTH ST

N COLUMBIA ST

28

29

COBB TER

Legend

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600 300 0 600 Feet

cour

21

22

25

HARTIG ST

WEINER ST

BARCLAY RD

WYRICK ST

JUSTICE ST

BRANCH ST

AIRPORT DR

BD 50

Stone wall

POSSIBLE BMP

Entrenched and incised

SEVERIN ST

WESLEY DR

BURRIS PL

BD 51

Transition to "A" channel- stable

BRADLEY RD

Stable

READE RD

WESLEY DR

BD 52

BD 53

BD 54

Mass failure along road

POSSIBLE BMP

WILLIAMS CIR

LEA CT

Stable

26

Concrete

UMSTEAD DR

BOLIN CREEK

25

24

Stable

BOLINWOOD DR

W COLUMBIA PL

E COLUMBIA PL

SUNRISE LN

GREENE ST

CLARK RD

COLUMBIA PL

N COLUMBIA ST

MARTIN LUTHER KING JR BLVD

E LONGVIEW ST

BOLIN HEIGHTS RD

BD 55

BD 57

Forming interior floodplain

Very stable

Apartments

HILLSBOROUGH ST

POSSIBLE BMP
OLD SW BASIN NEEDS REPAIR

Pipe outlet from apartments
Discharging directly into stream

POSSIBLE BMP
CURRENTLY NO RETENTION HERE

Kudzu field

Incised

IJ50

IJ49

IJ48

IJ51

Incised some erosion

POSSIBLE BMP
SIDE CHANNEL DISCHARGE
WETLAND OR BASIN

POSSIBLE BMP
ENERGY DISSIPATION NEEDED
AT CURB-GUTTER OUTLET

Start of incision

BOLINWOOD DR

IJ40

IJ41

IJ42

IJ53

New, large (>60") RCP installed at road crossing
Seems to have reduced SW velocity

IJ43

MILL RACE DR

MILL RUN DR

IJ44

Severe gulley erosion caused by buried pipe
Discharging stormwater system along street

Concrete "weir" or dam in stream

IJ54

IJ45

30

Gulley erosion on steep hillside

Large mass wasting

29

N

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600 300 0 600 Feet

26

22

WOODSHIRE LN

MARTIN LUTHER KING JR BLVD

AIRPORT DR

JUSTICE ST

BARCLAY RD

Entrenched, incised

POSSIBLE BMP

BD 58

Begining of more severe bank erosion

BD71

POSSIBLE BMP

SOMERSET DR

ESTES DR

POSSIBLE BMP
SIDE-CHANNEL

BD 59

BD70

Mass wasting

BD 60

POSSIBLE BMP

BD 69

BD 68

Bedrock ends upstream erosion

Mass wasting banks

BD 61

End of severe instability
is "B" the rest of the way up

BD 67

MAPLE DR

26

Incised

27

25

BD 62

Severe wasting

Incised

BD 62

Probably intermittent

BD BD 63

Incised

BD 66

CASWELL RD

SURRY RD

Old channel in floodplain

High wasting banks

POSSIBLE BMP

BD 64

SYCAMORE DR

BD 65

CHATHAM LN

UTILITY CROSSING CAUSING PROBLEMS

MULLIN CT

BD 55

BD 57

MT BOLUS RD

COULD DO SIDE CHANNEL
BMPS ALONG THIS VALLEY

SONGBIRD LN

CEDAR ST

Pipe outlet for subdivision

Entrenchment and partial
incision

NEEDS BMP

BD 75

GRANVILLE RD

POSSIBLE BMP
SOUTH SIDE OF SEWER LINE
NEEDS RETENTION

Need bank stabilization

BURLAGE CIR

N

30

BD 77

31

Legend

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600 300 0 600 Feet

27

WOODSHIRE LN

OLD FOREST CREEK DR

PINEY MOUNTAIN RD

HUNTINGTON DR

SOMERSET DR

PORTER PL

BOOKER CREEK

ROCK CREEK RD

WELLINGTON DR

TOTTEN PL

ESTES DR

CASWELL RD

26

27

KENSINGTON DR

BEECH TREE CT

CONCORDIA CT

SURRY RD

CUMBERLAND RD

CURTIS RD

LYONS RD

ALLARD RD

CHEROKEE CIR

CLAYTON RD

AUDUBON RD

ELLIOTT RD

31

32

N

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600 300 0 600 Feet

28

24

23

29

BASNIGHT L
CAMERON CT
KENAN ST
MALLETTE ST
COLONY CT
CHURCH ST
W ROSEMARY ST
W FRANKLIN ST
N COLUMBIA ST
E ROSEMARY ST
NCNB ALY
DAWSON ALY
E FRANKLIN ST
W CAMERON AVE
PATTERSON PL
WILSON ST
FETZER LN
FRATERNITY CT
RANSOM ST
PITTSBORO ST
MCCAULEY ST
E CAMERON AVE
ALUMNI PL
VANCE ST
PHARMACY LN
S COLUMBIA ST
N MEDICAL DR
SOUTH RD
DENTAL CIR
WEST DR
HOSPITAL DR
EAST DR
GRAVELY DR
STADIUM DR
EMERGENCY ROOM DR
MANNING DR
RIDGE RD

Legend

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N

600 300 0 600 Feet

24 25 29 28 30 33

NORTH ST
COBB TER
HENDERSON ST
SPRING LN
NCNB ALY
ROBERTSON LN
FRIENDLY LN
COTTAGE LN
PICKARD LN
HILLSBOROUGH ST
E FRANKLIN ST
E ROSEMARY ST
N BOUNDARY ST
GLENBURNIE ST
CAMPBELL LN
ALUMNI PL
RALEIGH ST
E CAMERON AVE
HOOPER LN
S BOUNDARY ST
EMERSON DR
BOUNDARY ST
BATTLE LN
SENLAC RD
PARK PL
LENOIR DR
COBB DR
PAUL GREEN THEATER DR
SOUTH RD
COUNTRY CLUB RD
GLANDON DR
EVERGREEN LN
RIDGE LN
GIMGHOUL RD
RIDGE RD
RALEIGH RD

IJ46
IJ47
BD 81
BD 82

POSSIBLE BMP
RETENTION POND IN KUDZU FIELD

POSSIBLE BMP
NEED RETENTION HERE,
HAVE BROKEN PIPE OUTFALL

POSSIBLE BMP
NEEDS RETENTION

Incised
headcut
Incised
Stable "A" to "B" stream. Probably ephemeral
Entrenched, but mostly stable
A lot of flow and stress on banks
Bank wasting from utility vehicles crossing stream
Stream crossing

N

Legend
- GPS Points
- Sidewalk
- Orange County Roads
- Planimetrics
- Waterbodies
- Streams
- Bolin Creek Subbasins
- 2 Foot Contours
- Text General stream note
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- TEXT BMP Note
- Map Pages

600 300 0 600 Feet

IJ54

Large mass wasting

POTENTIAL BMP
POSSIBILITY FOR FLOODPLAIN WETLANDS
ALONG GREENWAY TO REDUCE FLOW

ephemeral

Incised

stable- bedrock controlled

BOLIN CREEK

26

30

25

MILL R DR

ROSE LN

N BOUNDARY ST

LONE PINE RD

HANFT KNL

WILD IRIS LN

BRECKENRIDGE PL

BOWLING CREEK RD

DEEPWOOD RD

NORTH ST

GLENBURNIE ST

TENNEY CIR

stable "C" stream

Incision at confluence, likely caused by
failing BMP on trib

looks good

IJ59-INCISION

IJ60-OLD BMP

POSSIBLE BMP
REPAIR OLD RETENTION BASIN

PENNY LN

ELIZABETH ST

E ROSEMARY ST

IJ61

looks good- stable

29

30

31

Old dam and silt-filled pond

some minor incision

-Old BMP on steep slope has filled in
-rock check dams on stream below

DEMING DR

HOWELL LN

RIDGEWOOD LN

FRIDAY LN

CAROLINA AVE

Partially buried 12" RCP,
need improved stormwater outfall

THE GLEN

E FRANKLIN ST

ROOSEVELT DR

-series of headcuts progressing up steep channel
-active erosion

HILLCREST RD

IJ64

JONES ST

HILL ST

POTENTIAL BMPS
POSSIBLE INLINE RETENTION
ALONG THIS REACH

HILLCREST CIR

DAVIE CIR

DAVIE LN

Stable "B" Stream

BD 82

BD84

33

34

small gulley on hill- needs
treatment of some type

GLENDALE DR

GLENWOOD DR

WEAVER RD

Stable

N

Legend
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600 300 0 600 Feet

26 27 31 32 30 34 35

tributary needs treatment

BD 78

Incised

BD 78 BD 79

BD 78

ELIZABETH ST

Ditch from apartment complex causing minor erosion near greenway

IJ56 IJ57

Channelized in concrete

POSSIBLE BMP
RESTORE CHANNEL, REMOVE CONCRETE

PENNY LN

HOLLOWAY LN

ELIZABETH ST

E FRANKLIN ST

ROOSEVELT DR

RIDGEWOOD LN

HILLVIEW RD

HILLVIEW DR

VALLEY PARK DR

ANGIER DR

HILLCREST RD

GRANVILLE RD

BURLAGE CIR

MEADOWBROOK DR

HOOT OWL LN

probably ephemeral

stable- good reference "C" stream

BD80-POSSIBL

LIBRARY DR

Road crossing is causing downstream impacts

ESTES DR

Relic incisi

entrenched but stable

DICKERSON CT

PLANT RD

COMMUNITY CENTER DR

WILLOW DR

CAMELOT LN

SHEPARD LN

BD89

Modified- channelized with aggradation

S ESTES DR

BROOKWOOD LN

SHEPARD LN

BD88-END DITCH-GREAT BMP SITE

Old, actively eroding ditch

SUGARBERRY RD

INDIAN SPRINGS RD

BD87

BOLIN CREEK

N

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600 300 0 600 Feet

32

27

AUDUBON RD

CLAYTON RD

ELLIOTT RD

ALLARD RD

GRANVILLE RD

BURLAGE CIR

ESTES DR

stable- good reference "C" stream

BD80-POSSIBLE REFERE

MICHAUX RD

WOOD CIR

probably ephemeral

LIBRARY DR

VELMA RD

Road crossing is causing downstream impacts

MEADOWBROOK DR

Relic incision

entrenched but stable

E FRANKLIN ST

31

32

DICKERSON CT

PLANT RD

COMMUNITY CENTER DR

BOLIN CREEK

CONNER DR

DOUCH RD

ELLIOTT RD

CAMELOT LN

SHEPARD LN

S ESTES DR

BD89

ified- channelized with aggradation

WILLOW DR

N FORDHAM BLVD

BROOKWOOD LN

SHEPARD LN

35

WALNUT ST

HICKORY DR

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600 300 0 600 Feet

small gulley on hill- needs treatment of some type

old "F" to "C" stream- intermittently stable

POTENTIAL BMP
RETENTION BASIN
AT CONFLUENCE

Incised

BD84

BD 83

IJ63

IJ62

29

30

33

34

RIDGE LN
GIMGHOUL RD
EVERGREEN LN
GLANDON DR
POINT PROSPECT PL
DAVIE LN
GLENDALE DR
GLENHILL LN
GLENWOOD DR
PURT NEAR LN
GREENWOOD RD
SANDY CREEK TRL
STAGECOACH RD
OLD MILL RD
ARROWHEAD RD
RALEIGH RD
CHAPEL CREEK
CHRISTOPHER RD
N FORDHAM BLVD
LANARK RD
MAXWELL RD
HAMILTON RD
NC 54 E

Legend
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600 300 0 600 Feet

34

BD88-END DITCH-GREAT BMP SITE

POTENTIAL BMP
OLD, ACTIVELY ERODING-DITCH IN FLOODPLAIN NEED BASIN HERE AND CHANNEL DIVERSION

POTENTIAL BMP
NEED RETENTION AREA HERE

POTENTIAL BMP
STORMWATER WETLAND OR RETENTION BASIN

BD87

BD86

IJ63

IJ62

BD90

Old, actively eroding ditch

Incised

Stable "B" stream

Stable

Channelized stream- great restoration opportunity

30 31 32 33 34 35

GLENWOOD DR
WEAVER RD
GLENDALE DR
SUGARBERRY RD
INDIAN SPRINGS RD
GREENWOOD RD EXT
GREENWOOD RD
CLELAND RD
SANDY CREEK TRL
OLD MILL RD
CHRISTOPHER RD
HAYES RD
FLEMINGTON RD
N FORDHAM BLVD
LANARK RD
BRANDON RD
HAMILTON RD
OAKWOOD DR
MAXWELL RD
DOUGLAS RD
ROGERSON DR
KENDALL DR
WHITLEY DR

Legend

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N

600 300 0 600 Feet

31 32 35 34 35

BROOKWOOD LN
S ESTES DR
INDIAN SPRINGS RD
N FORDHAM BLVD
HICKORY DR
WALNUT ST
RIDGEFIELD RD
ESTES DR
S ESTES DR EXT
LONG LEAF DR
LECLAIR ST
BELMONT ST
WILDWOOD DR
DEERWOOD CT
GROVE ST
BOLIN CREEK
BOOKER CREEK
HAMILTON RD
CLELAND RD
OAKWOOD DR
ROGERSON DR
KENDALL DR
WHITNEY DR
LITTLE CREEK
LITTLE ST
BRIGHAM CT
BRIGHAM RD
EMORY DR
CHURCHILL DR

BD91

stream- great restoration opportunity

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