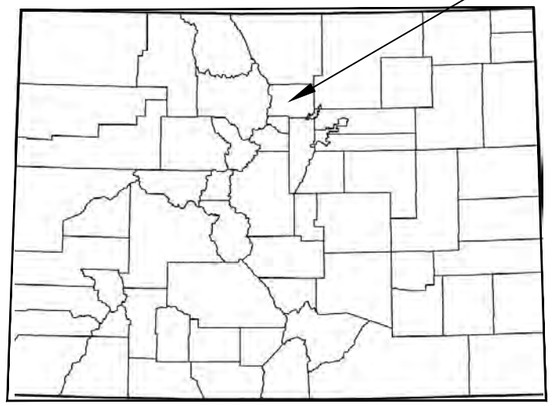
BOULDER COUNTY, CO



60% DESIGN DRAWINGS

BOULDER COUNTY PARKS AND OPEN SPACE

BREWBAKER–SORENSSON LEFT HAND CREEK RIPARIAN RESTORATION DESIGN

BOULDER COUNTY, COLORADO

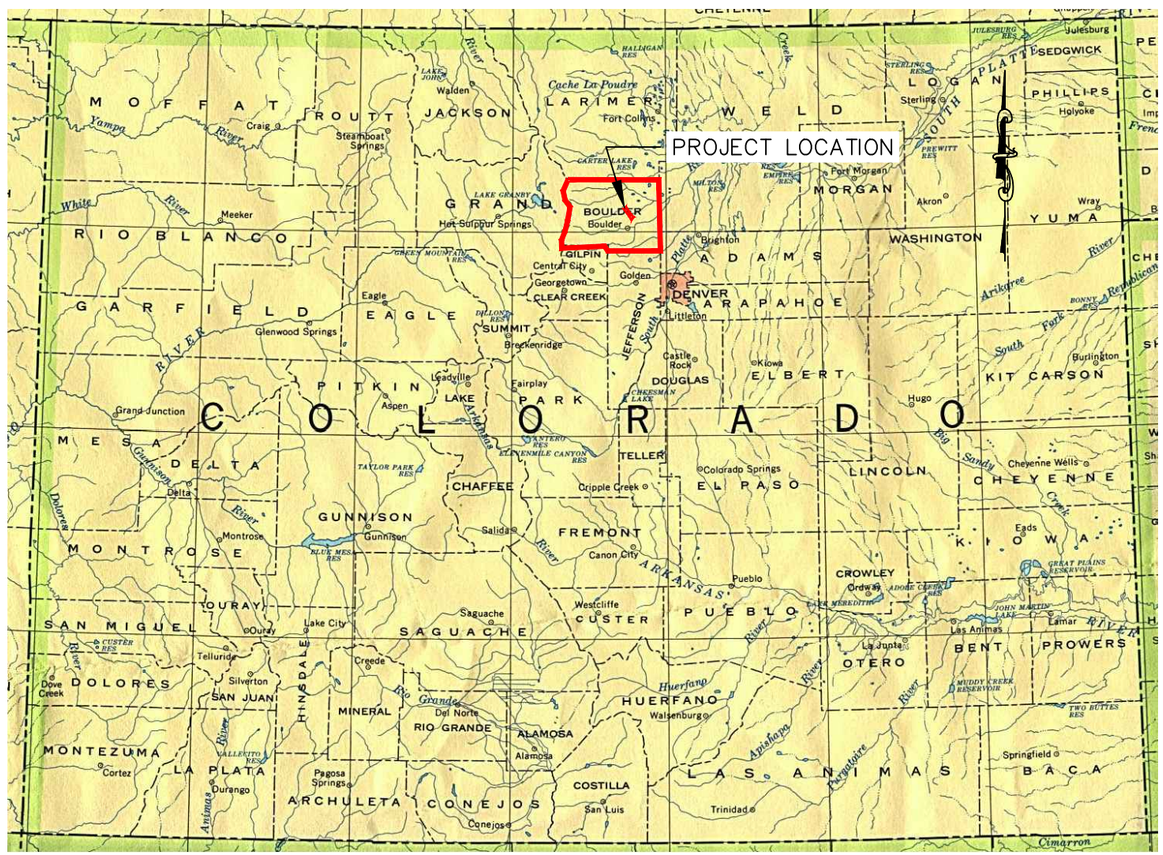
North State ENVIRONMENTAL

5 | SMOOTH STONES RESTORATION PLLC

AloTerra Restoration Services

LEFT HAND CREEK RIPARIAN RESTORATION 60% SUBMITTAL

Sheet List Table		Sheet List Table	
Sheet Number	Sheet Title	Sheet Number	Sheet Title
1	Cover Sheet	26	DT_JHOOK
2	NOTES_1	27	DT_WOOD_TOE
3	OVERVIEW	28	DT_CONTR_RIFF
4	PP – (1)	29	DT_ECB
5	PP – (2)	30	DT_CROSSING
6	PPTOPO – (1)	31	DT_ENTRANCE
7	PPTOPO – (2)		
8	GRADING_HEAT		
9	SECTION_OVERVIEW		
10	SECTION – (1)		
11	SECTION – (2)		
12	SECTION – (3)		
13	SECTION – (4)		
14	SECTION – (5)		
15	SECTION – (6)		
16	SECTION – (7)		
17	EXISTING WETLAND		
18	WETLAND IMPACTS		
19	LS – (1)		
20	LS – (2)		
21	LS – (3)		
22	LS – (4)		
23	LS – (5)		
24	STRM_MORPH		
25	DT_CROSS–VANE		



VICINITY MAP

NOT TO SCALE

Left Hand Creek Project Site

Start:

Lat: 40° 6' 48.22" N

Long: 105° 15' 12.66" W

End:

Lat: 40° 6' 42.45" N

Long: 105° 14' 56.21" W

GENERAL CONSTRUCTION NOTES

1. THE WORK ON THIS PROJECT SHALL ADHERE TO THE FOLLOWING SPECIFICATIONS, STANDARDS AND/OR REGULATIONS:
2. THIS PROJECT IS LOCATED WITHIN A FEMA 100-YEAR FLOODPLAIN AND WILL RESULT IN A NO-RISE.
3. INSTREAM STRUCTURES SHALL BE INSTALLED AS THE CHANNEL IS BEING CONSTRUCTED AND NOT POST CONSTRUCTION. FILTER FABRIC INSTALLED AS PART OF THE INSTREAM STRUCTURE SHALL BE A NONWOVEN GEOTEXTILE UNLESS OTHERWISE SPECIFIED IN STRUCTURE DETAILS OR SPECIFICATIONS.
4. WHERE PRACTICABLE, EXISTING TREES AND VEGETATION SHOULD BE LEFT IN PLACE TO FACILITATE NATURAL REGENERATION AND SOIL STABILIZATION. BCPOS AND PROJECT TEAM WILL DELINEATE AREAS AND VEGETATION TO BE SAVED PRIOR TO AND DURING CONSTRUCTION. IDENTIFIED PROTECTION AREAS ARE TO BE FENCED OFF USING CONSTRUCTION FENCING.
5. DEFINITIONS:
   - A. BANKFULL ELEVATION IS THE POINT OF INCIPIENT FLOODING IN AN ALLUVIAL CHANNEL. THIS ELEVATION IS THE REFERENCE FOR DEPTHS ON OR ALONG THE CHANNEL PROFILE AND STRUCTURES DESCRIBED IN THESE SHEETS.
   - B. THE BANKFULL BENCH IS A CONSTRUCTED FLOODPLAIN ADJACENT TO THE CHANNEL. THE BANKFULL BENCH IS CONSTRUCTED AT THE BANKFULL ELEVATION.
   - C. THE THALWEG IS THE LOWEST PORTION OF THE CHANNEL.
   - D. THE VANE LENGTH IS THE STRAIGHT LINE DISTANCE BETWEEN THE VANE ARM AND A LINE TANGENT TO THE STREAMBANK AT THE POINT WHERE THE VANE ARM INTERSECTS THE STREAMBANK.
   - E. THE VANE ANGLE IS THE ANGLE BETWEEN THE VANE ARM AND A LINE TANGENT TO THE STREAMBANK AT THE POINT WHERE THE VANE ARM INTERSECTS THE STREAMBANK.
   - F. SOD MATS ARE GRASS AND WILLOW TRANSPLANTS THAT STILL CONTAIN ROOTING DEPTH. APPROXIMATELY 9-12IN OF DEPTH WILL BE NEEDED WHEN HARVESTING THE SOD MATS.
6. NORTH STATE ENVIRONMENTAL (NSE) SHALL STAKE OUT THE PROPOSED STREAM CENTERLINE FOR REVIEW BY THE ENGINEER BEFORE INITIATING EXCAVATION. DEPENDING ON ENCOUNTERED CONDITIONS SOME SHIFTING OF THE STREAM CHANNEL MAY BE NECESSARY. ANY COST ASSOCIATED WITH CHANGING STRUCTURE LOCATIONS OR ALIGNMENT SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION. STAKING MAY BE OMITTED FOR PORTIONS OF THE STREAM WHEN SURVEY-GRADE GPS IS USED TO CONSTRUCT THE CHANNEL. IF GPS IS USED IN LIEU OF STAKING THE CHANNEL IN THE FIELD, NSE ASSUMES ALL RESPONSIBILITY FOR THE STREAM BEING CONSTRUCTED AS DESIGNED, INCLUDING ANY ISSUES RELATED TO PROJECTIONS, BASE POINTS OR CONVERSION OF DIGITAL TERRAIN MODELS. BOULDER COUNTY PARKS AND OPEN SPACE (BCPOS) SHALL APPROVE STAKED OUT CHANNEL PRIOR TO COMMENCEMENT OF EXCAVATION.
7. PRIOR TO CLEARING AND GRUBBING, NSE SHALL MARK THE LIMITS OF CLEARING NEAR TREES FOR VERIFICATION OF INTENT BY THE ENGINEER. SOME MINOR ADJUSTMENT OF CHANNEL ALIGNMENT MAY BE REQUIRED TO PRESERVE TREES OR MINIMIZE IMPACT TO TREES. AN AUTHORIZED BCPOS REPRESENTATIVE SHALL APPROVE ALL VEGETATION REMOVAL PRIOR TO REMOVAL.
8. ANY HARVESTING OF WILLOWS AND SOD FROM ONSITE MUST BE APPROVED BY THE ENGINEER AND AUTHORIZED BCPOS REPRESENTATIVE.
9. NSE SHALL MINIMIZE, TO THE MAXIMUM EXTENT POSSIBLE, IMPACTS TO THE ADJACENT TREES. CONSTRUCTION EQUIPMENT TRACKS AND PATHWAYS SHALL BE GRADED AND RECONTOURED AFTER CONSTRUCTION TO PREVENT RILL AND GULLY EROSION. TREES THAT BCPOS WOULD LIKE TO SEE SAVED WILL BE MARKED/FLAGGED BY BCPOS PRIOR TO CONTSRUCTION.
10. THE PROPOSED GRADING IS SHOWN ON THESE PLAN SHEETS. NSE MAY EXTEND THE LIMITS OF DISTURBANCE ONLY WITH THE APPROVAL OF THE ENGINEER AND BCPOS REPRESENTATIVE.
11. NSE SHALL USE AN EXCAVATOR WITH A HYDRAULIC THUMB TO INSTALL INSTREAM STRUCTURES.
12. CHANNEL RELOCATION WORK SHALL BE COMPLETED AND STABILIZED PRIOR TO ALLOWING FLOW TO ENTER INTO THE NEWLY CONSTRUCTED STREAM CHANNEL. NSE SHALL NOT OPEN UP MORE THAN 200 FEET OF CHANNEL WITHOUT EROSION CONTROL BLANKET IN PLACE OR BY APPROVAL OF THE ENGINEER.
13. THE PROPOSED STREAM CHANNEL SHALL BE CONSTRUCTED BY FIRST GRADING THE FLOODPLAIN ADJACENT TO THE CHANNEL TO THE ELEVATION INDICATED ON THESE PLANS. THIS MAY BE DONE AS GENERAL EXCAVATION. THE PROPOSED STREAM CHANNEL SHALL THEN BE EXCAVATED TO THE PROPER DEPTHS INDICATED ON THE PROFILE AND PROPOSED CONTOURS. THIS SHALL BE DONE AS SPECIALIZED EXCAVATION AND IS TYPICALLY ACCOMPLISHED WITH A TRACK EXCAVATOR. THE PROFILES AND CONTOURS SHOWN PROVIDE WIDTHS AND SLOPES FOR AID IN CONSTRUCTING THE CHANNEL TO THE APPROPRIATE DIMENSIONS. THE THALWEG CAN FIRST BE EXCAVATED TO THE POINT INDICATED ON THE PROFILE. EXCAVATION AND FINE GRADING OF THE CROSS SECTIONS SHALL THEN BE PERFORMED AS SHOWN ON THE TYPICAL CROSS SECTIONS AND PROPOSED CONTOURS. ANY STOCKPILING OF MATERIALS OR "DOUBLE HANDLING"NECESSARY TO BUILD THE CHANNEL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
14. IF THE EXISTING GROUND IS LESS THAN 0.2 FEET HIGHER THAN THE PROPOSED BANKFULL ELEVATION, IT IS NOT NECESSARY TO EXCAVATE MATERIAL TO THE PROPOSED ELEVATION SHOWN ON THE PROFILE. IF THE EXISTING GROUND IS MORE THAN 0.2 FEET LOWER THAN THE PROPOSED BANKFULL ELEVATION, IT IS NOT NECESSARY TO FILL MATERIAL TO THE PROPOSED ELEVATION SHOWN ON THE PROFILE.
15. THE SURFACE OF ALL INSTREAM STRUCTURES SHALL BE FINISHED TO A SMOOTH LINE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR THE VANE SLOPES AND INVERT ELEVATIONS SHALL BE WITHIN 0.1 VERTICAL FEET OF THE GRADES AND ELEVATIONS INDICATED. ALL GAPS OR VOIDS BETWEEN THE ROCKS SHALL BE PLUGGED WITH SMALL GRAVEL TO FORM A TIGHT-FITTING SEAL.
16. CONSTRUCTION SPECIFICATIONS FOR BANKFULL CHANNEL DIMENSIONS OR CROSS SECTIONS WILL BE HELD TO THE DIMENSIONS SHOWN ON THE TYPICAL CROSS SECTIONS. ELEVATIONS SHALL BE CONSTRUCTED WITHIN 0.1 VERTICAL FEET; WIDTHS AND MEAN DEPTHS MUST FALL WITHIN THE RANGES SHOWN IN THE DRAWINGS.
17. THE IN-STRUCTURE BID ITEMS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY TO CONSTRUCT THE STRUCTURE. BID ITEMS INCLUDE SEEDING, PLANTING, AND MULCH AND EROSION CONTROL BLANKETS AND INCLUDE ALL LABOR AND MATERIALS NECESSARY TO STABILIZE AREAS DISTURBED DURING CONSTRUCTION OF STRUCTURES. AFTER THE STRUCTURE IS COMPLETE AND FLOW IS RESTORED TO THE CHANNEL, SOME ADJUSTMENT TO THE STRUCTURE OR ADDITIONAL STABILIZATION MEASURES MAY BE NECESSARY TO ACHIEVE DESIRED EFFECT. ANY COSTS ASSOCIATED WITH THESE ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
18. THE CONSTRUCTED STREAM CHANNEL SHALL BE STABILIZED AS SOON AS POSSIBLE BY SEEDING IN ACCORDANCE WITH THE PLOT SCHEDULE, ADDING COLORADO CERTIFIED WEED FREE STRAW OR WOOD MULCH TO BARE SOIL AND BY INSTALLING EROSION CONTROL BLANKET FROM THE INNER BERM TO BEYOND THE TOP OF THE BANKFULL CHANNEL. SEE EROSION CONTROL BLANKET DETAIL. PRIOR TO INSTALLING BLANKET, PREPARE THE BED BY LOOSENING THE SOIL 3 TO 6 INCHES, APPLY SEED AND THEN COLORADO CERTIFIED WEED FREE STRAW OR WOOD MULCH. SEED SHALL BE BROADCAST EVENLY OVER THE AREA USING A BROADCAST SPREADER PRIOR TO COVERING WITH THE EROSION CONTROL BLANKET. THE BLANKET SHALL BE ROLLED OUT IN THE DIRECTION OF THE ANTICIPATED RUN-OFF FLOW. INSTALL BLANKET IN ACCORDANCE WITH DETAIL SHOWN HEREIN. REWORKING OF AREAS THAT DO NOT ESTABLISH VEGETATION OR BECOME UNSTABLE SHALL BE NECESSARY IF THE EROSION CONTROL BLANKET SEPARATES FROM THE SOIL. GEOCOIR / DEKOWE 700 OR APPROVED EQUAL SHALL BE USED FOR THE EROSION CONTROL BLANKET. SEEDING OF THE BANKFULL BENCH SHALL BE IN ACCORDANCE WITH THE PLANTING TABLE. REFER TO EROSION CONTROL BLANKET DETAIL FOR PLACEMENT OF EROSION CONTROL BLANKET.
19. IF THE TIMING OF PROJECT IS SUCH THAT RIPARIAN SEED MIX CANNOT BE PLACED IN THE SPRING, THEN NSE SHALL SEED WITH TEMPORARY COVER ACCORDING TO THE EROSION AND SEDIMENT PLAN OR APPROVED BY THE ENGINEER AND AUTHORIZED BCPOS REPRESENTATIVE UNTIL RIPARIAN MIX CAN BE SEEDED IN THE FALL.
20. ALOTERRA WILL HARVEST WILLOWS DURING THE DORMANT SEASON (APPROX. SEPT 21), AND INSTALL THEM AT THE END OF THE PROJECT TO PROVIDE FOR AMPLE SOAKING TIME BEFORE INSTALLATION. NSE SHALL NOTIFY ENGINEER 7 DAYS PRIOR TO HARVESTING TO REVIEW AND APPROVE ALL HARVESTING SITES. UPON APPROVAL BY ENGINEER AND AUTHORIZED BCPOS REPRESENTATIVE, NSE SHALL BE RESPONSIBLE FOR HARVESTING AND TRANSPORTING THE LIVE STAKE CUTTINGS TO THE JOB SITE.
21. LIVE STAKES SHALL BE INSTALLED ALONG THE OUTSIDE MEANDER BEND AND ALONG RIFFLES WHERE INDICATED ON THE DRAWINGS AND DETAILS. LIVE STAKES SHALL BE INSTALLED INTO THE EROSION CONTROL BLANKET IN ADDITION TO THE DEAD STAKES.
22. EXCESS SPOIL MATERIAL MAY BE SPREAD AND GRADED ONSITE OR IN THE ONSITE PIT AS APPROVED BY THE ENGINEER AND AUTHORIZED BCPOS REPRESENTATIVE. PLACEMENT OF ANY ONSITE OR OFFSITE SPOIL MATERIAL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION. BCPOS SHALL APPROVE SPOIL MATERIALS BEING TAKEN OFFSITE.
23. TOPSOIL SHALL BE REMOVED FROM EXCAVATION AND SPOIL AREAS PRIOR TO CUT OR FILL AND RE-APPLIED TO AREAS AFTER ROUGH GRADING IS COMPLETE. SIX INCHES OF TOPSOIL SHALL BE PLACED ON DISTURBED AREAS TO MEET GRADE. STOCKPILING AND PLACEMENT OF TOPSOIL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND APPROVED BY THE ENGINEER.
24. SPOIL AREAS SHALL BE SEEDED WITH TEMPORARY VEGETATION WITHIN 7 DAYS FOLLOWING GRADING.
25. THE PLACEMENT OF STRAW MULCH SHALL OCCUR A MAXIMUM 48 HOURS AFTER SEEDING. MULCH WILL BE SPREAD TO COVER THE INSTALLED AREAS AT A MINIMUM RATE OF 1.5 TONS PER ACRE. MULCH SHALL BE KEPT OUT OF THE CROWNS OF SHRUBS AND GROUND COVER.
26. IF SOFT SOILS ARE ENCOUNTERED WHEN RECONSTRUCTING STREAM BANKS, RESTORE BANK WITH SOD MAT COVERING ALONG RIFFLES AND WOOD TOE SOD MAT ALONG BENDS.
27. NSE SHALL CALL FOR UTILITY MARKING AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION. IT MAY BE NECESSARY FOR NSE TO CONTACT THE COUNTY CLERK TO DETERMINE WHAT UTILITY COMPANIES HAVE FACILITIES IN THE PROJECT AREA. THE LOCATIONS OF THE UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE ONLY AND MAY NOT BE ACCURATE. LOCATING UTILITIES IS THE SOLE RESPONSIBILITY OF NSE. THE ENGINEER AND PROJECT OWNER WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO UTILITIES.
28. NSE SHALL UTILIZE NATIVE MATERIAL FROM THE SITE WHERE AVAILABLE AND ALLOWED BY THE ENGINEER. NATIVE MATERIAL THAT CAN BE FOUND ON SITE INCLUDE TREES THAT CAN PROVIDE LIVE STAKES AND TREES THAT CAN BE USED FOR LOG STRUCTURES AND WOOD DEBRIS.
29. AFTER CONSTRUCTION, THE ACCESS ROADS LEADING TO THE PROJECT SITE SHALL BE RESTORED TO AS GOOD OR BETTER CONDITION THAN BEFORE CONSTRUCTION. BCPOS SHALL INSPECT AND APPROVE OF THE RESTORATION OF THESE SITES.
30. FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE AT LEAST 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY UPSTREAM OR APPROVED BY THE ONSITE ENGINEER.
31. NSE SHALL FOLLOW ALL FEDERAL, STATE, AND LOCAL PERMIT REQUIREMENTS REQUIRED FOR PROJECT WORK.
32. ACCESS AND STOCKPILE AREAS TO BE GRADED TO PRE-CONSTRUCTION CONDITION.
33. WORKER VEHICLES MUST BE PARKED ON SITE AND NOT ON ACCESS ROADS, DRIVEWAY, OR OXFORD ROAD..
34. ALL STRUCTURES ARE TO BE APPROVED BY ENGINEER AND APPROPRIATE BCPOS REPRESENTATIVE BEFORE THEY SIGNED OFF AND DEEMED COMPLETE.
35. ACCESS ROUTES FROM PROJECT AREA TO STAGING AREAS NEED TO BE CONFIRMED IN THE FIELD AND APPROVED BY BCPOS.
36. BCPOS SHALL BE CONTACTED TO DELINEATE AND APPROVE ANY ACCESS.
37. TEMPORARY FENCE SEPARATING RECLAIMED ACCESS ROUTE AND STAGING AREAS SHOULD FOLLOW THE DISTURBANCE FOOTPRINT AND BE CONSTRUCTED USING 6'X1.33 LBS./FT STEEL T-POSTS ON 12' SPACING. FOUR STRANDS OF PREMIUM 12 1/2 GA. BARBED WIRE (4" BARB SPACING) EVENLY SPACED WITH TOP WIRE HEIGHT 48" FROM GROUND SURFACE AND BOTTOM WIRE HEIGHT 12" FROM GROUND SURFACE. EXISTING GATE IN SE CORNER OF FIELD MUST RETAIN ACCESSIBILITY THROUGH ADDITIONAL GATE BETWEEN FIELD AND RIPARIAN AREA FOLLOWING RECLAMATION.
38. BIODEGRADABLE HYDRAULIC FLUIDS MUST BE USED IN ALL EQUIPMENT AND MACHINERY WORKING WITHIN THE CHANNEL. A TEMPORARY CULVERT AND ROADWAY WILL BE INSTALLED IF EQUIPMENT WITHOUT BIODEGRADABLE HYDRAULIC FLUIDS IS REQUIRED TO CROSS THE CHANNEL.
39. PRIOR TO TRANSPORTING EQUIPMENT TO THE SITE, ALL MACHINERY MUST BE CLEANED TO REMOVE AQUATIC NUISANCE SPECIES (ANS) AND WEED SEEDS IN ACCORDANCE WITH STATE OF COLORADO ANS REGULATIONS. THIS INVOLVES EITHER STEAM (HEAT) OR CHEMICAL CLEANING, NOT JUST POWER WASHING.
40. A"SPILL KIT" FOR EMERGENCY POLLUTANT ISOLATION, AND WRITTEN CLEAN-UP PROCEDURES, MUST BE ONSITE AT ALL TIMES DURING CONSTRUCTION ACTIVITY.

NOTES. EROSION/SEDIMENTATION CONTROL NOTES

1. ALL CONTROL MEASURES SHALL BE CHECKED, AND REPAIRED AS NECESSARY, MONTHLY IN DRY PERIODS, AND WITHIN 24 HOURS AFTER ANY RAINFALL AT THE SITE OF .75 INCHES OR GREATER WITHIN A 24 HOUR PERIOD. DAILY CHECKING AND, IF NECESSARY, REPAIRING SHALL BE DONE DURING PROLONGED RAINFALLS. THE PERMITTEE SHALL MAINTAIN WRITTEN RECORDS OF SUCH CHECKS AND REPAIRS ON-SITE AT ALL TIMES, AND RECORDS SHALL BE SUBJECT TO INSPECTION AT ANY REASONABLE TIME.
2. THE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED AS REQUIRED TO PREVENT SILT/SEDIMENT FROM LEAVING THE SITE. THIS INCLUDES BUT IS NOT LIMITED TO WASH DOWN OF THE CONSTRUCTION ENTRANCE, INSTALLING AND UTILIZING A VEHICLE WASH DOWN AREA, INSTALLING ADDITIONAL STONE, ETC. EQUIPMENT MUST BE CLEAN PRIOR TO SITE ENTRY.
3. ANY AND ALL SILT/SEDIMENTATION SHALL BE FREQUENTLY REMOVED FROM THE SILT FENCE, DITCHES, CHECK DAMS AND RETENTION AREAS. AT THE END OF CONSTRUCTION, THESE AREAS SHALL BE COMPLETELY FREE OF SILT/SEDIMENTATION AND SHALL BE STABILIZED AS STATED IN THE PLANS AND SPECIFICATIONS.
4. ALL BMPS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE COLORADO HANDBOOK FOR EROSION CONTROL, SEDIMENT CONTROL AND STORMWATER MANAGEMENT ON CONSTRUCTION SITES AND URBAN AREAS, LOCAL STANDARDS FOR EROSION AND SEDIMENT CONTROL AND THE PLANS AND SPECIFICATIONS. IF CONFLICTS ARISE BETWEEN THESE REQUIREMENTS, THE MORE STRINGENT SHALL APPLY.
5. BMPS SHOWN ALONG THE PERIMETER OF THE DISTURBED AREAS SHALL BE INSTALLED PRIOR TO DISTURBANCE ACTIVITY. OTHER BMPS SHALL BE INSTALLED AS SOON AS CONSTRUCTION SEQUENCES ALLOW.
6. TEMPORARY DIVERSION OF RUNOFF/RUNON WATER SHALL BE INSTALLED AS NEEDED TO FACILITATE CONSTRUCTION OR AS DIRECTED ON-SITE BY THE ENGINEER.
7. ALL DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY AFTER THE COMPLETION OF THE GRADING OPERATION. AREAS REQUIRING COCONUT COIR MATTING SHALL BE SEEDED AND MULCHED FOR STABILIZATION PRIOR TO THE INSTALLATION OF THE MATTING.
8. TEMPORARY STABILIZATION OF DISTURBED AREAS MUST BE INITIATED IMMEDIATELY WHENEVER WORK TOWARD PROJECT COMPLETION AND FINAL STABILIZATION OF ANY PORTION OF THE SITE HAS TEMPORARILY CEASED AND WILL NOT RESUME FOR A PERIOD EXCEEDING THIRTEEN (13) CALENDAR DAYS. THOSE AREAS SHALL BE SEEDED AND MULCHED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
9. NECESSARY MEASURES SHALL BE TAKEN TO PRODUCE AND MAINTAIN AN ACCEPTABLE STAND OF GRASS. SAID MEASURES TO INCLUDE (BUT NOT LIMITED TO) WATERING, RE-SEEDING, REGRADING ERODED AREAS, ADDITION OF COMPOST, ETC.
10. NSE IS RESPONSIBLE FOR KEEPING MUD AND DEBRIS OFF CITY/STATE STREETS AND ROW. CLEANUP IS REQUIRED DAILY.
11. NSE SHALL KEEP A COPY OF THE NPDES CONSTRUCTION GENERAL PERMIT AND THE "CONSTRUCTION BEST MANAGEMENT PRACTICES PLAN" ON SITE AT ALL TIMES FOR THE LIFE OF THE PROJECT.
12. ALL HAZARDOUS SUBSTANCES USED FOR THIS PROJECT (PAINT, OIL, GREASE, AND OTHER PETROLEUM PRODUCTS) SHALL BE STORED IN ACCORDANCE WITH SPCC REGULATIONS. THESE SUBSTANCES SHALL BE STORED AWAY FROM DRAINS AND DITCHES IN WATERTIGHT CONTAINERS. DISPOSAL OF THESE SUBSTANCES SHALL BE IN ACCORDANCE WITH ADEM REGULATIONS. DAILY INSPECTIONS SHALL BE PERFORMED FOR LEAK DETECTION. IF LEAKS OCCUR, APPROPRIATE ACTION SHALL BE TAKEN TO CONTAIN AND REMEDIATE THE SPILL. ADEQUATE TRASH CONTAINERS SHALL BE KEPT ON SITE FOR THE DISPOSAL OF CONSTRUCTION MATERIALS WASTE. NECESSARY MEASURES SHALL BE TAKEN TO PREVENT ANY TRASH OR OTHER POLLUTANTS FROM ENTERING "WATERS OF THE UNITED STATES."
13. ALL TEMPORARY MEASURES SHALL BE REMOVED ONCE ACCEPTABLE PERMANENT STABILIZATION IS ACHIEVED. THE ENGINEER SHALL DETERMINE IF THE PERMANENT STABILIZATION IS ACCEPTABLE.

SPECIAL NOTES

1. THE ELEVATIONS SHOWN HEREIN ARE BASED ON ELEVATION DATA DOWNLOADED FROM HTTPS://GEODATA.CO.GOV/# ON 10/27/2017. POST-FLOOD REFLIGHT DEM TILES: CO_N_1623, 1624, 1646, 1647 MOSAICKED. US ACE ACQUIRED ELEVATION DATA ON 10/01/2014. FROM WHICH ALL COMPUTATIONS FOR CUT/FILL ARE BASED. SLIGHT DISCREPANCIES BETWEEN THE EXISTING GROUND DIGITAL SURFACE AND FIELD CONDITIONS CAN RESULT IN SIGNIFICANT VARIATIONS IN TOTAL EXCAVATED QUANTITIES. THUS, QUANTITIES OF MATERIAL EXCAVATED SHOULD BE COMPARED TO THOSE SHOWN ON THE DRAWINGS TO MANAGE THE MOVEMENT OF MATERIAL ACROSS THE SITE.

TOPOGRAPHIC INFORMATION:

EXISTING GROUND SURFACES ARE BASED ON LIDAR DATA. BENCHMARKS WERE SET THROUGHOUT THE SITE AND CAN BE PROVIDED AT ANY TIME. CHANGES IN EXISTING SURFACES SHALL BE INCIDENTAL TO CONSTRUCTION. THE ENGINEER MAKES NO WARRANTY FOR THE ACCURACY OF ANY SURVEY INFORMATION SHOWN IN THESE DRAWINGS. IF DISCREPANCIES EXIST BETWEEN THE THREE-DIMENSIONAL DIGITAL SURFACE AND THE ACTUAL GROUND SURFACE, SIGNIFICANT VARIATIONS IN THE EXCAVATIONS QUANTITIES CAN BE EXPECTED, WHICH COULD AFFECT HANDLING AND PHASING CONSIDERATIONS FOR THE PROJECT. THE ENGINEER ACCEPTS NO RESPONSIBILITY FOR CHANGES TO EXCAVATION QUANTITIES THAT CHANGE AS A RESULT OF ANY DISCREPANCIES BETWEEN THE DIGITAL SURFACE AND EXISTING GROUND.

SPECIAL GRADING NOTE:

THE AGREED UPON INTENT OF THIS GRADING PLAN IS TO MAINTAIN A "LIVE" SURFACE SO THAT ANY CHANGES THAT ARISE DURING CONSTRUCTION CAN BE QUICKLY ENCOMPASSED INTO THE THREE-DIMENSIONAL SURFACE GENERATED DURING THIS DESIGN PROCESS. AS SUCH, FINE TUNING OF THE SURFACE THAT WOULD ELIMINATE THE APPEARANCE OF JAGGED CONTOUR LINES WHERE SLIGHT VARIATIONS BETWEEN THE EXISTING AND PROPOSED SURFACES WAS NOT COMPLETED.

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

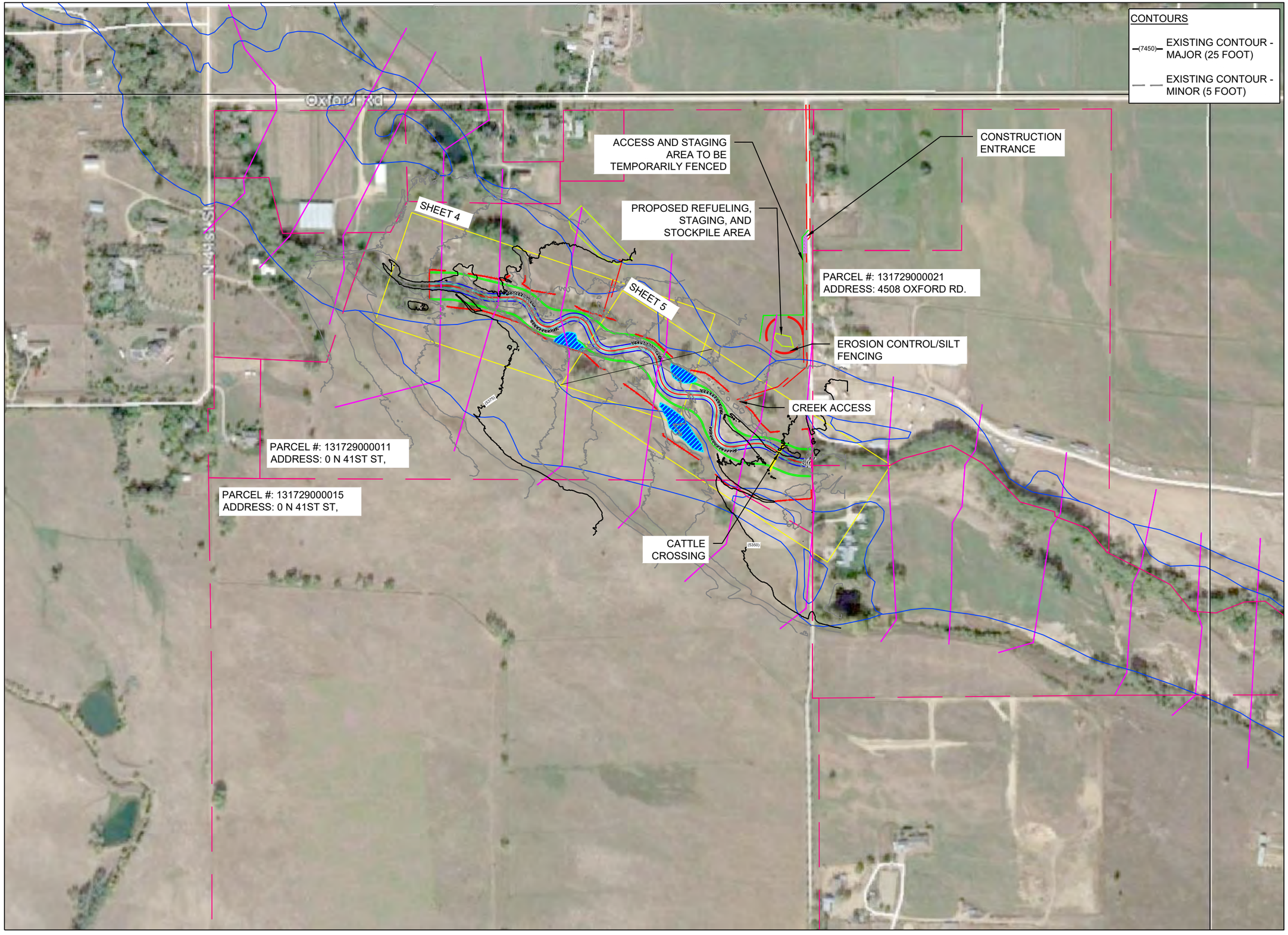
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101
NorthState ENVIRONMENTAL

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
NOTES AND SPECIFICATIONS

Date: 4/17/2018
Scale: NTS
Sheet:

E:\dropbox (Sear)\brewbaker-sorenson\CAD\sheets\cover_notes_brewbaker.dwg
2018/04/17 1:48 PM By: Tailwater Limited



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- PARCEL
- FLOOD HAZARD LINE
- HYDRAULIC MODEL CROSS-SECTION
- MULCH AREA
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE
- CONSTRUCTION ENTRANCE

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101
North State ENVIRONMENTAL

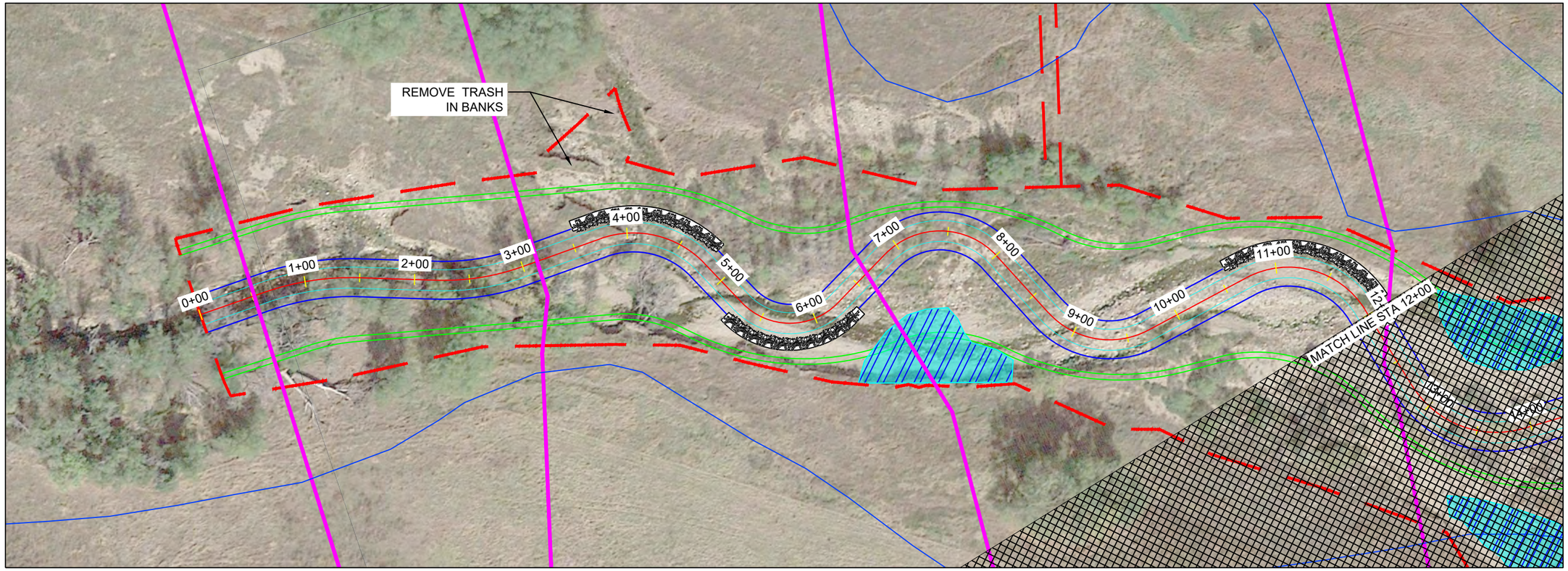
Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
Overview

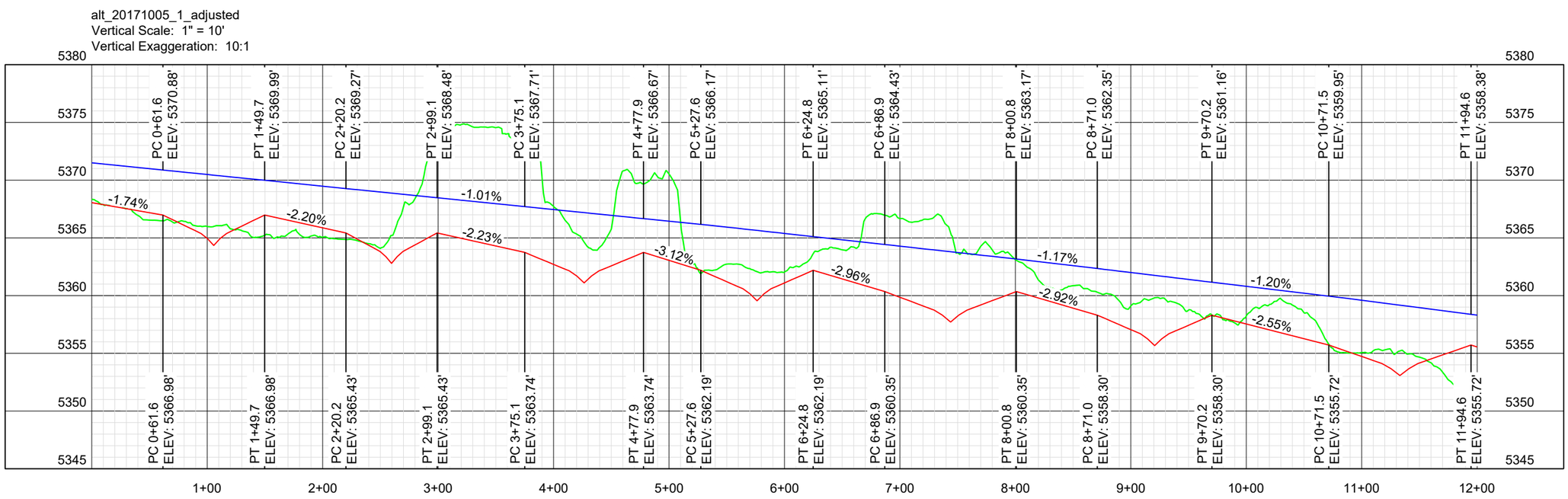
Date
4/17/2018

Scale
1" = 400'

Sheet
3 OF 31

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\pp_breeboker.dwg
2018/04/17 1:48 Pld By: Tolleiter Limited





General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- PARCEL
- FLOOD HAZARD LINE
- HYDRAULIC MODEL CROSS-SECTION
- MULCH AREA
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE
- CONSTRUCTION ENTRANCE

PROFILE LEGEND

- EXISTING GROUND
- PROPOSED THALWEG
- PROPOSED BANKFULL

Prepared By: DAB – 5SSR

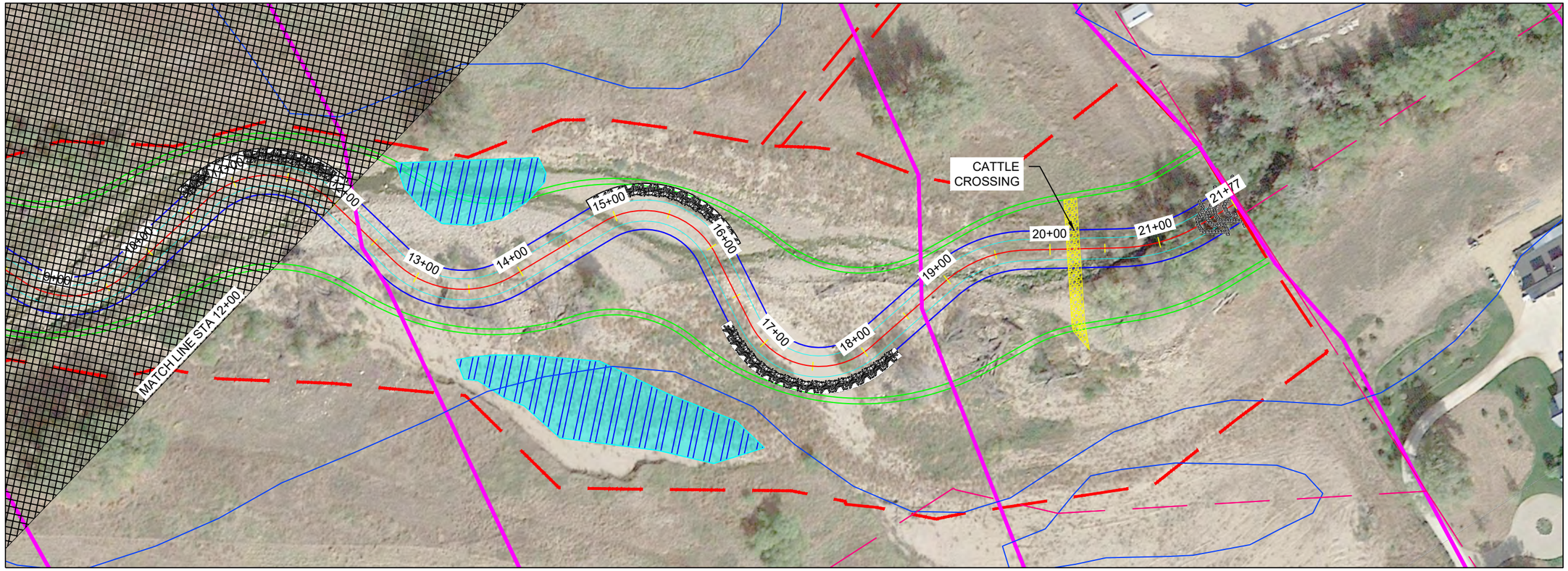
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

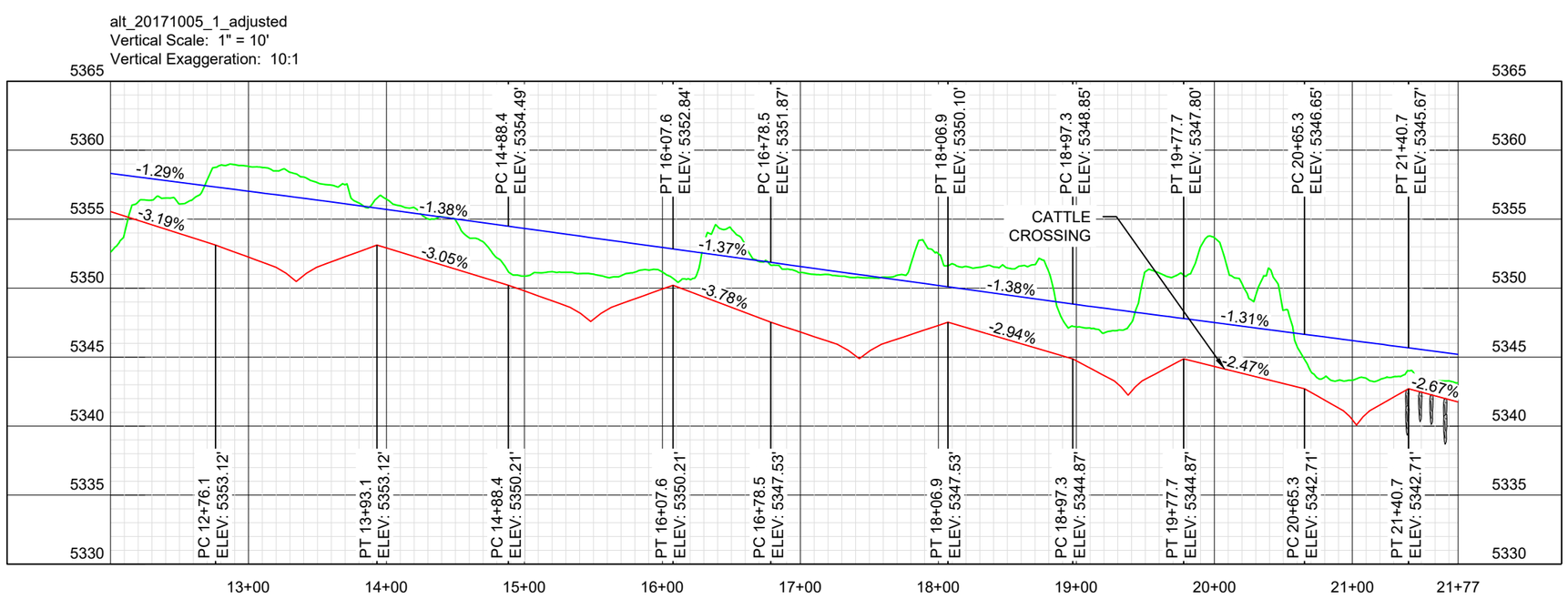
Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
PLAN AND PROFILE STA 0+00 TO 12+00

Date	Sheet
4/17/2018	4 OF 31
Scale 1" = 100'	

E:\dropbox (ssss)\breeboker-sorenson\CAD\sheets\ps_breeboker.dwg
2018/04/17 1:49 Pad By: Talwater Limited





General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- PARCEL
- FLOOD HAZARD LINE
- HYDRAULIC MODEL CROSS-SECTION
- MULCH AREA
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE
- CONSTRUCTION ENTRANCE

PROFILE LEGEND

- EXISTING GROUND
- PROPOSED THALWEG
- PROPOSED BANKFULL

Prepared By: DAB – 5SSR

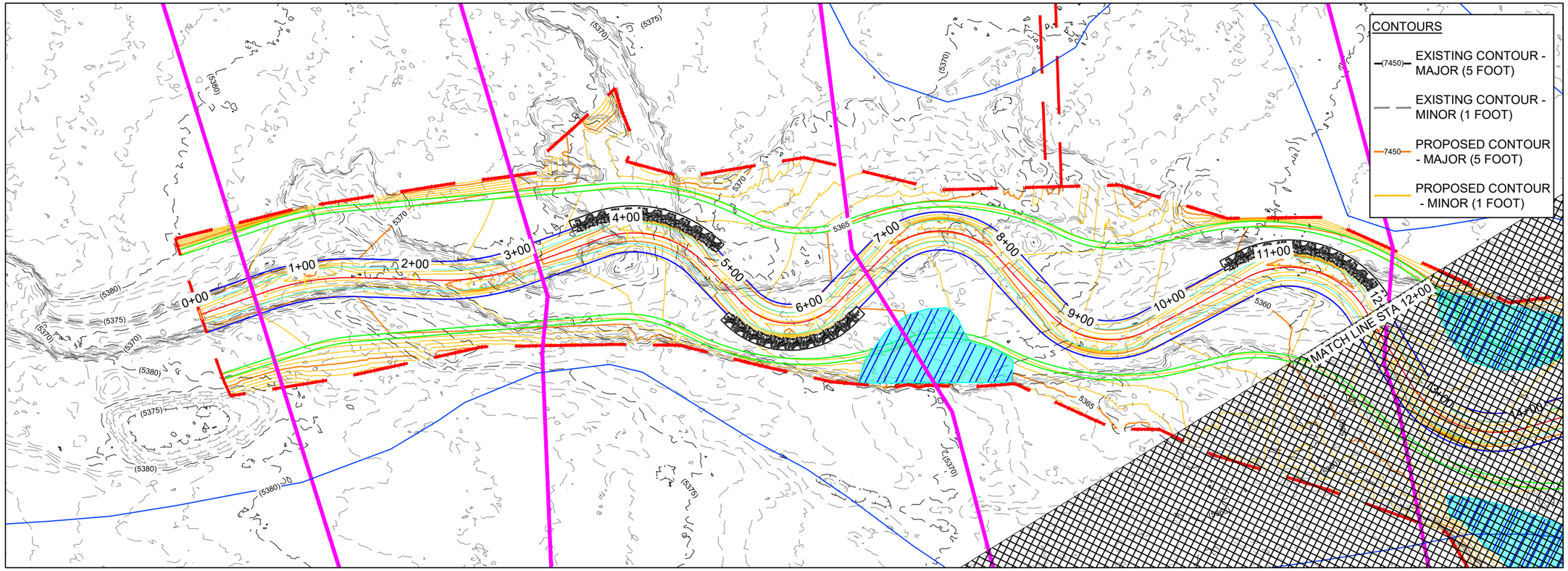
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

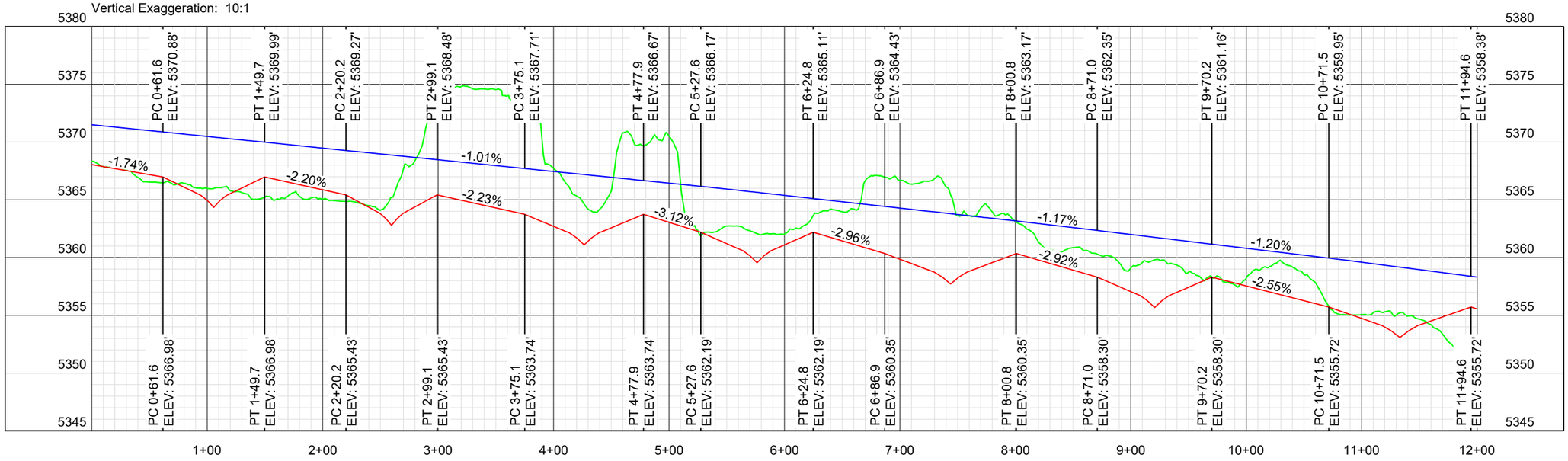
Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
PLAN AND PROFILE STA 12+00 TO 12+77

Date	Sheet
4/17/2018	5 OF 31
Scale 1" = 100'	

E:\dropbox (sssr)\brebokor-sorenson\CAD\sheets\pp_brebokor.dwg
2018/04/17 1:49 Pad By: Talwater Limited





General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- PARCEL
- FLOOD HAZARD LINE
- HYDRAULIC MODEL CROSS-SECTION
- MULCH AREA
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE
- CONSTRUCTION ENTRANCE

PROFILE LEGEND

- EXISTING GROUND
- PROPOSED THALWEG
- PROPOSED BANKFULL

Prepared By: DAB – 5SSR

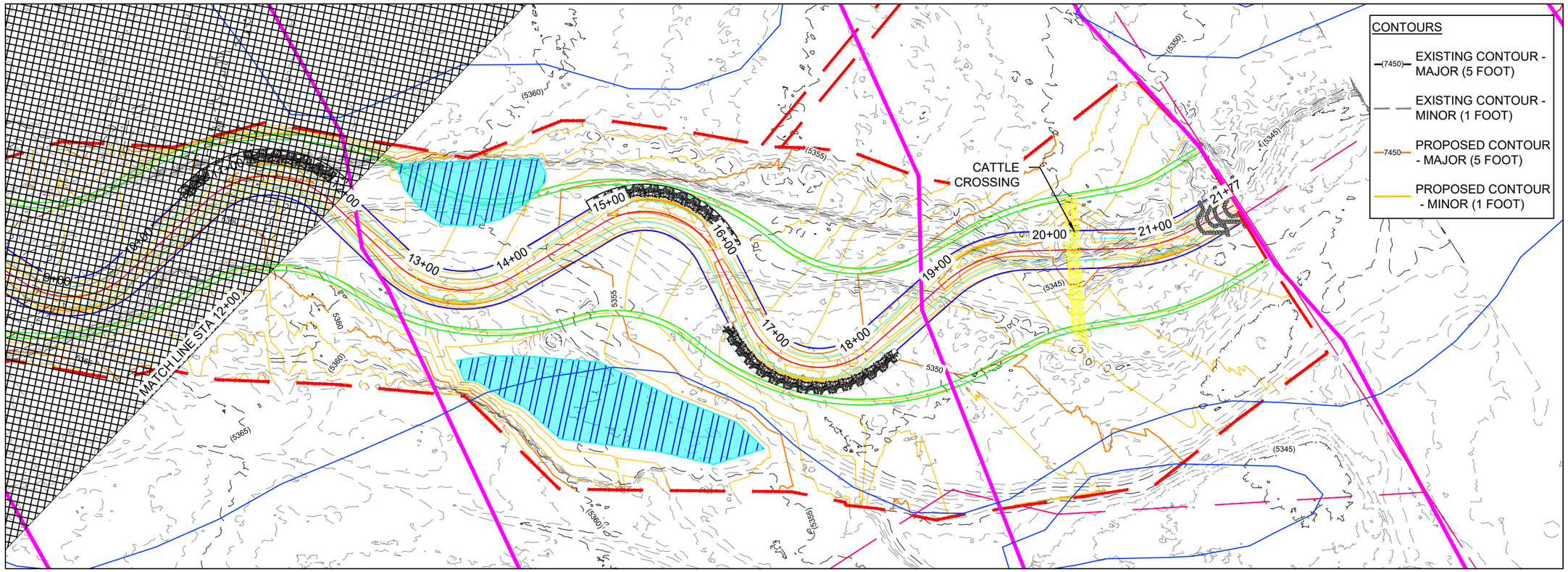
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

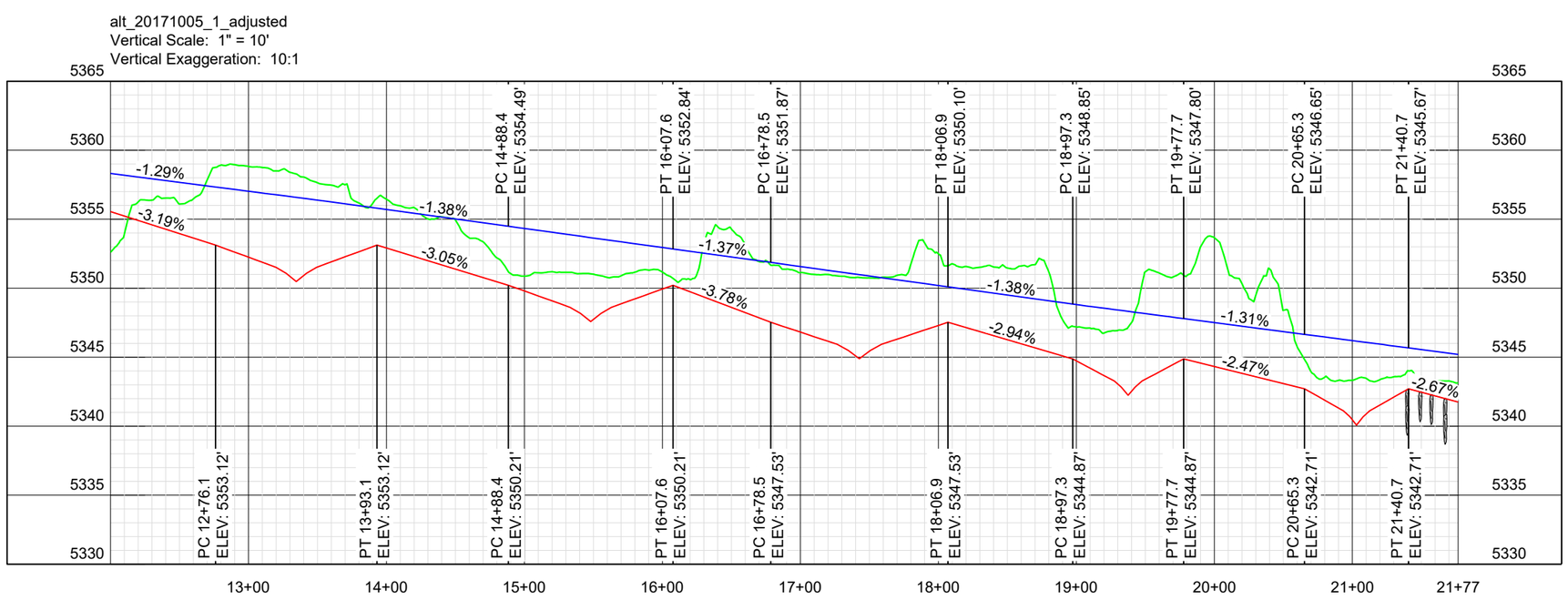
Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
PLAN AND PROFILE STA 0+00 TO 12+00 (TOPO)

Date: 4/17/2018
Scale: 1" = 100'
Sheet: 6 OF 31

E:\dropbox (ssss)\brebokor-sorenson\CAD\sheets\ps_brebokor.dwg
2018/04/17 1:49 Pld By: Talwater Limited





General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- PARCEL
- FLOOD HAZARD LINE
- HYDRAULIC MODEL CROSS-SECTION
- MULCH AREA
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE
- CONSTRUCTION ENTRANCE

PROFILE LEGEND

- EXISTING GROUND
- PROPOSED THALWEG
- PROPOSED BANKFULL

Prepared By: DAB – 5SSR

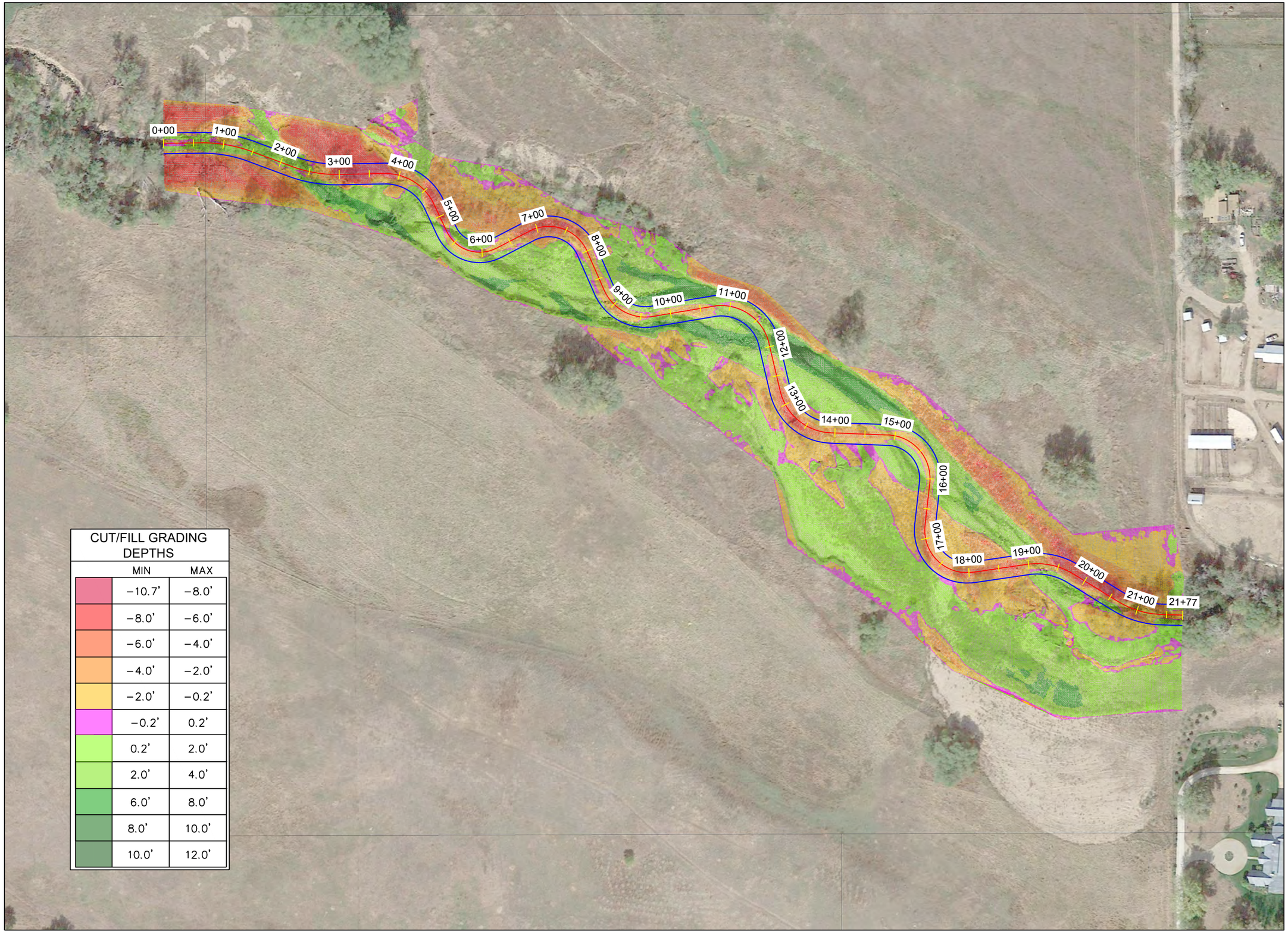
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
PLAN AND PROFILE STA 12+00 TO 12+77 (TOPO)

Date: 4/17/2018
Scale: 1" = 100'
Sheet: 7 OF 31

E:\dropbox (ssss)\breeboker-sorenson\CAD\sheets\pp_breeboker.dwg
2018/04/17 1:49 Pad By: Talwater Limited



CUT/FILL GRADING DEPTHS

	MIN	MAX
	−10.7'	−8.0'
	−8.0'	−6.0'
	−6.0'	−4.0'
	−4.0'	−2.0'
	−2.0'	−0.2'
	−0.2'	0.2'
	0.2'	2.0'
	2.0'	4.0'
	6.0'	8.0'
	8.0'	10.0'
	10.0'	12.0'

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

North State ENVIRONMENTAL

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
GRADING HEAT MAP

Date
4/17/2018

Scale
1" = 150'

Sheet
8 OF 31

E:\dropbox_(5ssr)\breeboker-sorenson\CAD\sheets\grading_heat_breeboker.dwg
2018/04/17 1:49 PM By: Tolwater Limited

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS – OVERVIEW

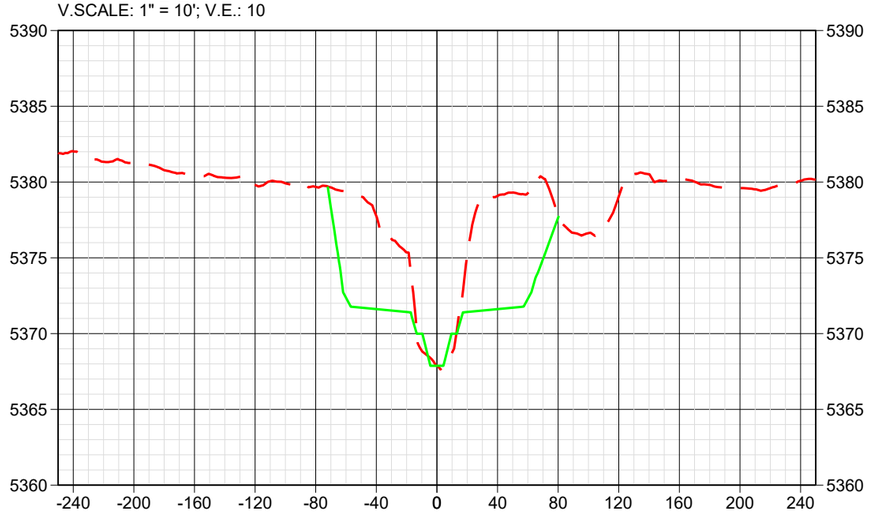
Date
4/17/2018

Scale
1" = 150'

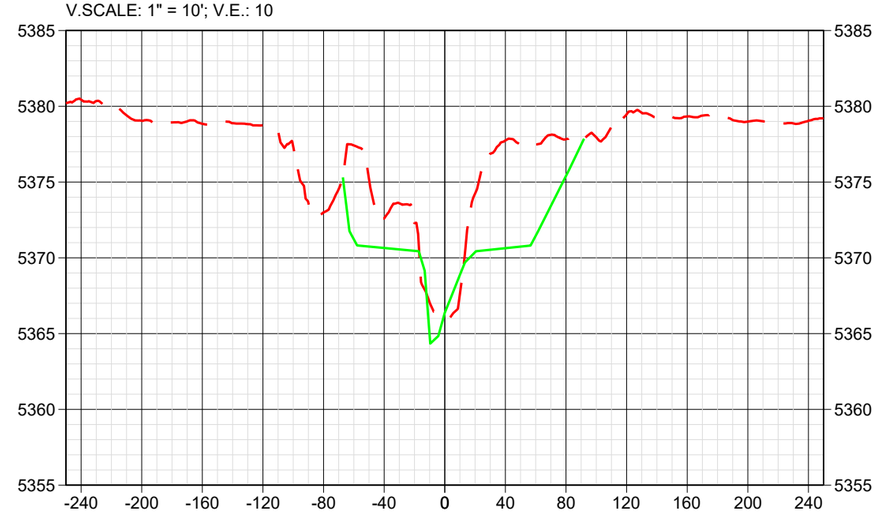
Sheet
9 OF 31

E:\dropbox_(5ssr)\brewbaker-sorenson\CAD\sheets\sections_brewbaker.dwg
2018/04/17 1:49 PM By: Talwater Limited

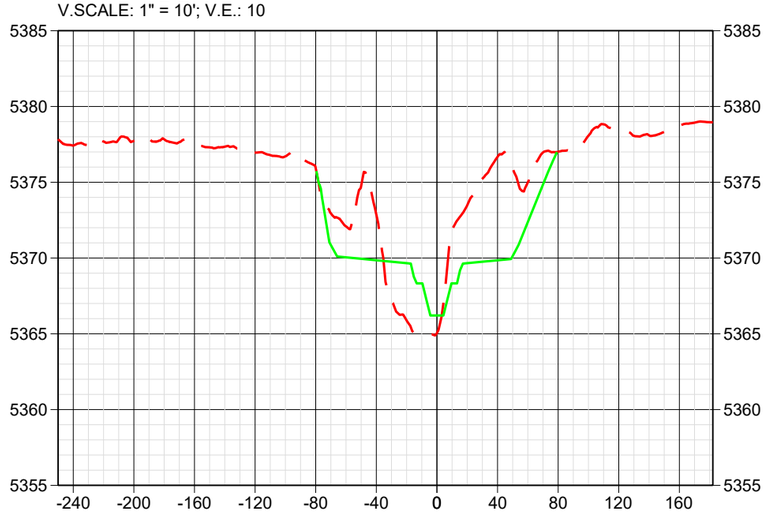
alt_20171005_1_adjusted STA 0+10
V.SCALE: 1" = 10'; V.E.: 10



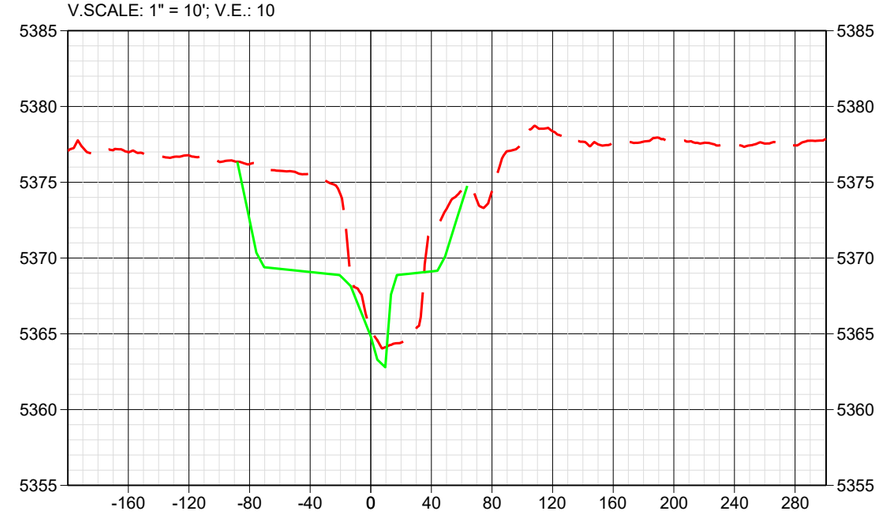
alt_20171005_1_adjusted STA 1+06
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 1+85
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 2+60
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS –STA 0+00 TO 2+60

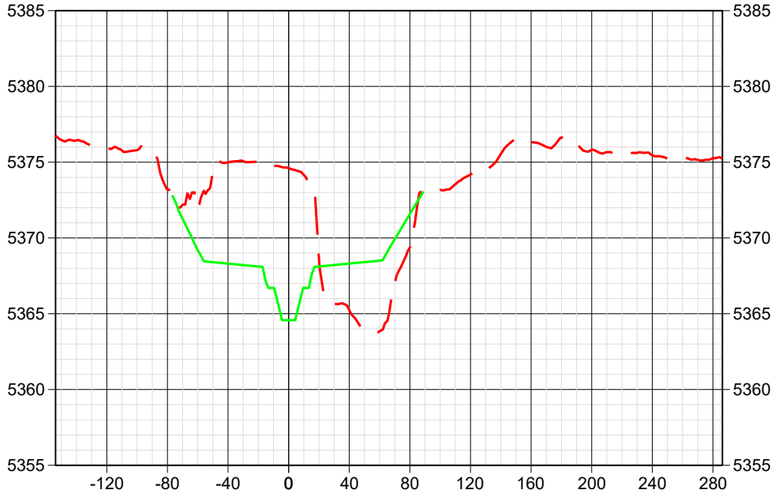
Date
4/17/2018

Scale
1" = 100'

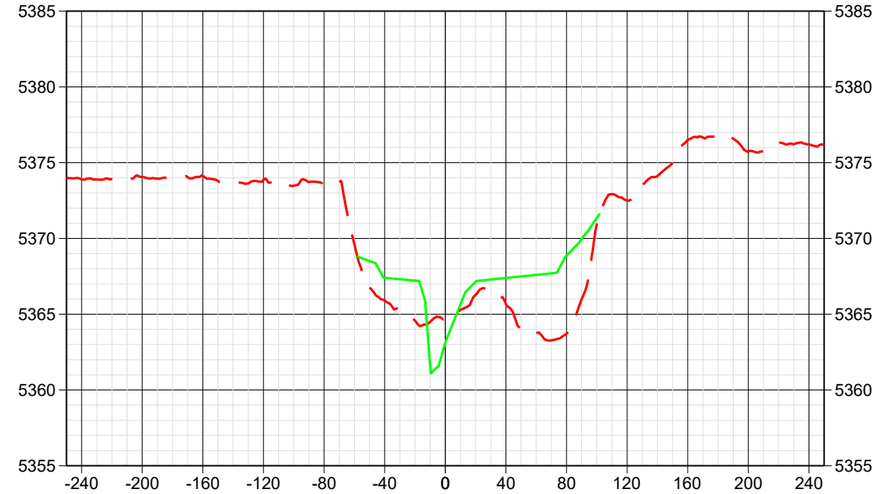
Sheet
10OF 31

E:\dropbox (5ssr)\breaboker-sorenson\CAD\sheets\sections_breaboker.dwg
2018/04/17 1:49 PM By: Tolkwater Limited

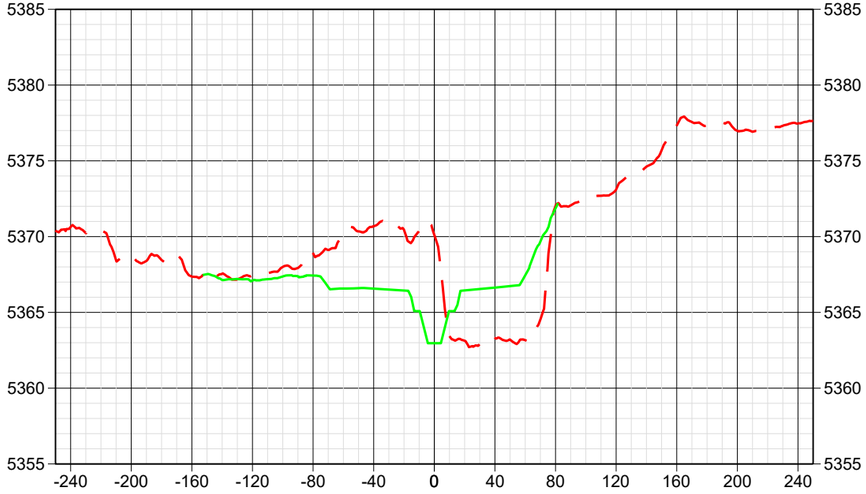
alt_20171005_1_adjusted STA 3+37
V.SCALE: 1" = 10'; V.E.: 10



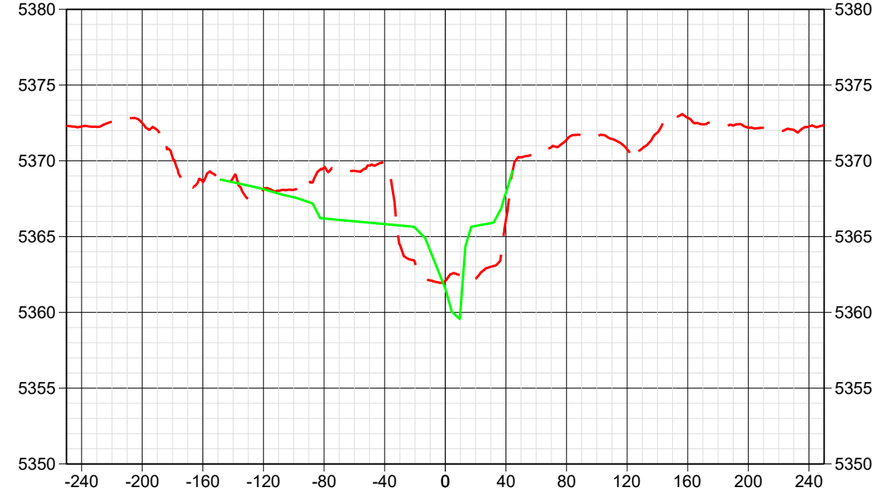
alt_20171005_1_adjusted STA 4+27
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 5+03
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 5+76
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS –STA 3+37 TO 5+76

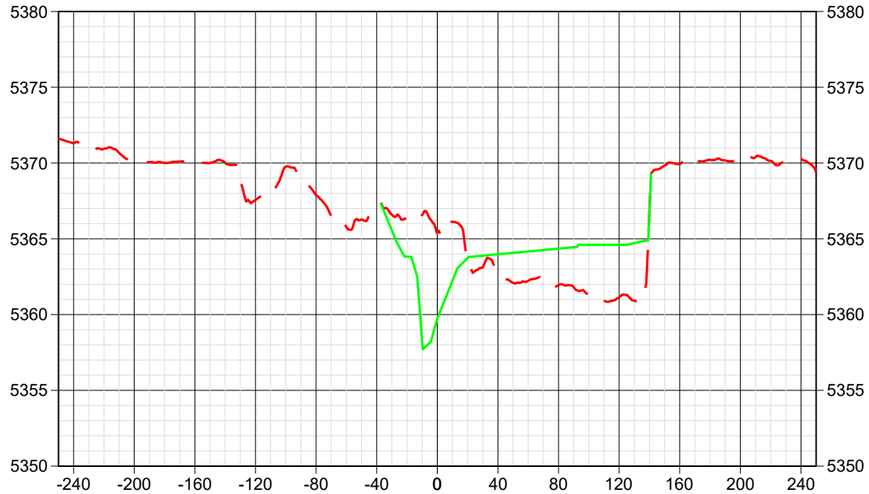
Date
4/17/2018

Scale
1" = 100'

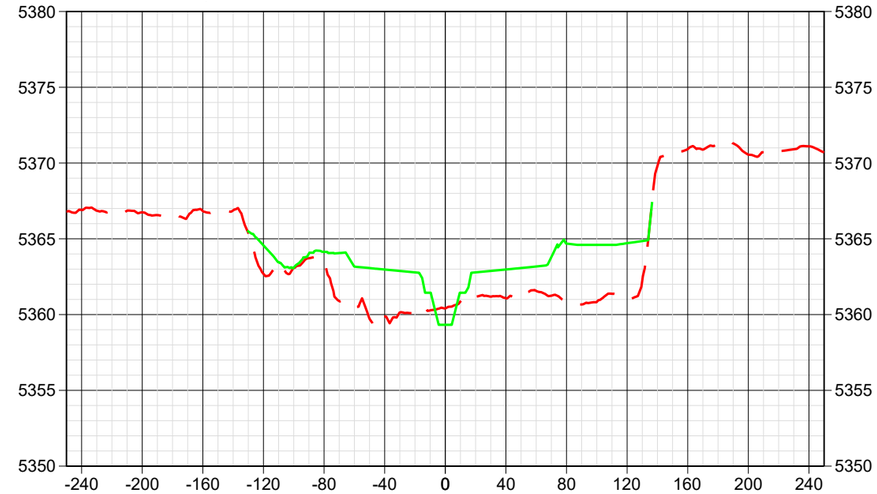
Sheet
11 OF 31

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\sections_breeboker.dwg
2018/04/17 1:49 PM By: Tolleiter Limited

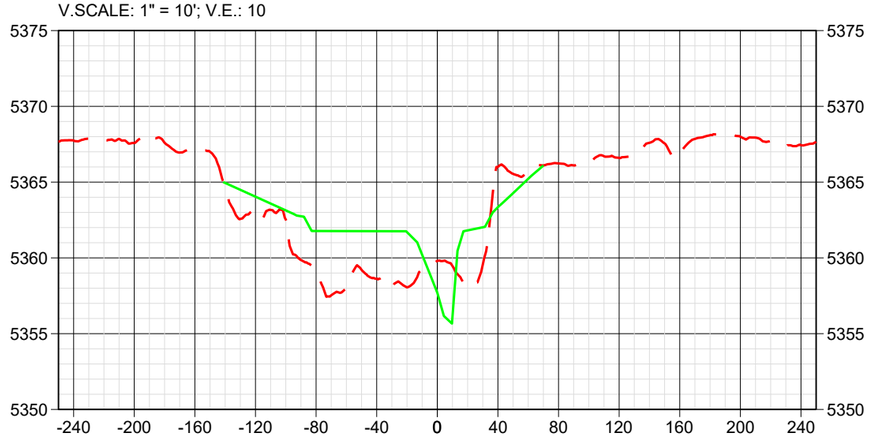
alt_20171005_1_adjusted STA 7+44
V.SCALE: 1" = 10'; V.E.: 10



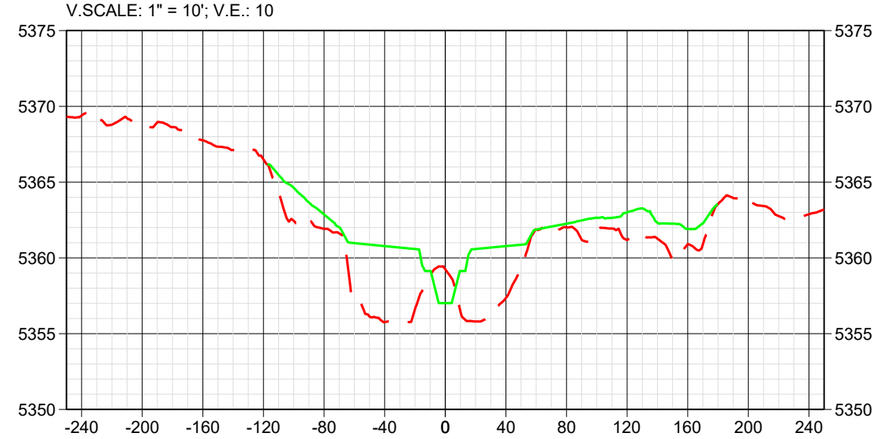
alt_20171005_1_adjusted STA 8+36
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 9+21
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 10+21
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS –STA 7+44TO 10+21

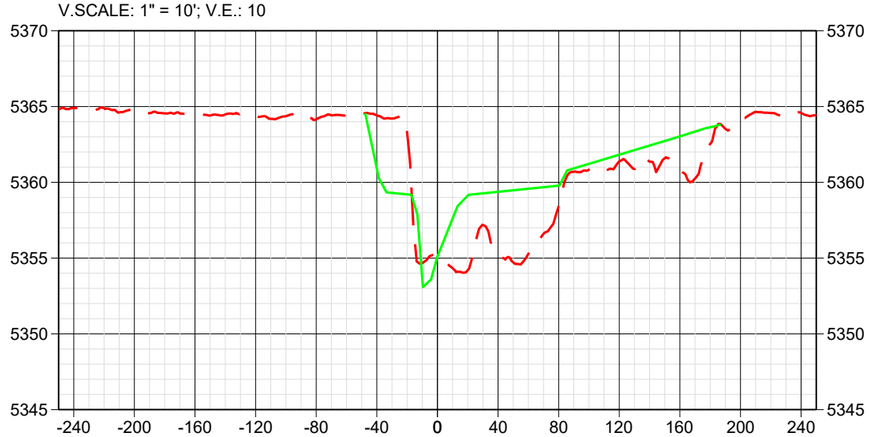
Date
4/17/2018

Scale
1" = 100'

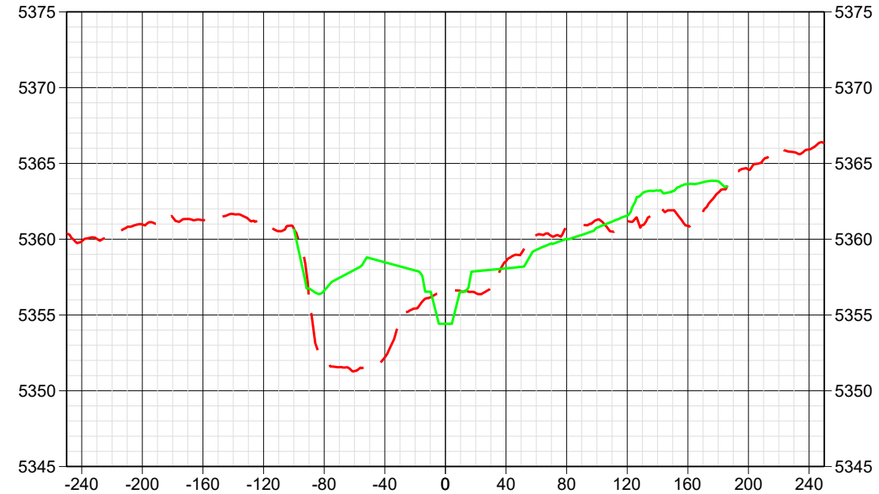
Sheet
12OF 31

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\sections_breeboker.dwg
2018/04/17 1:49 PM By: Tolweiler Limited

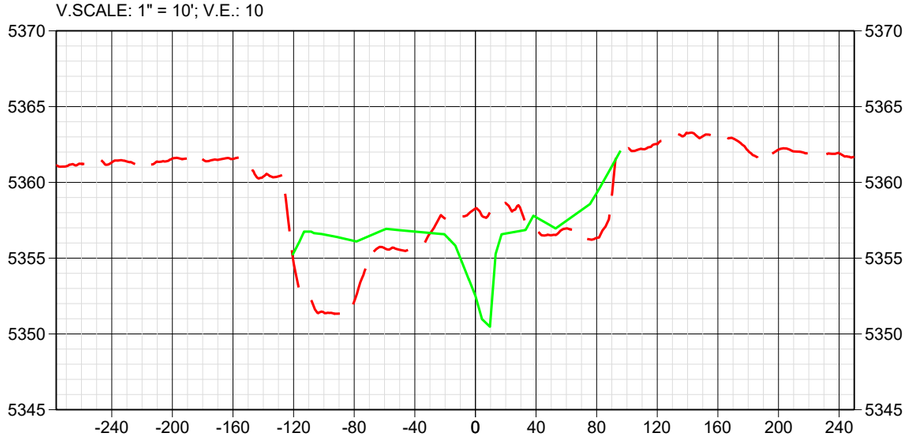
alt_20171005_1_adjusted STA 11+33
V.SCALE: 1" = 10'; V.E.: 10



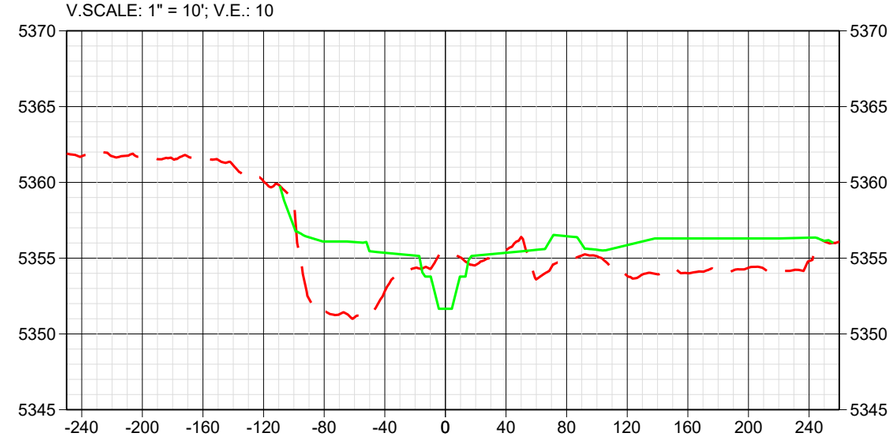
alt_20171005_1_adjusted STA 12+35
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 13+35
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 14+41
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS –STA 11+33 TO 14+41

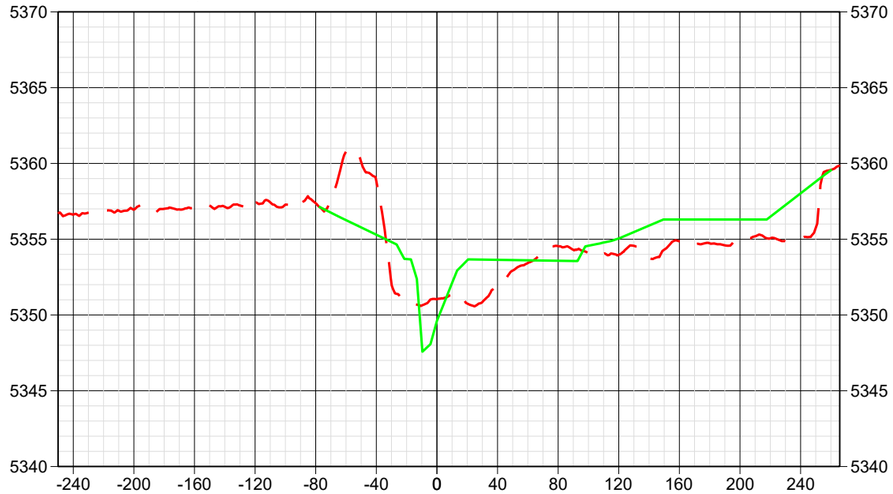
Date
4/17/2018

Scale
1" = 100'

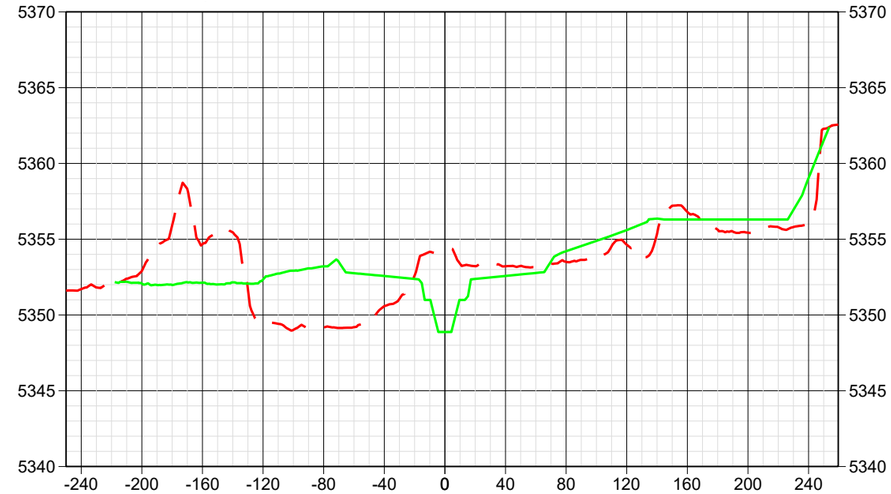
Sheet
13OF 31

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\sections_breeboker.dwg
2018/04/17 1:49 PM By: Tolweiler Limited

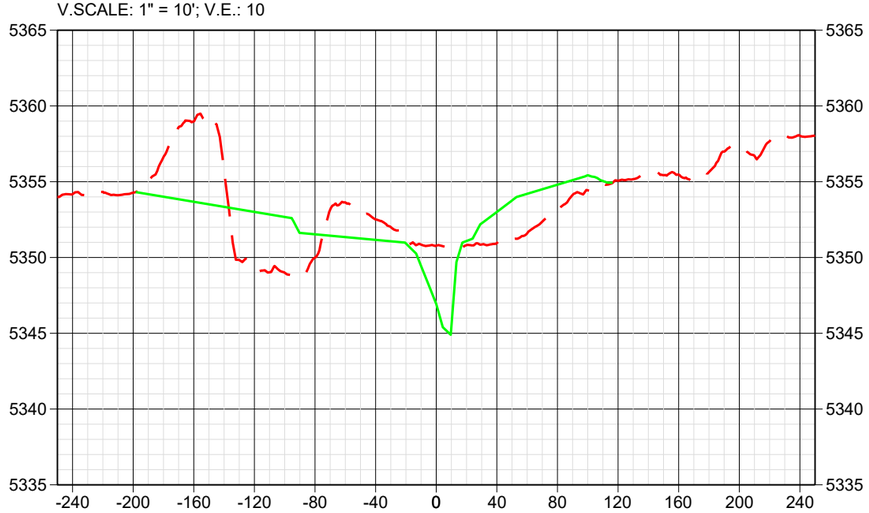
alt_20171005_1_adjusted STA 15+48
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 16+43
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 17+43
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS – STA 15+48 TO 17+43

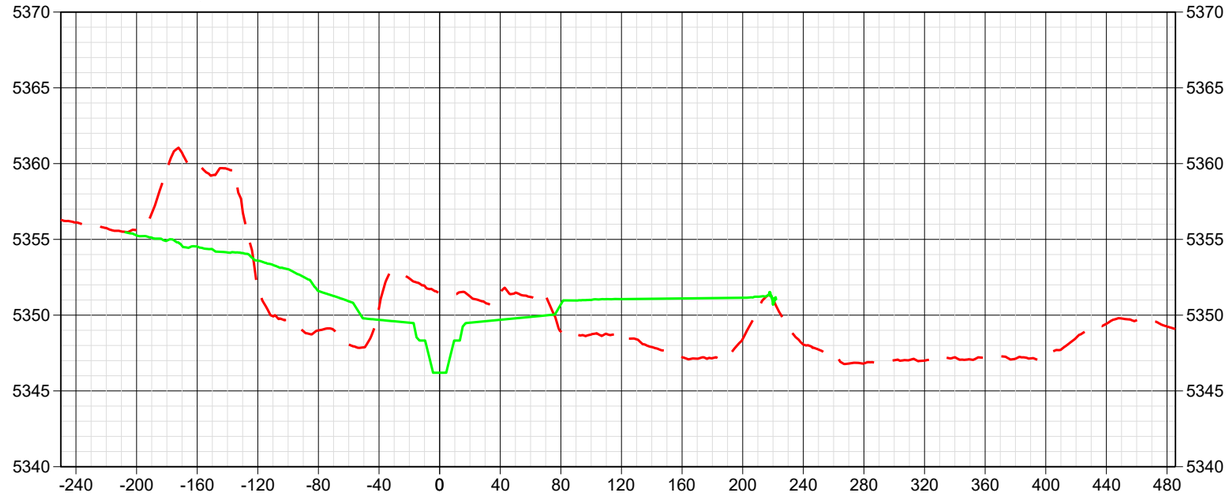
Date
4/17/2018

Scale
1" = 100'

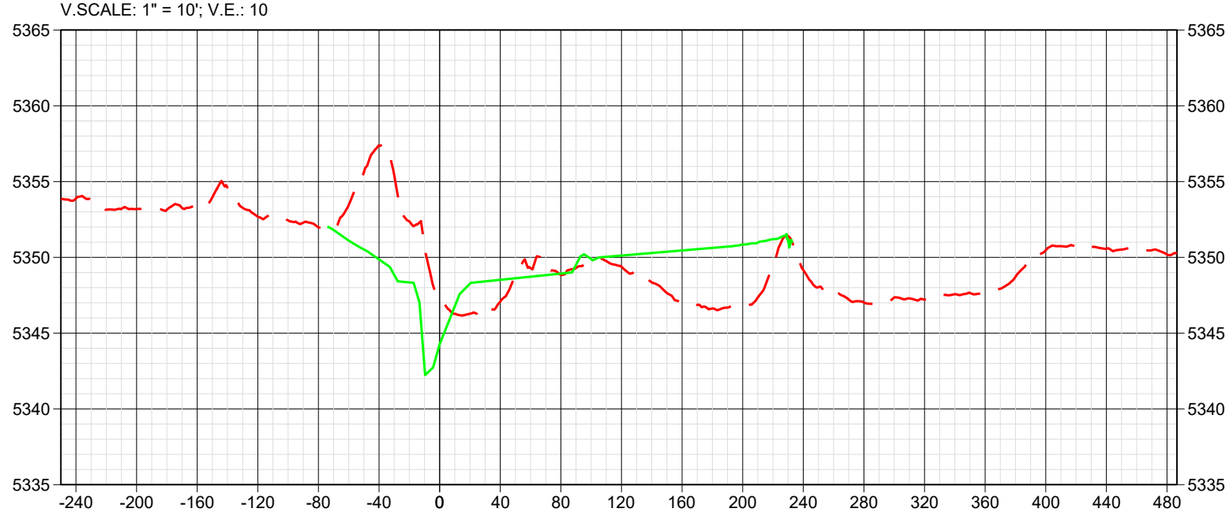
Sheet
14 OF 31

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\sections_breeboker.dwg
2018/04/17 1:49 PM By: Tolleiter Limited

alt_20171005_1_adjusted STA 18+52
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 19+38
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS –STA 19+38 TO 21+03

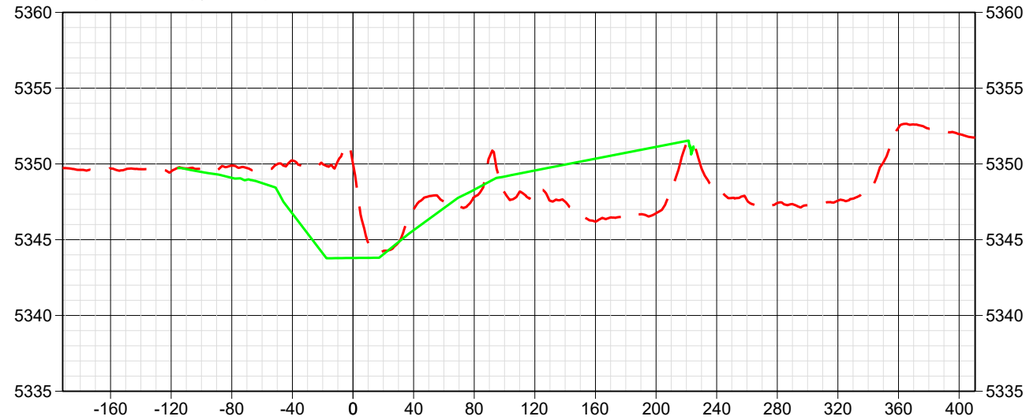
Date
4/17/2018

Scale
1" = 100'

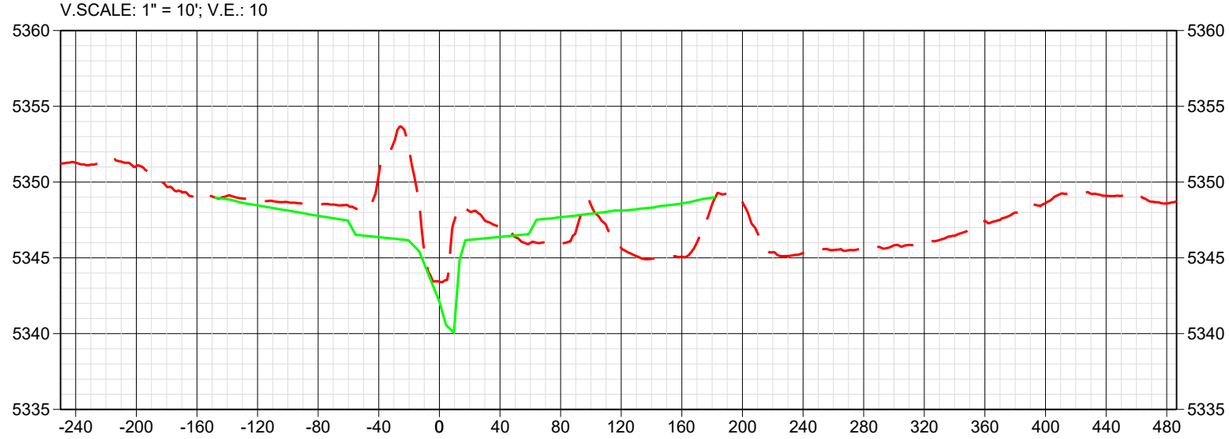
Sheet
15OF 31

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\sections_breeboker.dwg
2018/04/17 1:49 PM By: Tolleiter Limited

alt_20171005_1_adjusted STA 20+22
V.SCALE: 1" = 10'; V.E.: 10



alt_20171005_1_adjusted STA 21+03
V.SCALE: 1" = 10'; V.E.: 10



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

SECTION LEGEND

EXISTING GROUND
DESIGN GROUND

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

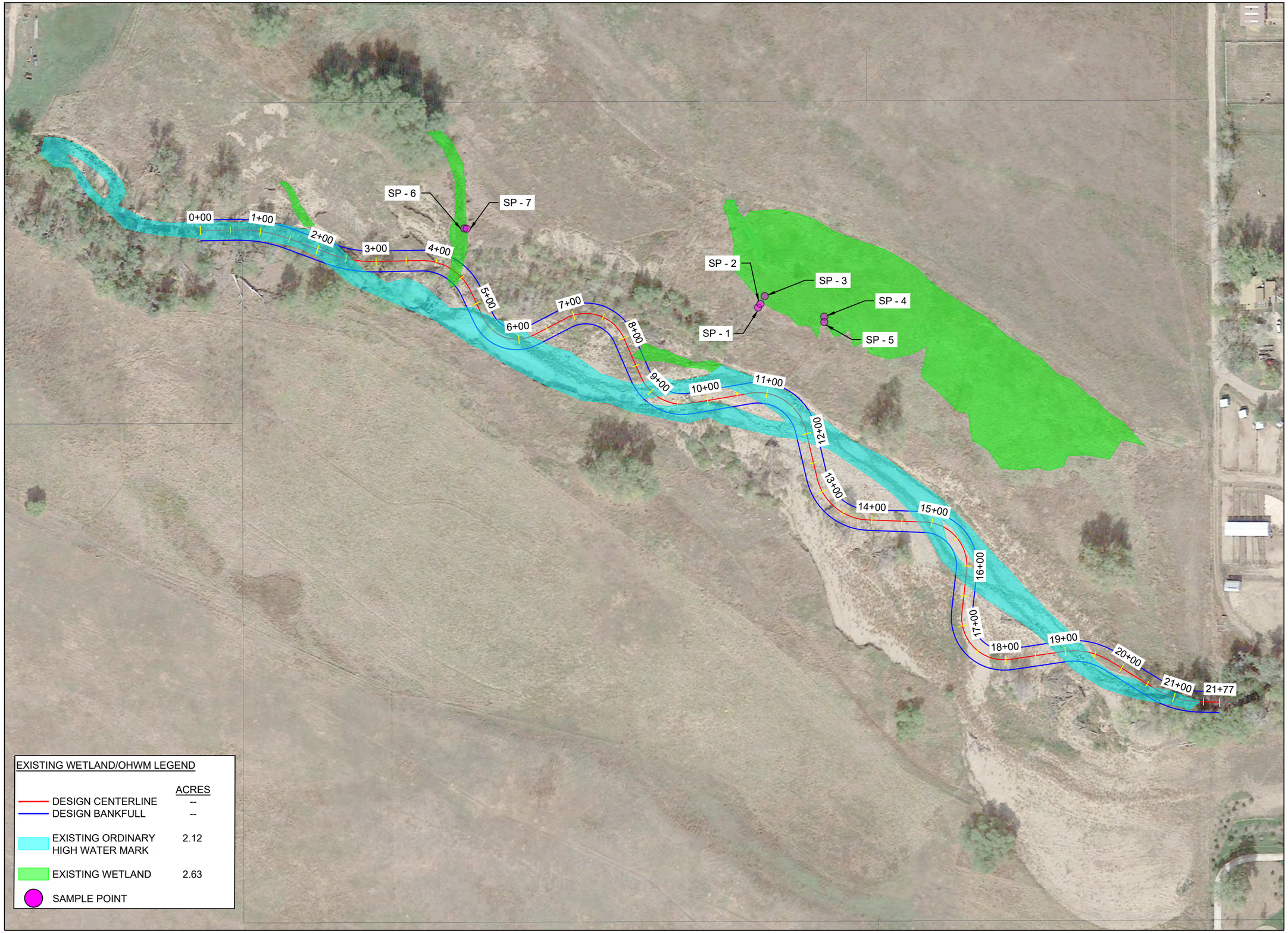
Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SECTIONS – STA 20+22 TO 21+03

Date
4/17/2018

Scale
1" = 100'

Sheet
16OF 31

E:\dropbox (5ssr)\breebaker-sorenson\CAD\sheets\sections_breebaker.dwg
2018/04/17 1:49 PM By: Tollwater Limited



General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

EXISTING WETLAND /OHWM LEGEND

- DESIGN CENTERLINE
- DESIGN BANKFULL
- EXISTING ORDINARY
- HIGH WATER MARK
- EXISTING WETLAND
- SAMPLE POINT

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

North State ENVIRONMENTAL

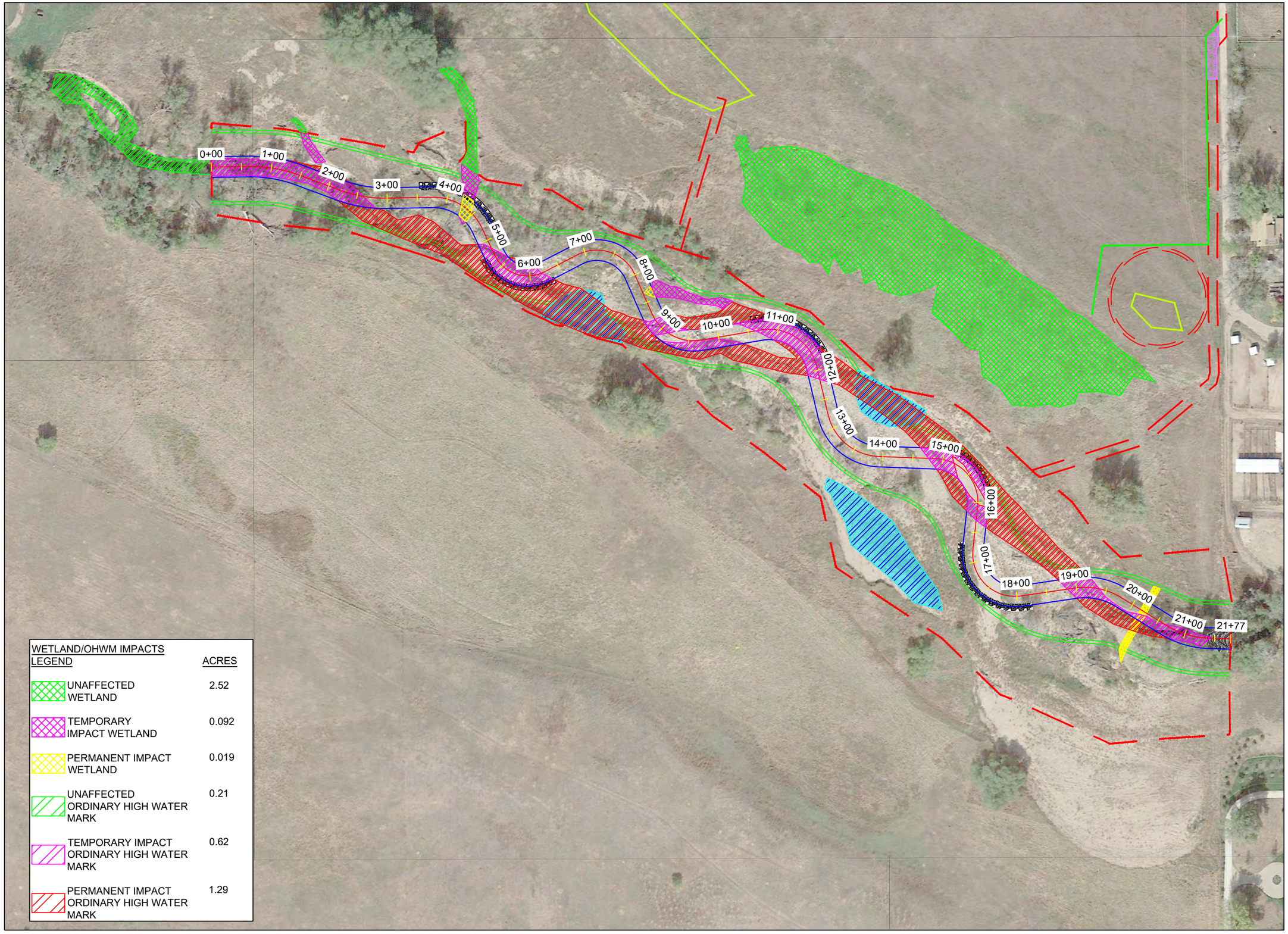
Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
MAP – EXISTING WETLANDS

Date
4/17/2018

Scale
1" = 150'

Sheet
17 OF 31

E:\dropbox (Sage)\breeboker-sorenson\CAD\sheets\wetland_breeboker.dwg
2018/04/17 1:50 PM By: Tolleiter Limited



WETLAND/OHWM IMPACTS LEGEND	ACRES
UNAFFECTED WETLAND	2.52
TEMPORARY IMPACT WETLAND	0.092
PERMANENT IMPACT WETLAND	0.019
UNAFFECTED ORDINARY HIGH WATER MARK	0.21
TEMPORARY IMPACT ORDINARY HIGH WATER MARK	0.62
PERMANENT IMPACT ORDINARY HIGH WATER MARK	1.29

General Notes

60% DESIGN NOT FOR CONSTRUCTION

N

PLAN LEGEND

- DESIGN CENTERLINE
- DESIGN INNER BERM
- DESIGN BANKFULL
- DESIGN FLOOD TERRACE
- LIMITS OF DISTURBANCE
- PARCEL
- MULCH AREA
- WETLAND DEPRESSION
- CONSTRUCTED RIFFLE
- WOOD TOE

WETLAND/OHWM IMPACTS LEGEND

- UNAFFECTED WETLAND
- TEMPORARY IMPACT WETLAND
- PERMANENT IMPACT WETLAND
- UNAFFECTED ORDINARY HIGH WATER MARK
- TEMPORARY IMPACT ORDINARY HIGH WATER MARK
- PERMANENT IMPACT ORDINARY HIGH WATER MARK

Prepared By: DAB – 5SSR

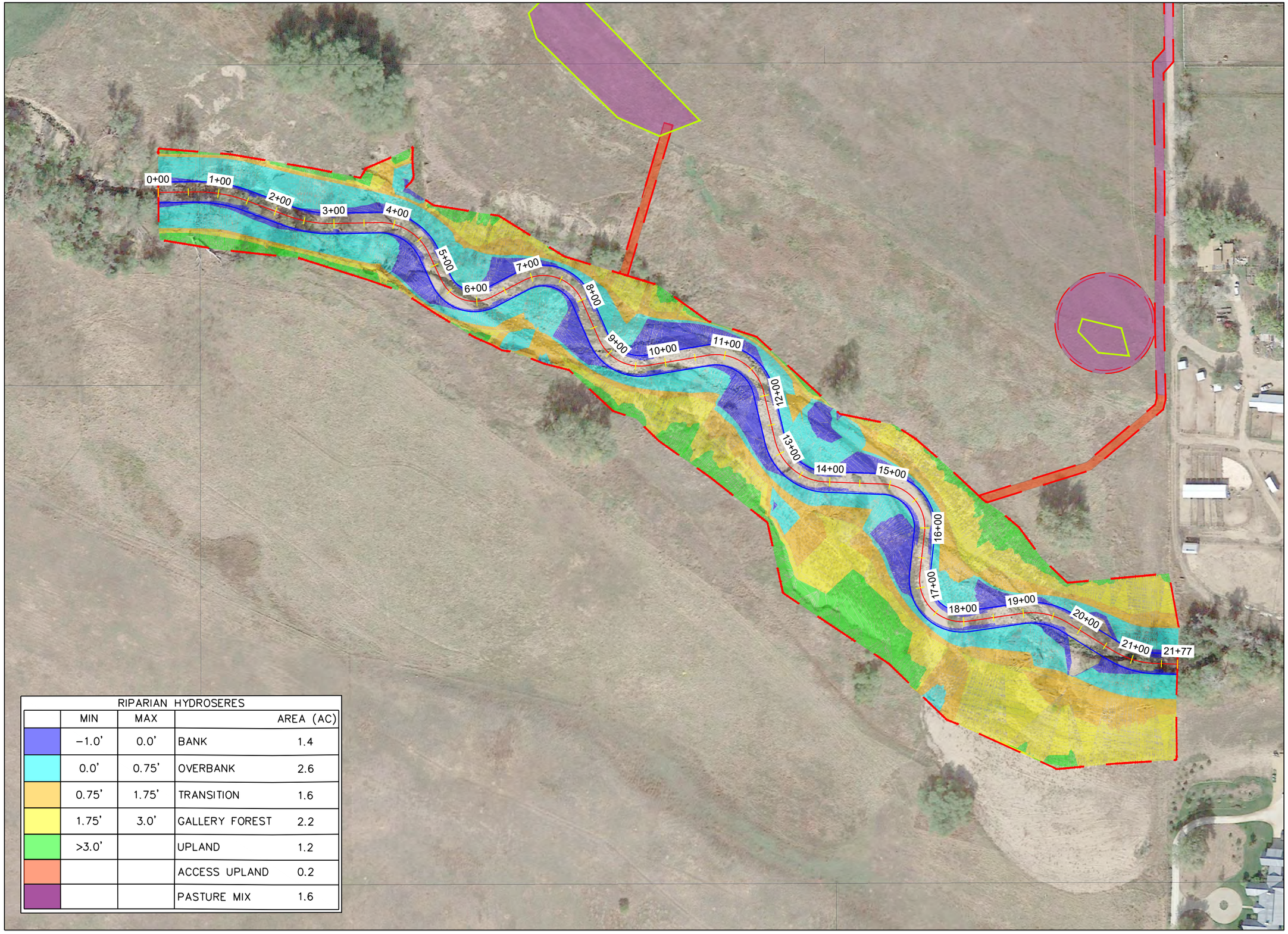
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
MAP – WETLAND/OHWM IMPACTS

Date: 4/17/2018
Scale: 1" = 150'
Sheet: 18OF 31

E:\dropbox (5ssr)\breebolar-sorenson\CAD\sheets\wetland_breebolar.dwg
2018/04/17 1:50 PM By: Tollwaller Limited



RIPARIAN HYDROSERES				
	MIN	MAX		AREA (AC)
	−1.0'	0.0'	BANK	1.4
	0.0'	0.75'	OVERBANK	2.6
	0.75'	1.75'	TRANSITION	1.6
	1.75'	3.0'	GALLERY FOREST	2.2
	>3.0'		UPLAND	1.2
			ACCESS UPLAND	0.2
			PASTURE MIX	1.6

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

N

	HYDROSERES
	BANK
	OVERBANK
	TRANSITION
	GALLERY FOREST
	UPLAND
	ACCESS UPLAND
	PASTURE MIX

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

North State ENVIRONMENTAL

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
MAP – HYDROSERES

Date	Sheet
4/17/2018	19OF 31
Scale 1" = 150'	

E:\dropbox (5ssr)\breeboker-sorenson\CAD\sheets\planlingzone_breeboker.dwg
2018/04/17 1:50 PM By: Tallwater Limited

Max Allowable Shrub Containers: 2000

Woody Plants (D60 or similar)

Scientific name	Common Name	BCPOS Bid Received Spr. 2018	Upper Bank* % in palette	Upper Bank* Total Qty per Zone	Overbank % in palette	Overbank Total Qty per Zone	Transition % in palette	Transition Total Qty per Zone	Gallery Forest % in palette	Gallery Forest Total Qty per Zone	Total
			Area (s.f.):	15246	Area (s.f.):	113256	Area (s.f.):	74052	Area (s.f.):	100188	
			Spacing (sf/plant)	190	Spacing (sf/plant)	110	Spacing (sf/plant)	110	Spacing (sf/plant)	378	
Acer negundo	BOX ELDER	90	0	0	2	20	4	30	0	0	50
Alnus incana var tenuifolia	THINLEAF ALDER	60	0	0	3	30	0	0	0	0	30
Amelanchier alnifolia	SERVICEBERRY	60	0	0	0	0	1	10	0	0	10
Amorpha fruticosa	LEADPLANT	60	0	0	2	20	1	10	0	0	30
Bedula occidentalis	WATER BIRCH	60	0	0	3	30	0	0	0	0	30
Celtis reticulata	HACKBERRY	45	0	0	1	15	4	25	0	0	40
Humulus lupulus var neomexicanus	HOPS	45	0	0	1	10	0	0	0	0	10
Populus angustifolia	NARROWLEAF COTTONWOOD	80	0	0	0	0	6	40	0	0	40
Populus deltoides var monilif	PLAINS COTTONWOOD	120	0	0	0	0	7	50	0	0	50
Prunus americana	WILD PLUM	120	0	0	0	0	4	25	30	80	105
Prunus virginiana var meland	CHOKECHERRY	150	0	0	0	0	13	90	17	45	135
Ribes aureum	GOLDEN CURRANT	60	0	0	0	0	7	50	4	10	60
Ribies cereum	WAX CURRANT	60	0	0	0	0	1	10	19	50	60
Rosa woodsii	WOOD'S ROSE	150	0	0	2	25	4	30	30	80	135
Salix amygdaloides	PEACHLEAF WILLOW	120	0	0	6	60	1	8	0	0	68
Salix bebbiana	BEBB'S WILLOW	30	0	0	2	20	1	7	0	0	27
Salix exigua	COYOTE WILLOW	940	0	0	39	400	21	140	0	0	540
Salix irrorata	BLUESTEM WILLOW	570	0	0	22	230	7	50	0	0	280
Symphorocarpos occidentalis	WESTERN SNOWBERRY	600	0	0	19	200	15	100	0	0	300
	Shrub Conatiner Subtotals:	3420	0	0	103	1060	100	675	100	265	2000

Herbaceous Wetland Plants (10ci or similar)

Scientific name	Common Name	BCPOS Bid Received Spr. 2018	Upper Bank* % in palette	Upper Bank* Total Qty per Zone	Overbank % in palette	Overbank Total Qty per Zone	Transition % in palette	Transition Total Qty per Zone	Gallery Forest % in palette	Gallery Forest Total Qty per Zone	Total
			Area (s.f.):	15246	Area (s.f.):	113256	Area (s.f.):	74052	Area (s.f.):	100188	
			Spacing (sf/plant)	42.5	Spacing (sf/plant)	69.5	Spacing (sf/plant)	175	Spacing (sf/plant)	n/a	
Asclepias incarnata	MARSH MILKWEED	90	0	0	6	90	0	0			90
Asclepias speciosa	SHOWY MILKWEED	96	5	19	4	62	4	15			96
Carex emoryi	EMORY'S SEDGE	480	39	140	21	340	0	0			480
Carex nebrascensis	NEBRASKA SEDGE	180	39	140	2	40	0	0			180
Carex pellita	WOOLLY SEDGE	180	0	0	11	180	0	0			180
Carex praegracilis	CLUSTERED FIELD SEDGE	60	0	0	4	60	0	0			60
Glyceria grandis	AMERICAN MANNAGRASS	60	17	60	0	0	0	0			60
Helianthus nuttallii	NUTTALL'S SUNFLOWER	96	0	0	6	96	0	0			96
Juncus balticus	BALTIC RUSH	288	0	0	12	188	24	100			288
Juncus torreyi	TORREY'S RUSH	60	0	0	4	60	0	0			60
Panicum virgatum	SWITCHGRASS	360	0	0	4	50	73	310			360
Spartina pectinata	PRAIRIE CORDGRASS	360	0	0	22	360	0	0			360
Verbena hastata	BLUE VERVAIN	90	0	0	6	90	0	0			90
	Herbaceous Container Subtotals:	2400	100	359	100	1616	100	425	0	0	2400

* Upper Bank: top 1/4 (elevationally) of the bank hydrosere, and adjacent 1' of so of overbank hydrosere

Willow Cuttings for Toe Wood Features

Scientific name	Common Name	BCPOS Bid Received Spr. 2018	Upper Bank* % in palette	Upper Bank* Total Qty per Zone	Overbank % in palette	Overbank Total Qty per Zone	Transition % in palette	Transition Total Qty per Zone	Gallery Forest % in palette	Gallery Forest Total Qty per Zone	Total
			Area (s.f.):	800	Area (s.f.):	800	Area (s.f.):	0	Area (s.f.):	0	
			Spacing (sf/plant)	2	Spacing (sf/plant)	2	Spacing (sf/plant)	n/a	Spacing (sf/plant)	n/a	
Salix exigua	coyote willow	n/a	80	320	80	320	0				640
Salix irrorata (as available)	bluestem willow	n/a	10	40	10	40	0				80
Salix bebbiana (as available)	Bebb's willow	n/a	10	40	10	40	0				80
										Total:	800

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Prepared By: DAB – 5SSR

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
PLANT PALETTE

Date
4/17/2018

Sheet
200F 31

Scale
NTS

E:\dropbox (5ssr)\breebaker-sorenson\CAD\sheets\planlingzone_breebaker.dwg
2018/04/17 1:50 PM By: Tollwelter Limited

Upland Mix

- upland and gallery forest hydroseres

PLS per square foot: 120
Seeding Area (Acres): 4.00 (rounded up from 3.58)
Seeding Area (s.f.): 174,240
Total Seeds/Site: 20,908,800

Scientific Name (USDA 2016)	Cultivar or Variety or Source	Common Name (USDA)	Life History	Seeds Per PLS Lb	% Mix	PLS Lbs Needed	Total Seeds/Site	Cost of Seed	Other Info	Price/ PLS Lb	Origin	Weed Content (name, % found)	Date last tested
Achillea millefolium	*var. occidentalis BCPOS as available*	Western yarrow	NPF	4400000	2	0.095	418,176	$0.00					
Achnatherum hymenoides	*RIMROCK*	Indian ricegrass	NPG-L	155000	5	6.745	1,045,440	$0.00					
Artemisia frigida		prairie sagewort	NPF	4536000	6	0.277	1,254,528	$0.00					
Bouteloua curtipendula		sideoats grama	NPG-L	159200	5	6.567	1,045,440	$0.00					
Bouteloua gracilis		blue grama	NPG-L	740000	5	1.413	1,045,440	$0.00					
Cleome serrulata		Rocky Mountain beeplant	NAF	65000	4	12.867	836,352	$0.00					
Elymus canadensis		Canada wildrye	NPG	114000	7	12.839	1,463,616	$0.00					
Elymus elymoides	*BCPOS as available*	squirreltail	NPG-L	185000	6	6.781	1,254,528	$0.00					
Elymus lanceolatus	*ssp. lanceolatus*	thickspike wheatgrass	NPG-L	135000	4	6.195	836,352	$0.00					
Elymus trachycaulus	*SAN LUIS*	slender wheatgrass	NPG-L	145000	5	7.210	1,045,440	$0.00					
Gaillardia aristata	*BCPOS as available*	blanketflower	NPF	186436	5	5.608	1,045,440	$0.00					
Helianthus annuus		common sunflower	NAF	70000	3	8.961	627,264	$0.00					
Heterotheca villosa		hairy false goldenaster	NPF	336500	5	3.107	1,045,440	$0.00					
Koeleria macrantha	*BCPOS as available*	prairie Junegrass	NPG-L	2315000	5	0.452	1,045,440	$0.00					
Monarda fistulosa	*var. menthifolia*	wild bergamot	NPF	900000	5	1.162	1,045,440	$0.00					
Pascopyrum smithii	*BCPOS OR "Arriba"*	western wheatgrass	NPG-L	118000	8	14.175	1,672,704	$0.00					
Penstemon secundiflorus	*BCPOS as available*	sidebells penstemon	NPF	500000	4	1.673	836,352	$0.00					
Poa secunda	*BCPOS as available*	Sandberg bluegrass	NPG-L	1046960	6	1.198	1,254,528	$0.00					
Ratibida columnifera	*BCPOS as available*	upright prairie coneflower	NPF	1000000	5	1.045	1,045,440	$0.00					
Rudbeckia hirta		blackeyed Susan	NBF	1600000	5	0.653	1,045,440	$0.00					
				Total:	100	99.02	20,908,800	0.00					

Riparian Mix

- top 1/4 of bank, overbank and transition hydroseres

PLS per square foot: 100
Seeding Area (Acres): 5.00 (rounded up from 4.43)
Seeding Area (s.f.): 217,800
Total Seeds/Site: 21,780,000

Scientific Name (USDA 2016)	Cultivar or Variety or Source	Common Name (USDA)	Life History	Seeds Per PLS Lb	% Mix	PLS Lbs Needed	Total Seeds/Site	Cost of Seed	Season	Price/ PLS Lb	Origin	Weed Content (name, % found)	Date last tested
Andropogon gerardii		big bluestem	NPG-L	150000	6	8.712	1,306,800	$0.00					
Sorghastrum nutans		Indiangrass	NPG-L	160000	6	8.168	1,306,800	$0.00					
Distichlis spicata		saltgrass	NPG-L	519000	7	2.938	1,524,600	$0.00					
Elymus canadensis		Canada wildrye	NPG-L	114000	8	15.284	1,742,400	$0.00					
Elymus lanceolatus	*ssp. Lanceolatus*	thickspike wheatgrass	NPG-L	135000	5	8.067	1,089,000	$0.00					
Elymus trachycaulus	*San Luis*	slender wheatgrass	NPG-L	145000	5	7.510	1,089,000	$0.00					
Glyceria grandis	*BCPOS as available*	American mannagrass	NPG-L	1280000	8	1.361	1,742,400	$0.00					
Helianthus nuttallii		Nuttall's sunflower	NPF	150000	7	10.164	1,524,600	$0.00					
Panicum virgatum		switchgrass	NPG-L	230000	8	7.576	1,742,400	$0.00					
Pascopyrum smithii	*BCPOS as available*	western wheatgrass	NPG-L	118000	6	11.075	1,306,800	$0.00					
Solidago canadensis		Canada goldenrod	NPF	4600000	7	0.331	1,524,600	$0.00					
Spartina pectinata		prairie cordgrass	NPG-L	400000	8	4.356	1,742,400	$0.00					
Sporobolus airoides		alkali sacaton	NPG-L	1600000	7	0.953	1,524,600	$0.00					
Sporobolus cryptandrus		sand dropseed	NPG-L	5600080	7	0.272	1,524,600	$0.00					
Verbena hastata	*BCPOS as available*	swamp verbena	NPF	1488000	5	0.732	1,089,000	$0.00					
				Total:	100	87.50	21,780,000	0.00					

Pasture Mix

- Access roads and staging areas within current pasture area
- 17.6 PLS lb/acre recommended for drill seeding
Mix Name: Premium Irrigated Mix #2
MIX SOURCE: Pawnee Butte Seed Company, Per BCPOS requirement

PLS per square foot: 80
Seeding Area (Acres): 1.75 (rounded up from 1.57)
Seeding Area (s.f.): 76,230.00
Cost/PLS Pound: $ 3.51

Scientific Name (USDA 2016)	Cultivar or Variety or Source	Common Name (USDA)	Life History	Seeds Per PLS Lb	% Mix	PLS Lbs Needed	[redacted]	Cost of Seed	Season	Price/ PLS Lb	Origin	Weed Content (name, % found)	Date last tested
Dactylis glomerata	orchardgrass "potomac"	orchardgrass	IPG	n/a	25.0	15.313							
Bromus inermis	meadow brome "fleet"	smooth brome	IPG	n/a	37.5	22.969							
Secale cereale variety	*Perennial Ryegrass, Tetraploid "Calibra"*	*n/a*	IG	n/a	18.75	11.484							
Secale cereale variety	*Perennial Ryegrass, Diploid "Linn"*	*n/a*	IG	n/a	18.75	11.484							
				Total:	100	61	-	$ 376.23					

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
SEED MIX

Date 4/17/2018
Scale NTS
Sheet 21OF 31

E:\dropbox (5ssr)\brebolder-sorenson\CAD\sheets\planlingtone_brebolder.dwg
2018/04/17 1:50 PM By: Tolhester Limited

REVEGETATION AND BIOENGINEERING NOTES

1. CONTAINERS (SHRUBS) LOCATED BELOW BANKFULL SHALL BE PROTECTED FROM POTENTIAL FOOT TRAFFIC WITH TWO WOOD STAKES SUCH THAT THE ABOVE GROUND PORTION OF THE STAKE IS AT LEAST AS HIGH AS THE CANOPY OF THE SHRUB CONTAINER PLANT. CONTAINERS (HERBACEOUS) SHALL NOT BE FENCED OR STAKED.
2. ALL SOIL APPLIED TO THE SITE MUST BE FREE OF COLORADO STATE NOXIOUS AND COLORADO A AND B LISTED WEED PROPAGULES, AND SHALL NOT CONTAIN MORE THAN 0.01% BY DRY WEIGHT OF CHEATGRASS (*BROMUS TECTORUM*), SMOOTH BROME (*BROMUS INERMIS*), OR CANADA THISTLE (*CIRSIUM ARVENSIS*). PROJECT ENGINEER OR THEIR REPRESENTATIVE SHALL APPROVE ALL IMPORTED SOIL AND FILL FOR WEED CONTENT BEFORE MATERIAL IS PURCHASED.
3. A SOIL TEST SHALL BE REQUIRED FOR ANY IMPORT SOILS THAT MAY BE REQUIRED. THE FOLLOWING SOIL CHEMISTRY CHARACTERISTICS MUST NOT BE EXCEEDED IN SOILS THAT BOTH RECEIVE SEED OR PLANT MATERIALS AND HAVE EITHER BEEN AMENDED:
   a. SOIL PH SHALL BE BETWEEN 6 AND 8.
   b. SOIL ELECTRICAL CONDUCTIVITY (MMHOS/CM SOLUBLE SALTS) SHALL BE LESS THAN 7.
   c. SODIUM ABSORPTION RATIO SHALL BE LESS THAN 8.
   d. SOIL ORGANIC MATTER SHALL BE BETWEEN 4% AND 10% BY DRY WEIGHT. THE DESIRED PORTION OF RECALCITRANT ORGANIC MATTER IS BETWEEN 20% AND 50% BY DRY WEIGHT.
   e. IN GENERAL, NITROGEN SUPPLEMENTING IS NOT RECOMMENDED FOR NATIVE PLANT RESTORATION, EXCEPT IN VERY SMALL QUANTITIES WHEN A DEFICIENCY IN NATIVE OR IMPORTED TOPSOIL IS NOTED. BASED ON THE SOIL TEST, NITROGEN ADDITIONS MAY BE REQUIRED BY THE PROJECT ENGINEER.
   f. IN SEEDED AREAS, IF IMPORTED TOPSOIL IS DEFICIENT IN NITROGEN AND LOW IN ORGANIC MATTER, SOIL AMENDMENTS USED SHALL INCLUDE BIOSOL (300-400 LBS/ACRE) AND HUMATE (300-500 LBS/ACRE) OR SIMILAR. COMPOST MAY ALSO BE MIXED WITH NATIVE SOIL TO MEET ORGANIC CONTENT REQUIREMENTS, ONLY IF THE RESULTANT TOPSOIL MEETS THE ABOVE SOIL CHEMISTRY CRITERIA.
4. ALL SEED MUST BE INSPECTED BY THE CONTRACTOR PRIOR TO INSTALLATION, AND ALL TAGS MUST BE MAINTAINED FOR DOCUMENTATION. ALL SEED MUST BE LABELED AS "CERTIFIED" BY THE COLORADO SEED GROWERS ASSOCIATION, AND SHALL NOT INCLUDE THE PRESENCE OF NOXIOUS OR INVASIVE SPECIES PROHIBITED UNDER THE COLORADO SEED ACT. SEED MUST BE FREE OF COLORADO STATE NOXIOUS AND COLORADO A AND B LISTED WEED PROPAGULES, AND SHALL NOT CONTAIN MORE THAN 0.01% BY DRY WEIGHT OF CHEATGRASS (*BROMUS TECTORUM*), SMOOTH BROME (*BROMUS INERMIS*), OR CANADA THISTLE (*CIRSIUM ARVENSIS*). PROJECT ENGINEER OR THEIR REPRESENTATIVE SHALL APPROVE ALL SEED MIXES FOR WEED CONTENT AND SUBSTITUTIONS BEFORE SEED IS PURCHASED. SEED IDENTIFICATION AND CERTIFICATION TAGS, SHALL BE PROVIDED TO THE PROJECT MANAGER FOR REVIEW AND APPROVAL PRIOR TO USE.
5. ALL SEED, AND SOIL AMENDMENTS MUST BE APPROVED BY BCPOS ECOLOGIST.
6. SEEDING SHALL BE BROADCAST AT RATES LISTED IN SEED MIX, RAKED INTO THE SOIL SURFACE TO A DEPTH OF BETWEEN 0.25 AND 0.5 INCHES DEEP, AND COVERED WITH MULCH AT A RATE THAT ATTAINS 70% SOIL COVERAGE AND IS NO DEEPER THAN 1".
7. THE SEED MIXES SHALL BE APPLIED TO AREAS AS SHOWN ON THE PLAN SET.
8. WOOD SHRED HAS BEEN PROVIDED BY BCPOS TO BE USED ON SEEDED AND PLANTED AREAS, WHERE SLOPES ARE LESS THAN 30% STEEP, AS MATERIAL IS AVAILABLE. ALL OTHER SEEDED AND PLANTED AREAS ABOVE BANKFULL ELEVATION SHALL BE MULCHED USING WOOD STRAW OR WOOD SHRED SHALL. IF WOOD SHRED IS USED, IT SHALL CONTAIN A DIVERSITY OF WOOD FIBER LENGTHS, WITH LESS THAN 10% FINES (I.E., LESS THAN 2" IN LENGTH). IF APPROVED BY THE BCPOS, ALTERNATIVE WEED-FREE AND WIND RESISTANT MULCH MAY BE USED.
9. THE PLACEMENT OF SURFACE MULCH OVER SEEDED AREAS SHALL OCCUR A MAXIMUM OF 7 DAYS AFTER SEEDING. EACH SHRUB OR TREE PLANTING SHALL BE TREATED WITH MULCH ACCORDING TO TYPICAL DETAILS. MULCH SHALL BE KEPT 1-2 INCHES AWAY FROM STEMS OF SHRUBS AND TREES. HERBACEOUS PLANTS SHALL NOT BE MULCHED EXCEPT WHERE INDICATED IN THE PLAN SET.
10. CERTIFIED WEED-FREE MULCH SHALL BE USED IN ALL SITUATIONS. PROPER LABELING FOR EACH BALE OR LOT OF MULCH USED IS REQUIRED. PROJECT MANAGER HAS THE RIGHT TO INSPECT AND REJECT BALES IF THEY ARE SUSPECTED TO CONTAIN UNACCEPTABLE WEED CONTENTS. SPECIFICALLY, SMOOTH BROME (*BROMUS INERMIS*), CHEATGRASS (*BROMUS TECTORUM*), CANADA THISTLE (*CIRSIUM ARVENSIS*), KOCHIA (*KOCHIA SCOPARIA*), AND OTHER AGGRESSIVE EXOTIC PLANT SPECIES SHALL NOT BE PRESENT IN MULCHES USED FOR THE PROJECT. A RESTORATION ECOLOGIST OR BOTANIST SHOULD BE CONSULTED WHEN REVIEWING THE WEED-FREE MULCH PRODUCT. A LIST OF POTENTIAL WEEDS PRESENT IN THE MULCH AND THE PRODUCT INFORMATION SHALL BE PROVIDED TO THE PROJECT MANAGER AND PROJECT DESIGNER FOR REVIEW AND APPROVAL PRIOR TO USE. HAY, REGARDLESS OF THE SOURCE, SHALL NOT BE USED AS A MULCH.
11. CONTAINERS (HERBACEOUS AND WOODY) SHALL BE PLANTED AS DIRECTED BY BCPOS AND THE PROJECT RIPARIAN ECOLOGIST.
12. EACH PLANT CONTAINER (OR TRAY OF PLANTS) MUST CONTAIN A LABEL IDENTIFYING THE SPECIES IN THE CONTAINER. LABELS SHALL BE LEFT WITH THE PLANT AND BE AVAILABLE FOR INSPECTION BY THE PROJECT MANAGER AND PROJECT DESIGNER PRIOR TO INSTALLATION, AND MUST BE KEPT IN THE GROUND FOLLOWING TRANSPLANTING, FOR FOLLOW-UP IDENTIFICATION.
13. ECOTYPIC (I.E., SOURCED FROM GENETICALLY LOCAL POPULATIONS) PLANT MATERIALS ARE REQUIRED WHEN AVAILABLE. REFER TO THE PLANT MATERIALS YELLOW PAGES (WWW.SYNERGY3.ORG) FOR A LIST OF VENDORS WHO CARRY ECOTYPIC PLANT MATERIALS IN COLORADO. WHEN ECOTYPES ARE NOT AVAILABLE, SITE ADAPTED CULTIVARS MAY BE APPROVED BY THE PROJECT MANAGER IF THEY ARE SUITED TO THE UNIQUE CONDITIONS OF THE SITE. FOR THE PURPOSES OF THIS PROJECT, ECOTYPES ARE THOSE WHOSE ORIGIN (CUTTINGS, SEEDS, OR BERRIES) MEETS THE FOLLOWING CRITERIA. MATERIAL IS SOURCED NOT MORE THAN 1,000 FEET HIGHER OR LOWER (AND PREFERENTIALLY NOT MORE THAN 500 FEET HIGHER OR LOWER) IN ELEVATION THAN THE WORK SITE, AND NOT MORE THAT 100 MILES NORTH OR SOUTH OF THE WORK SITE.
14. SHRUBS AND TREES PLANTED AS CONTAINER STOCK OR BARE-ROOT STOCK SHALL BE SURROUNDED BY A PLANTING DEPRESSION, INCLUDING AN IRRIGATION BERM, OF 2" DEEP AT THE CENTER OF THE DEPRESSION, AND 18" IN DIAMETER FROM BERM TO BERM.
15. DUE TO THE POOR CONDITION OF SUBSTRATE IN WHICH CONTAINER STOCK WILL BE INSTALLED, AMENDED BACKFILL (APPROVED LOAM WITH BETWEEN 20-40% ORGANIC MATTER BY VOLUME) SHALL BE PLACED AROUND THEIR ROOT BALLS TO A WIDTH AT LEAST TWICE THE DIAMETER OF THE ROOT BALL AND TO A DEPTH OF AT LEAST ONE QUARTER THE DEPTH OF THE ROOT BALL. AMENDED BACKFILL SHALL BE TAMPED MODERATELY TO REMOVE AIR POCKETS AND WATERED THOROUGHLY WHILE BACKFILLING AROUND THE ROOT BALL. SHALL COVER THE ROOT BALL WHEN ROOTS ARE EXPOSED ON THE UPPER SURFACE OF ROOT BALL.
16. CUTTINGS SHALL BE INSTALLED WITHIN AREAS LABELED AS BANK OR OVERBANK HYDROSERES (I.E. ZONES), OR AS INDICATED IN THE PLAN SET. THESE LOCATIONS ARE GENERALLY AT OR NEAR BANKFULL ELEVATION. CUTTINGS SHALL BE COTTONWOODS OR WILLOWS, AS SPECIFIED IN THE "PLANTING PALETTE" OF THIS PLAN SET. WILLOW CUTTINGS SHALL BE INSTALLED AT A FREQUENCY INDICATED IN THE "PLANTING SCHEDULE". HARVESTING AND INSTALLATION OF CUTTINGS (WILLOW/COTTONWOOD) SHALL FOLLOW THE "FIELD GUIDE FOR HARVESTING AND INSTALLING WILLOW AND COTTONWOOD CUTTINGS" (WWW.SYNERGY3.ORG). CUTTINGS SHALL BE ECOTYPES HARVESTED FROM NATIVE POPULATIONS.
17. SOIL LIFTS, JOINT PLANTING, AND OTHER BIOENGINEERING TREATMENTS SHALL FOLLOW TYPICAL DETAILS OF THE PLAN SET.
18. IF STRAW MULCH OR STRAW BALE BARRIERS ARE USED, ALL STRAW MUST BE CERTIFIED WEED-FREE. HAY CANNOT BE USED AS IT CONTAINS AGGRESSIVE PASTURE GRASS SEED. STRAW MULCH TO BE USED IN THE RESEEDED PASTURE AREAS.

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

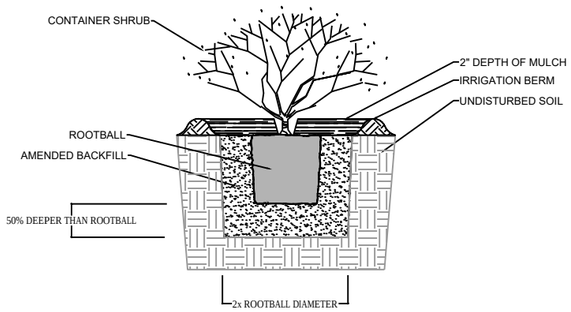
No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
NOTES – REVEGETATION AND BIOENGINEERING

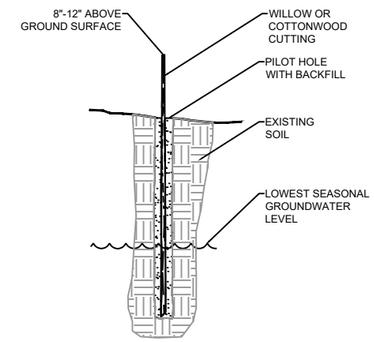
Date 4/17/2018
Scale NTS
Sheet 220F 31

E:\dropbox (Sesc)\breebaker-sorenson\CAD\sheets\planlingzone_breebaker.dwg
2018/04/17 1:50 PM By: Tolmeter Limited



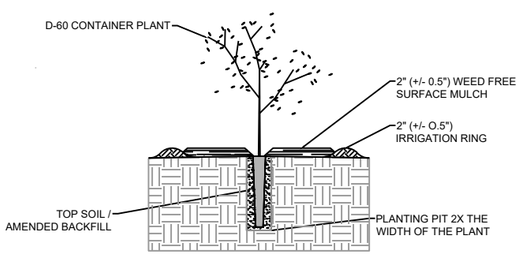
SHRUB PLANTING
CROSS SECTION — NOT TO SCALE

NOTE:
1. BROKEN OR CRUMBLING ROOT-BALLS WILL BE REJECTED
2. CARE SHOULD BE TAKEN NOT TO DAMAGE THE SHRUB OR ROOT-BALL WHEN REMOVING IT FROM ITS CONTAINER
3. BACKFILL AROUND ROOT-BALL WITH SOIL THAT DOES NOT EXCEED SPECIFICATIONS IN THE RESTORATION NOTES
4. EXCAVATE PLANTING PIT 2X THE DIAMETER OF THE ROOTBALL AND 50% DEEPER THAN THE ROOTBALL
5. ADD BACKFILL AROUND ROOTBALL IN 2" LIFTS, WATERING EACH LIFT THOROUGHLY BEFORE APPLYING THE NEXT LIFT
6. ADD 2" DEPTH OF MULCH TO COVER AN 18" AREA OF THE GROUND/DRIPLINE, NO MULCH WITHIN 1" OF THE TRUNK
7. USE PART OF THE EXCAVATED SOIL TO BUILD AN IRRIGATION BERM AT THE EDGE OF THE DRIPLINE, ABOUT 1-2" HIGH AND 3-4" WIDE AT THE BASE. IMPORT SOIL AS NEEDED FROM NEARBY HARVEST SITES



WILLOW AND COTTONWOOD CUTTING
CROSS SECTION — NOT TO SCALE

1. ALL WILLOW AND COTTONWOOD CUTTINGS SHALL BE SOUND, HEALTHY SPECIMENS. PLANT MATERIALS THAT HAVE SERIOUS INJURIES, INSECT PESTS, DISEASES OR ARE DRY, WILL BE REJECTED.
2. IF HARVESTED, CUTTINGS SHALL BE OBTAINED FROM APPROVED SOURCES USING A SHARP TOOL. CUTTINGS SHALL BE LONG ENOUGH IN LENGTH TO REACH A DEPTH OF 6" INTO THE GROUND WATER DURING THE DRIEST TIMES OF THE YEAR.
3. CUTTINGS SHALL HAVE A BASAL END OF 0.5 TO 1.5 INCHES IN DIAMETER. THE TOP ENDS SHALL BE BLUNT; BUTT ENDS SHALL BE ANGLED AT 45 DEGREES. THEY SHALL BE STRIPPED OF ALL BUT TWO TO THREE HEALTHY TERMINAL STEMS.
4. THE CONTRACTOR SHALL PROVIDE FOR THE PROPER CARE, STORAGE, AND HANDLING OF THE CUTTINGS. DURING ALL STAGES OF CONSTRUCTION, THE CUTTINGS SHALL BE PROTECTED FROM EXPOSURE TO WIND AND DIRECT SUNLIGHT.
5. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL FLAG ALL PLANTING LOCATIONS FOR APPROVAL BY THE OWNER'S REP. ADJUSTMENTS TO THESE LOCATIONS MAY BE REQUIRED TO MEET FIELD CONDITIONS.
6. IF CUTTINGS CANNOT BE INSTALLED DIRECTLY TO THE REQUIRED DEPTH DUE TO SOIL CONDITIONS, A DIBBLE BAR, AUGER, OR OTHER TOOL SHALL BE USED TO CREATE A PILOT HOLE. THE HOLE MUST BE BACKFILLED AND WATERED SO NO AIR POCKETS EXIST AROUND THE CUTTING.



D-60 CONTAINER PLANTING
CROSS SECTION — NOT TO SCALE

NOTE:
1. BROKEN OR CRUMBLING ROOT-BALLS WILL BE REJECTED
2. CARE SHOULD BE TAKEN NOT TO DAMAGE THE SHRUB OR ROOT-BALL WHEN REMOVING IT FROM ITS CONTAINER
3. BACKFILL AROUND ROOT-BALL WITH SOIL THAT DOES NOT EXCEED SPECIFICATIONS IN THE RESTORATION NOTES
4. EXCAVATE PLANTING PIT 2X THE DIAMETER OF THE ROOTBALL AND 50% DEEPER THAN THE ROOTBALL
5. ADD BACKFILL AROUND ROOTBALL IN 2" LIFTS, WATERING EACH LIFT THOROUGHLY BEFORE APPLYING THE NEXT LIFT
6. ADD 2" DEPTH OF MULCH TO COVER AN 18" AREA OF THE GROUND/DRIPLINE, NO MULCH WITHIN 1" OF THE TRUNK
7. USE PART OF THE EXCAVATED SOIL TO BUILD AN IRRIGATION BERM AT THE EDGE OF THE DRIPLINE, ABOUT 1-2" HIGH AND 3-4" WIDE AT THE BASE. IMPORT SOIL AS NEEDED FROM NEARBY HARVEST SITES

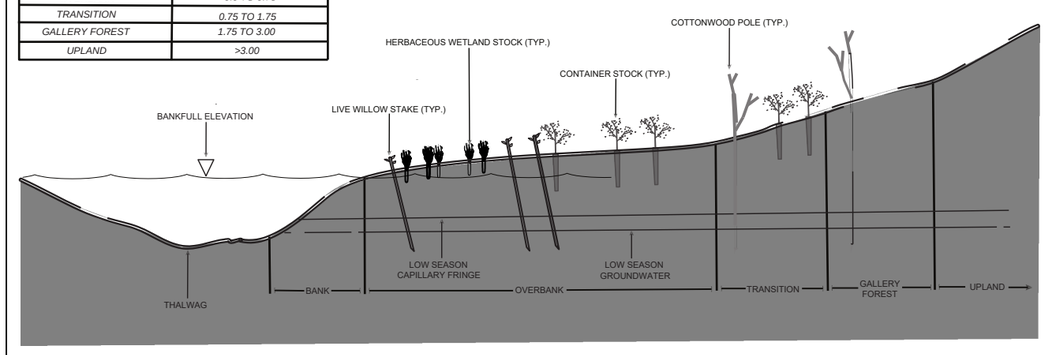
Irrigation Schedule: Brewbaker-Sorensson

	Waterings Per Month (spread equally across the month)									
Hydrosere	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Containers
Overbank (upper half)*	1	1	1	2	4	4	2	1	1	800
Transition	1	2	2	2	6	6	4	2	1	675
Totals:	2	3	3	4	10	10	6	3	2	

Gallons/Plant/Watering: [illegible]
Gallons/Year (Overbank): [illegible]
Gallons/Year (Transition): [illegible]

* The upper elevations of the overbank hydrosere (approx. 0.35 to 0.75 above bankfull/N-GW)

BREWBAKER SORENSSON - 60% HYDROSERE DESIGN	
HYDROSERE	RELATIVE TO BANKFULL (FT)
BANK	*-1.0 TO 0.0*
OVERBANK	*0.0 TO 0.75*
TRANSITION	*0.75 TO 1.75*
GALLERY FOREST	*1.75 TO 3.00*
UPLAND	*>3.00*



HYDROSERES
CROSS SECTION (TYPICAL) — NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET
Sheet Title:
LANDSCAPING DETAILS

Date: 4/17/2018
Scale: NTS
Sheet: 23OF 31

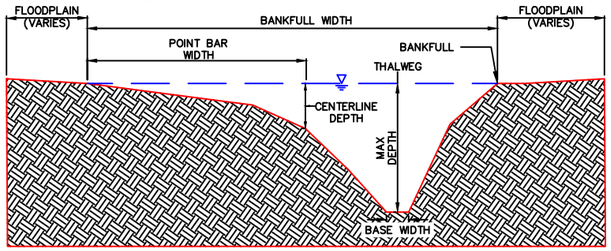
E:\dropbox (5ssr)\brewbaker-sorenson\CAD\sheets\planlingzone_brewbaker.dwg
2018/04/17 1:50 PM By: Tollwelter Limited

STREAM MORPHOLOGY LEFT HAND CREEK

TYPICAL SECTION – POOL RIGHT (A)

NOT TO SCALE

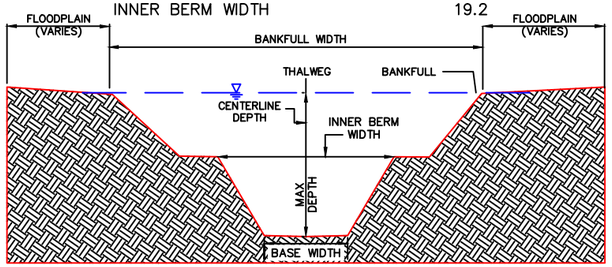
DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	37.9
POINT BAR WIDTH	14
MAX DEPTH	6.1
BASE WIDTH	4.4
CENTERLINE DEPTH	4.1



TYPICAL SECTION – RIFFLE (B)

NOT TO SCALE

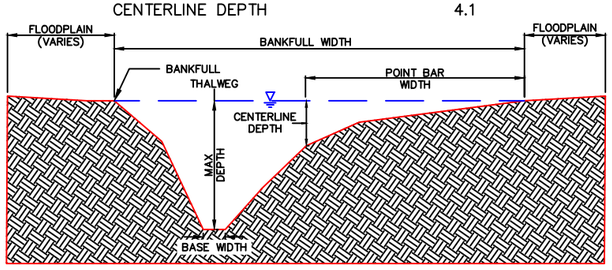
DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	34.5
MAX DEPTH	3.45
BASE WIDTH	7
INNER BERM DEPTH	1.3
INNER BERM WIDTH	19.2



TYPICAL SECTION – POOL LEFT (C)

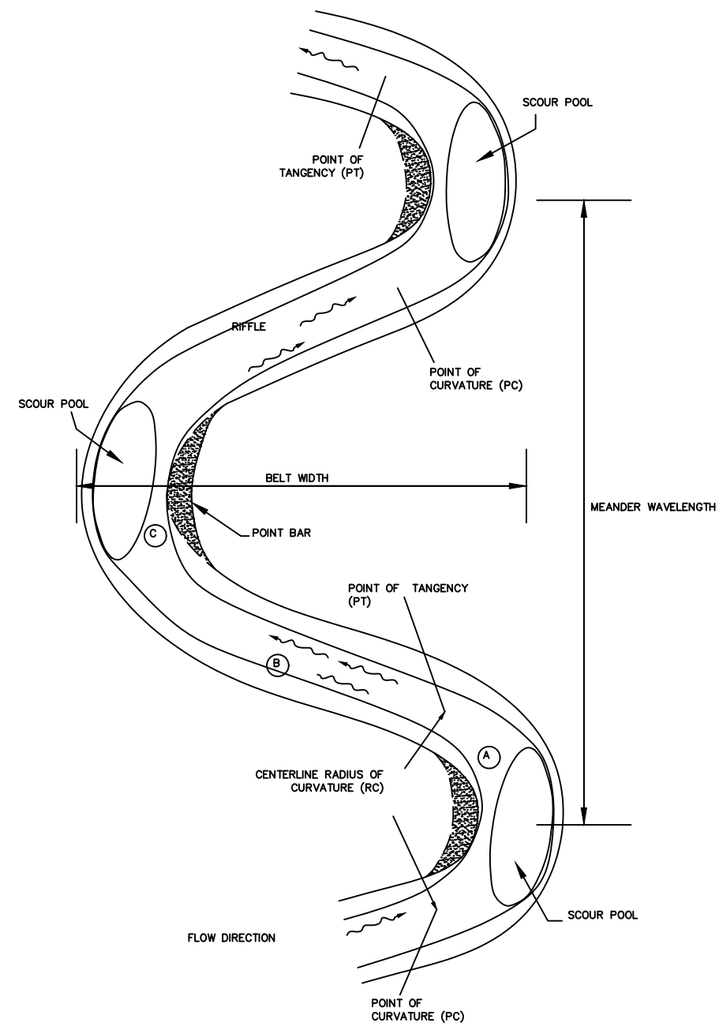
NOT TO SCALE

DESIGN PARAMETERS	SIZE (FT)
BANKFULL WIDTH	37.9
POINT BAR WIDTH	14
MAX DEPTH	6.1
BASE WIDTH	4.4
CENTERLINE DEPTH	4.1



STREAM LAYOUT TYPICAL

NOT TO SCALE



Stream name	LEFT HAND CREEK		
Stream type			
Drainage area, DA (sq mi)	61.7		
Design Parameters	Minimum	Median	Maximum
Mean riffle depth, dbkf (ft)		2.0	
Riffle width, Wbkf (ft)		34.5	
Width–to–depth ratio, [Wbkf/dbkf]		17	
Riffle cross–section area, Abkf (sq ft)		70.0	
Max riffle depth, dmbkf (ft)		3.45	
Pool width, Wbkfp (ft)		37.9	
Pool cross–section area, Abkfp (sq ft)		100.5	
Max pool depth, dmbkfp (ft)		6.1	
Entrenchment ratio, ER [Wfpa/Wbkf]	4.4	--	>17
Bankfull discharge, Qbkf (cfs)		350	
Meander length, Lm (ft)	36	90	144
Belt width, Wblt (ft)	61.2	93.6	126
Radius of curvature, Rc (ft)	36	81	126
Pool–to–pool spacing, p–p (ft)	150	182	213
Valley slope, VS (ft/ft)	0.0050		
Water Surface Slope, WS (ft/ft)	0.0012		
Sinuosity, k = SL/VL (ft/ft)	1.165		

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

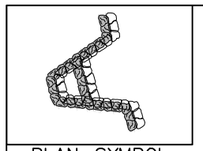
DETAIL – STREAM MORPHOLOGY

Date 4/17/2018

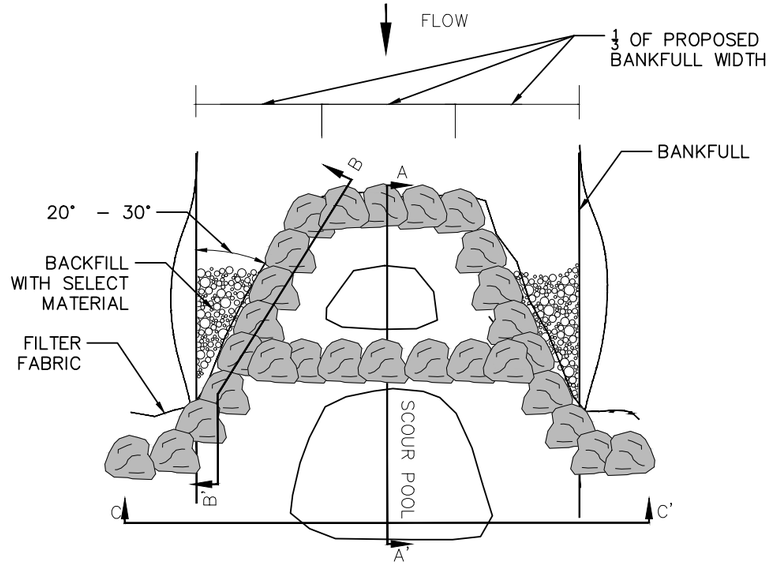
Scale NTS

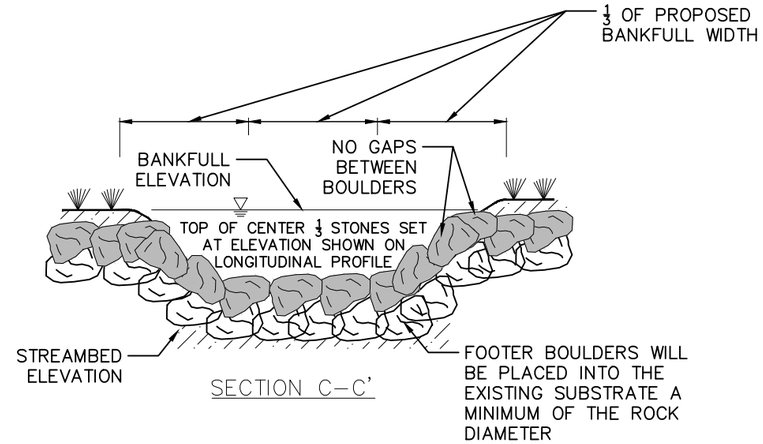
Sheet 24OF 31

E:\dropbox (Geary)\brewbaker-sorenson\CAD\sheets\dtl_brewbaker.dwg
2018/04/17 1:50 PM By: Tallwater Limited

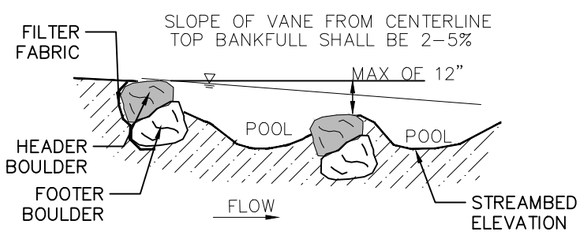


PLAN–SYMBOL

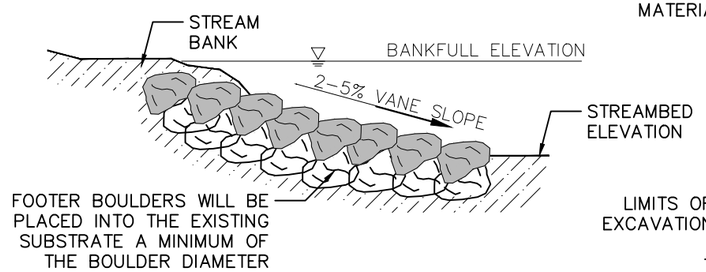




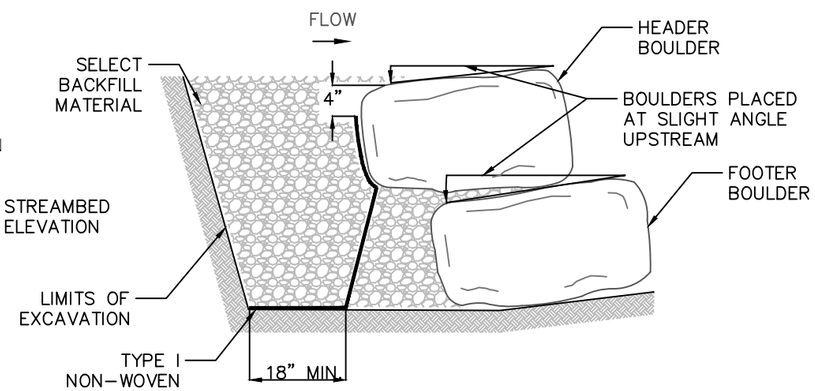
SECTION C–C'



SECTION A–A'



SECTION B–B'



GEOTEXTILE PLACEMENT

NOTES:

1. POTENTIAL ALTERNATIVE TO CONSTRUCTED RIFFLE
2. ALL STONES ARE TO BE STRUCTURE STONE.
3. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER AND PLUGGING WITH STRUCTURE STONE CLASS A AND SELECT MATERIAL OR CHINKING STONE APPROVED BY THE ENGINEER, AND LINING WITH FILTER FABRIC.
4. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.
5. NSE WILL FIT BOULDERS TIGHTLY.
6. FOOTER BOULDERS AND VANE BOULDERS SHALL BE 1–2 TONS MINIMUM AND NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
7. SLOPE OF VANE FROM CENTERLINE TO THE TOP OF THE VANE ARM SHALL BE 2–5%.
8. THERE SHALL BE NO DROP GREATER THAN 6".
9. THE ELEVATION OF EACH GRADE CONTROL STRUCTURE SHOULD BE EQUAL TO OR GREATER THAN THE ELEVATION OF THE TOP OF THE FOOTER ROCKS DIRECTLY UPSTREAM.
10. FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
11. FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY UPSTREAM.

DETAIL – ROCK CROSS VANE
NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

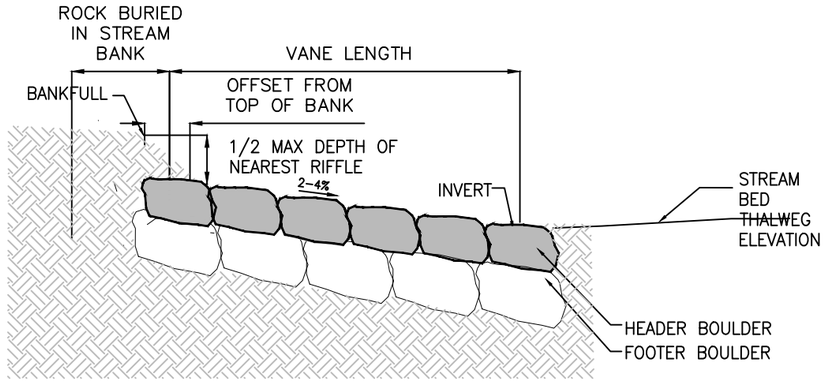
Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

DETAIL – CROSS–VANE

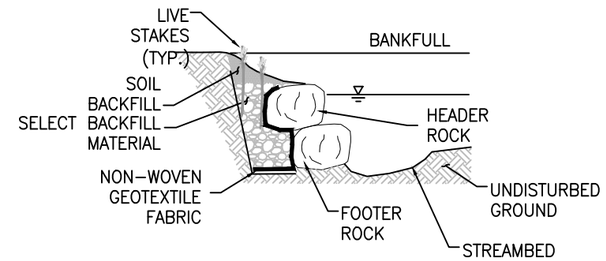
Date	Sheet
4/17/2018	25OF 31
Scale NTS	

E:\dropbox (Geary)\brewbaker-sorenson\CAD\sheets\dtl_brewbaker.dwg
2018/04/17 1:50 PM By: Tallmeter Limited

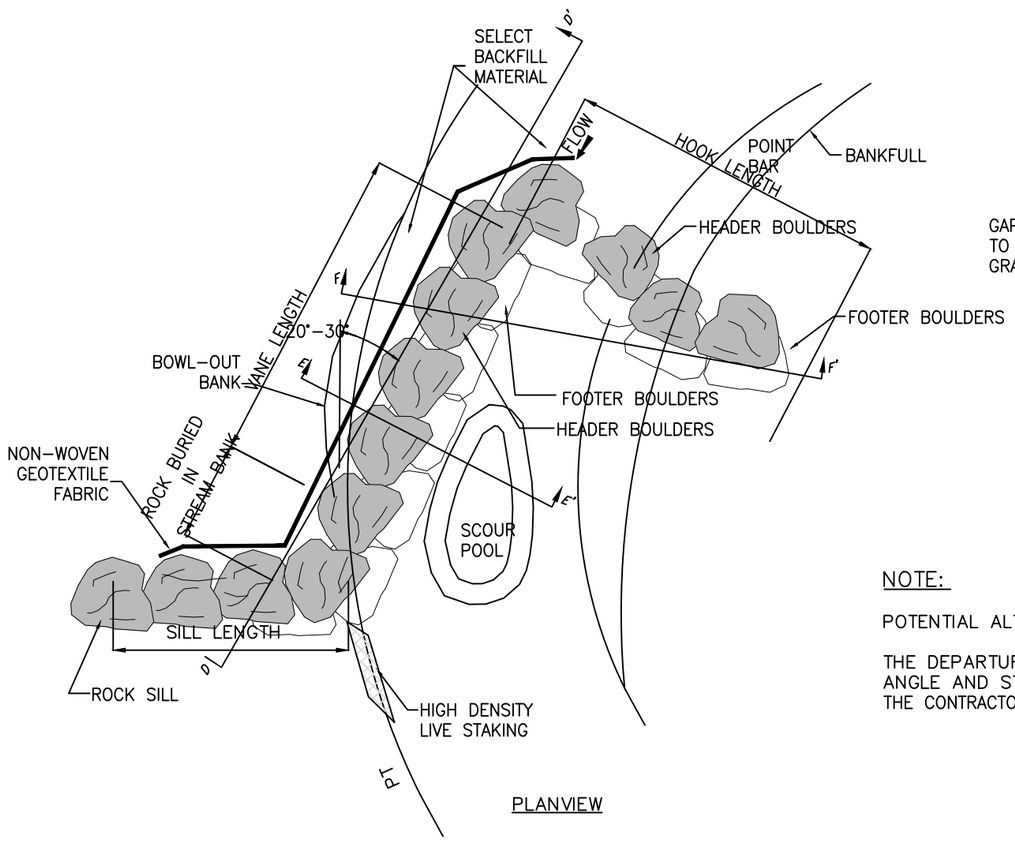
PLAN–SYMBOL



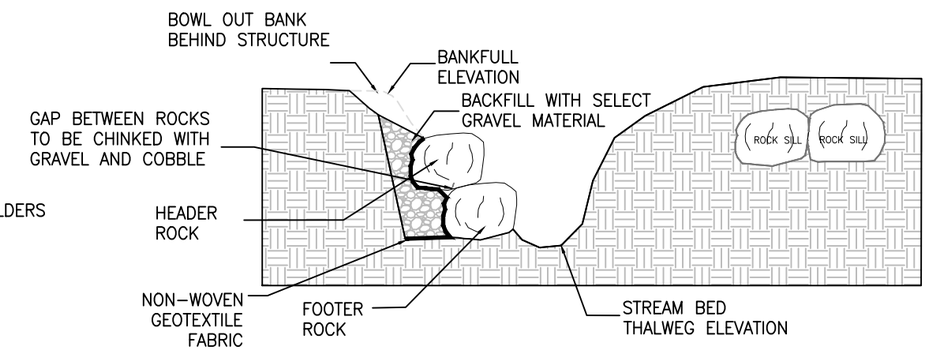
SECTION D–D'



SECTION E–E'



PLANVIEW



SECTION F–F'

NOTE:

POTENTIAL ALTERNATIVE TO WOOD TOE.

THE DEPARTURE ANGLE SHOWN ABOVE IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE AND STRUCTURE LOCATION SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE AND LN3 FILE.

DETAIL – ROCK J–HOOK
NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

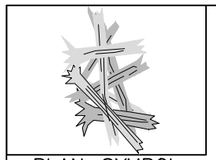
Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

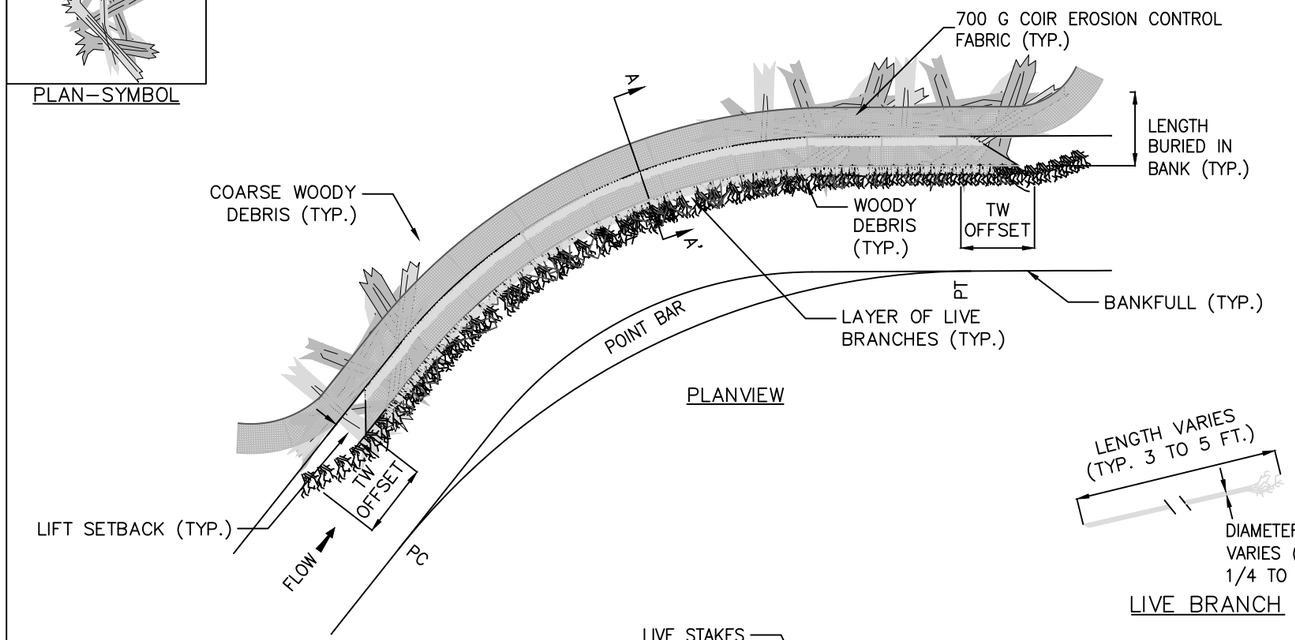
DETAIL – J–HOOK

Date	Sheet
4/17/2018	26OF 31
Scale NTS	

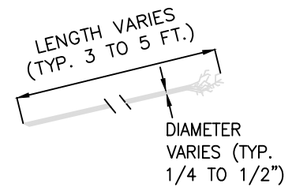
E:\dropbox (Sser)\brewbaker-sorenson\CAD\sheets\dtl_brewbaker.dwg
2018/04/17 1:30 PM By: Tailwater Limited



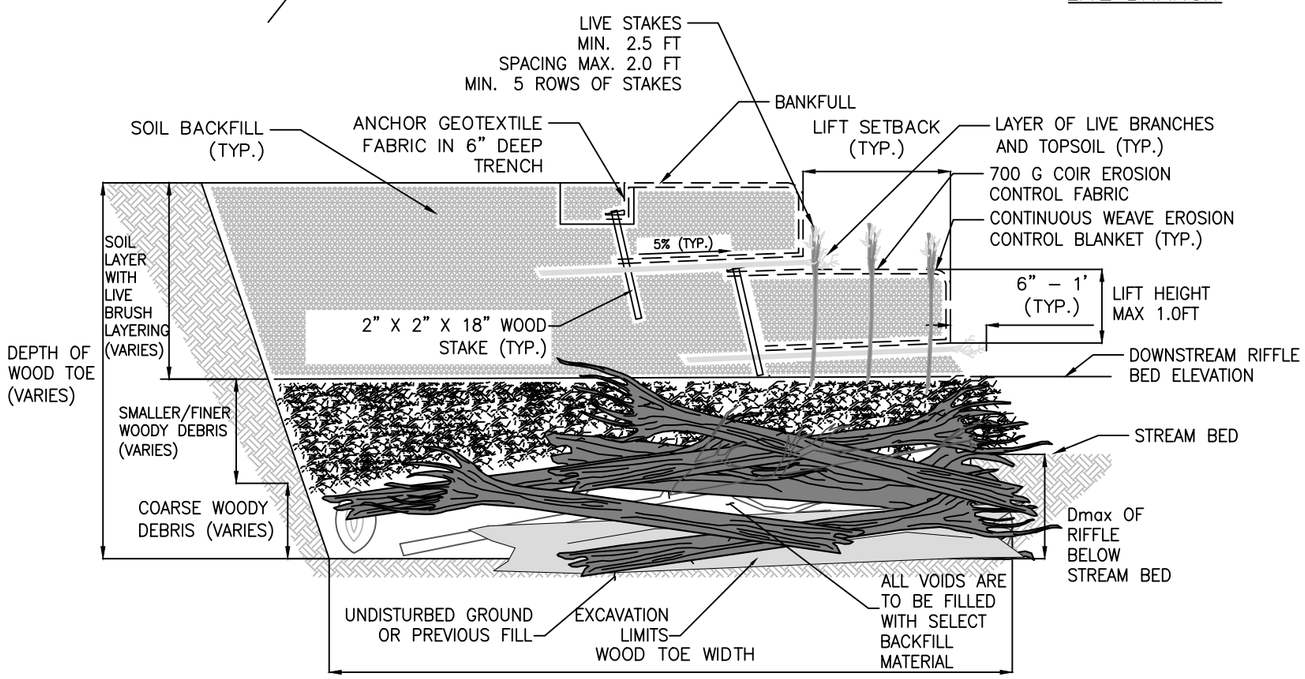
PLAN–SYMBOL



PLANVIEW



LIVE BRANCH



SECTION A–A'

DETAIL – WOOD TOE
NOT TO SCALE

NOTES:

1. COARSE WOODY DEBRIS SHALL CONSIST OF LOGS, ROOTWADS, AND LARGE BRANCHES NOT SUITABLE FOR CONSTRUCTION OF LOG STRUCTURES. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER.
2. COARSE WOODY DEBRIS SHALL BE CONSTRUCTED WITH THE LARGEST MATERIAL PLACED FIRST. NO LOGS SHALL BE PLACED PARALLEL TO THE FLOW OF WATER, UNLESS DIRECTED BY THE ENGINEER. LOGS SHALL BE PLACED IN A CROSSING PATTERN OR WEAVE SUCH THAT EACH LOG IS ANCHORED BY ANOTHER LOG.
3. SMALL/FINE WOODY DEBRIS SHALL CONSIST OF MEDIUM TO SMALL LIMBS, BRANCHES, BUSHES, AND/OR LOGS. INVASIVE SPECIES SHALL NOT BE USED.
4. SMALL/FINE WOODY DEBRIS SHALL BE PLACED ABOVE THE COARSE WOODY DEBRIS WITH THE LARGEST MATERIAL BEING PLACED FIRST AND THE SMALLEST MATERIAL PLACED LAST.
5. ALL WOODY DEBRIS SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET IN ORDER TO REDUCE THE PRESENCE OF VOIDS IN THE SMALL/FINE WOODY DEBRIS LAYER.
6. THE HORIZONTAL LOCATIONS OF ALL WOODY DEBRIS ARE LOCATED ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE. NO LOCATIONS OF WOODY DEBRIS SHALL VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE ENGINEER.
7. GRAVEL LEVELING BASE SHALL BE INSTALLED ABOVE THE HIGHEST ELEVATION OF THE WOODY DEBRIS BEFORE THE SOIL LIFTS ARE INSTALLED. THE D50 OF THE GRAVEL BASE MUST BE GREATER THAN 22 MM.
8. THE SOIL BACKFILL USED FOR LIFTS AND TOPSOIL FROM ON SITE, WITHIN THE LIMITS OF DISTURBANCE, USED FOR LAYERING WITH THE LIVE BRANCHES SHALL BE FREE OF ANY LARGE ROOTS OR WOODY DEBRIS AND SHALL GENERALLY BE FREE FROM ANY GRAVEL OR COBBLE MATERIAL.
9. SOIL BACKFILL SHALL BE COMPACTED SUCH THAT FUTURE SETTLING WILL BE KEPT TO A MINIMUM; YET, NOT SUCH THAT THE UNDERLYING BRUSH IS DISPLACED OR DAMAGED.
10. THE TOP OF THE BACKFILL FOR THE FIRST LIFT SHALL BE SLOPED AT APPROXIMATELY 5% AWAY FROM THE STREAM.
11. PLACE A LAYER OF TOPSOIL FROM ON SITE, WITHIN THE LIMITS OF DISTURBANCE, AND LIVE BRANCHES ON TOP OF EACH SOIL LIFT SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE NEXT SOIL LIFT.
12. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER AND SHALL EXCLUDE INVASIVE SPECIES.
13. PLACE A LAYER OF 6.5 FEET WIDE GEOCOIR DEKOWE 700 EROSION CONTROL BLANKET, OR EQUIVALENT AS APPROVED BY ENGINEER, ON TOP OF THE TOPSOIL AND LIVE BRANCHES SUCH THAT 2.5 FEET OF THE BLANKET WILL BE BURIED BELOW THE NEXT SOIL LIFT. ALLOW THE REMAINING 4.0 FEET OF BLANKET TO HANG OVER THE PRECEDING SOIL LIFT OR COIR FIBER LOGS.
14. PLACE A LAYER OF 6.5 FEET WIDE GEOCOIR DEKOWE 700 EROSION CONTROL BLANKET, OR EQUIVALENT, AS APPROVED BY ENGINEER, NON–WOVEN COIR MATTING OVER THE EROSION CONTROL BLANKET TO THE SAME LIMITS.
15. SOIL CAN BE COMPACTED BY STACKING A PIECE OF 2 X 6 SAWN LUMBER EDGEWAYS UP TO THE LIFT HEIGHT SPECIFIED IN THE STRUCTURE TABLE AND SECURING WITH WOODEN STAKES TO PROVIDE A RIGID BACKSTOP FOR COMPACTING SOIL LIFT.
16. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.0 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
17. THE TOP OF THE SOIL BACKFILL SHALL BE FLAT WITHIN THE LIFT SETBACK DISTANCE SPECIFIED IN THE STRUCTURE TABLE. BEYOND THE LIFT SETBACK DISTANCE, THE SOIL BACKFILL SHALL BE SLOPED AT AN APPROXIMATE 5% SLOPE AWAY FROM THE STREAM.
18. TOP DRESS THE SOIL LIFT TO BE AT BANKFULL STAGE OR WITHIN 3 IN WITH TOPSOIL FROM ON SITE, WITHIN THE LIMITS OF DISTURBANCE THE FACE OF THE SOIL LIFT BACK INTO THE FLOODPLAIN AT LEAST 4FT.
19. REMOVE THE SAWN LUMBER AND WOODEN STAKES FROM THE FACE OF THE SOIL LIFT AND WRAP THE FACE AND TOP OF THE SOIL LIFT USING THE WOVEN AND NON–WOVEN COIR MATTING HANGING OVER THE PREVIOUS LIFT/COIR FIBER LOGS.
20. THE EROSION CONTROL FABRIC SHALL BE PULLED AS TIGHT AS POSSIBLE WITHOUT TEARING OR EXCESSIVELY DISTORTING THE FABRIC.
21. SECURE THE EROSION CONTROL AND NON–WOVEN MATTING IN PLACE BY STAKING THE END OF THE EROSION CONTROL FABRIC WITH WOODEN STAKES ON 1.5–FOOT CENTERS.
22. BEGIN CONSTRUCTION OF THE NEXT SOIL LIFT BY REPEATING THE PREVIOUS NOTES STARTING WITH NOTE 11.
23. THE OVERALL SLOPE CREATED BY THE LIVE BRUSH LAYERING SHALL MATCH THE PROPOSED CROSS SECTION SHAPE FOR THE OUTER BANK OF THE THE TYPICAL POOL CROSS–SECTION FOR EACH REACH.
24. THE COIR BLANKETS AND GEOTEXTILE FABRIC USED FOR THE UPPER MOST SOIL LIFT WILL BE SECURED WITHIN A 6 INCH DEEP TRENCH AS SHOWN IN DETAIL.
25. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS–SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
26. RE–DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN–STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
27. THE LOWER BANK STABILIZATION IS CRITICAL TO THE DESIGN INTENT OF THIS PROJECT. VARIANCE FROM WOOD TOE BANK STABILIZATION WILL ONLY BE CONSIDERED IF THE WOOD IS NOT AVAILABLE ONSITE.

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

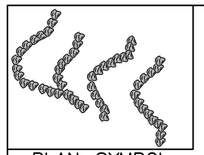
Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

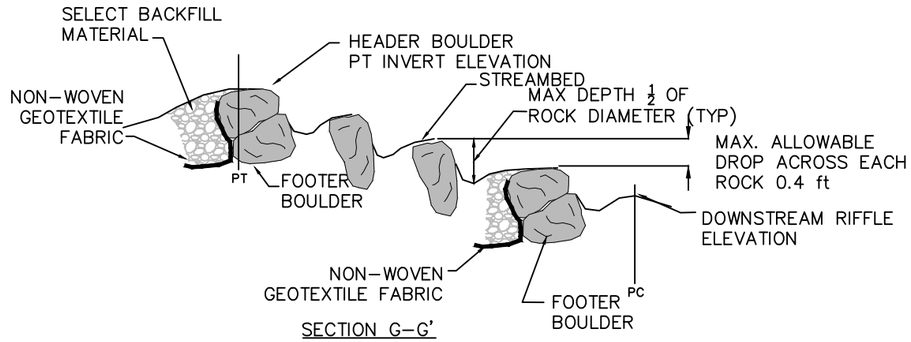
DETAIL – WOOD TOE

Date	Sheet
4/17/2018	27OF 31
Scale NTS	

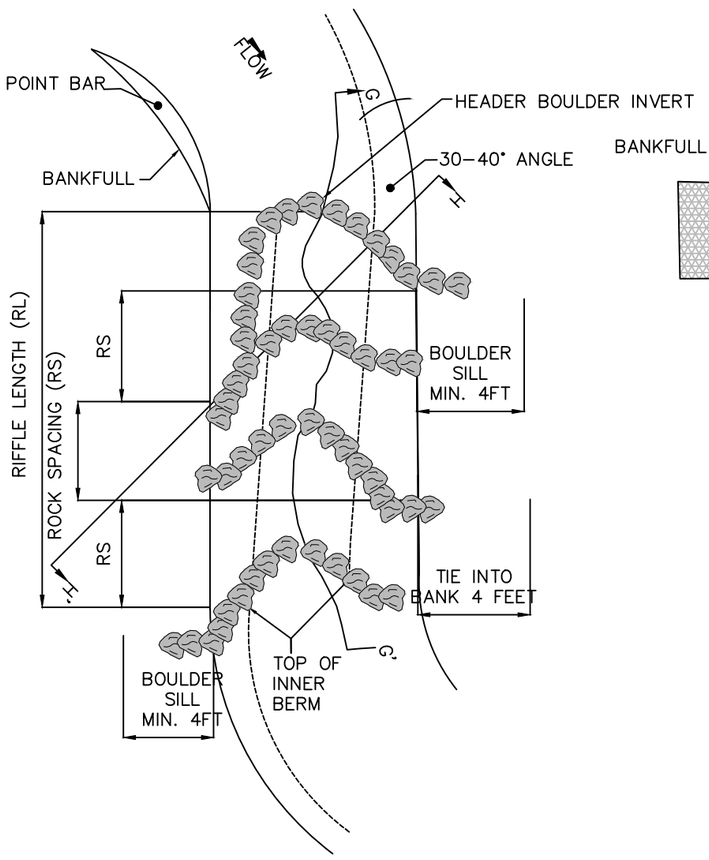
E:\dropbox (fosse)\brewbolier-sorenson\CAD\sheets\dtl_brewbolier.dwg
2018/04/17 1:50 PM By: Tailwater Limited



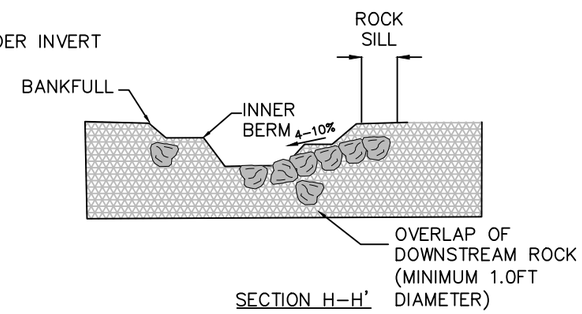
PLAN–SYMBOL



SECTION G–G'



PLANVIEW



SECTION H–H'

NOTES:

1. BOULDERS FOR THE CONSTRUCTED RIFFLE MUST BE A MIN. OF 1–2TN BOULDER WITH A MIN. DIAMETER OF 2–3FT.
2. THE UPSTREAM AND DOWNSTREAM HEADER BOULDERS SHALL BE UNDERLAIN BY FOOTER BOULDERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. HEADER BOULDERS ARE THE TOP MOST BOULDERS USED IN EACH STRUCTURE. HEADER BOULDERS FOR THIS STRUCTURE ARE ONLY VISIBLE BETWEEN THE INNER BERMS.
4. HEADER BOULDERS SHALL BE OFFSET SLIGHTLY UPSTREAM OF THE FOOTER BOULDERS. FOOTER BOULDERS SHALL BE INSTALLED BEFORE THE HEADER BOULDERS.
5. SET INVERTS AT ELEVATION SHOWN ON PLAN AND PROFILE SHEETS. INVERTS AND ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AS A 2014 FORMAT DWG FILE. NO ELEVATIONS OF THE CONSTRUCTED RIFFLE ARMS MAY VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE ENGINEER.
6. THE DROP IN ELEVATION ACROSS THE STRUCTURE SHALL NOT EXCEED 0.5FT UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
7. MINI–VANES WILL BE SPACED IN THE RIFFLE AS A FUNCTION OF THE RIFFLE LENGTH.
8. THE MOST UPSTREAM RIFFLE MINI–VANE ARM SHALL BE PLACED SUCH THAT THE BANK TIE–IN IS ON THE SAME SIDE AS THE NEXT UPSTREAM OUTSIDE BEND IN ORDER TO SERVE AS A VANE AND HELP DIRECT STREAM FLOW AWAY FROM THE PREVIOUS OUTSIDE BEND. LOCATION OF ALL RIFFLE VANE ARMS ARE SHOWN ON THE PLAN AND PROFILE SHEETS.
9. THE MOST DOWNSTREAM MINI–VANE ARM SHALL BE PLACED SUCH THAT THE HIGH POINT IS ON THE SAME SIDE AS THE NEXT DOWNSTREAM OUTSIDE BEND IN ORDER TO HELP DIRECT STREAM FLOW FROM THE NEXT OUTSIDE BEND.
10. THE VERTICAL SLOPE OF EACH MINI–VANE ARM SHALL NOT EXCEED 10% UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE SLOPES WILL BE DICTATED BY THE WIDTH–TO–DEPTH RATIO OF THE REACH, TYPICAL RIFFLE INNER BERM CHANNEL, VERTICAL DROP OVER THE LOG, AND LOG DIAMETER.
11. ALL GAPS/VOIDS LARGER THAN 2IN BETWEEN THE HEADER AND FOOTER BOULDERS SHALL BE HAND CHINKED WITH COBBLE AND GRAVEL ON THE UPSTREAM SIDE PRIOR TO PLACEMENT OF THE GEOTEXTILE. ALL CHINKING SHALL BE APPROVED BY THE ENGINEER BEFORE THE MINI–VANES ARE BACKFILLED.
12. THE UPSTREAM SIDE OF THE FIRST AND LAST MINI–VANE ARM REQUIRE A LAYER OF NON–WOVEN GEOTEXTILE FABRIC THAT SHALL BE PLACED AS SHOWN IN THE GEOTEXTILE PLACEMENT DETAIL THE ENTIRE LENGTH OF THE MINI–VANE.
13. BACKFILL VANES WITH SELECT BACKFILL MATERIAL AS SHOWN AND DEFINED IN THE CONSTRUCTED RIFFLE DETAIL.
14. SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
15. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS–SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1FT OF THE GRADES AND ELEVATIONS INDICATED, PROVIDED ANY HEIGHT DOES NOT EXCEED MAX. ALLOWABLE DROP OF 0.5FT FOR THIS STRUCTURE.
16. RE–DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN–STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
17. FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY UPSTREAM.
18. THE DEPARTURE ANGLE SHOWN ABOVE IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2014 FORMAT DWG FILE AND LN3 FILE.
19. BCPOS APPROVAL OF FABRIC PLACEMENT IS REQUIRED BEFORE CONSTRUCTION IS CONSIDERED COMPLETE.

DETAIL – CONSTRUCTED BOULDER RIFFLE
NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR	
6	R6/60% DESIGN PLAN SET
No.	Revision/Issue

Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

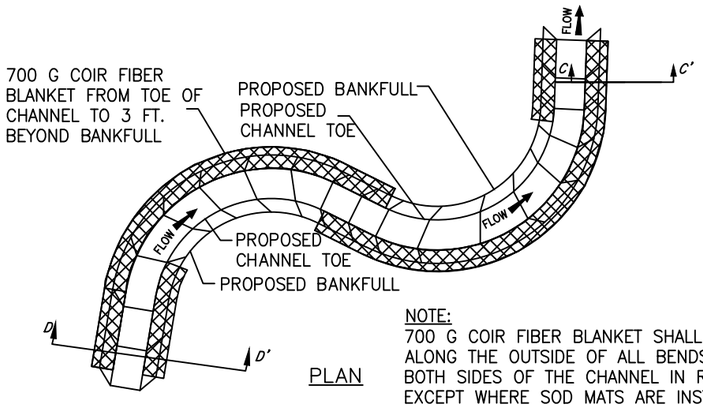
Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

DETAIL – CONSTRUCTED RIFFLE

Date	Sheet
4/17/2018	28OF 31
Scale NTS	

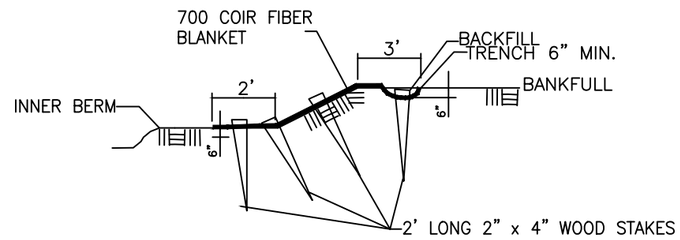
E:\dropbox (Gsap)\brewbolier-sorenson\CAD\sheets\dtl_brewbolier.dwg
2018/04/17 1:50 PM By: Tallwater Limited

* BEFORE INSTALLING COIR FIBER BLANKET, TILL UPPER 6" OF SOIL TO HELP VEGETATION TO ESTABLISH. RAKE SOIL LEVEL AND ADD SEED AND MULCH BEFORE INSTALLING COIR FIBER BLANKET.

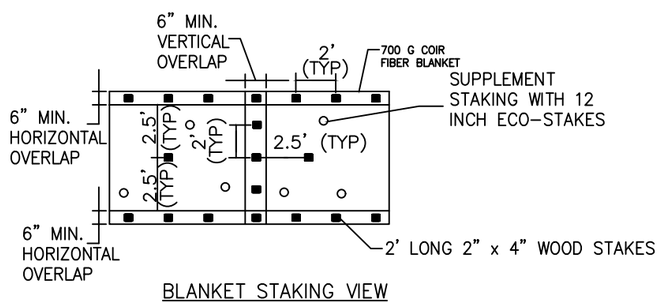


PLAN

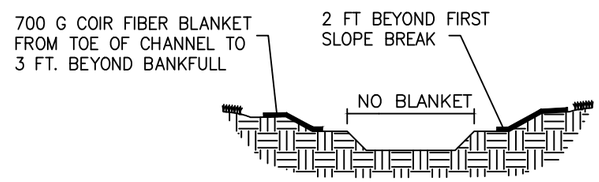
NOTE:
700 G COIR FIBER BLANKET SHALL BE PLACED ALONG THE OUTSIDE OF ALL BENDS AND ALONG BOTH SIDES OF THE CHANNEL IN RIFFLE AREAS, EXCEPT WHERE SOD MATS ARE INSTALLED, ONLY AS APPROVED BY ENGINEER AND BCPOS AS AN ACCEPTED ALTERNATIVE TO DESIGN PLANS.



SECTION C–C'



BLANKET STAKING VIEW



SECTION D–D'

NOTE:

ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.

NOTE:

SECURE BLANKET BY STAKING AND OVERLAPPING AT THE SEAMS WITH A SHINGLE–TYPE METHOD. ADDITIONAL STAKING SHALL BE APPLIED AT NO ADDITIONAL COST IF THE BLANKET SEPERATES FROM THE SOIL MORE THAN ONE INCE UNDER A REASONABLE PULL.

DETAIL – EROSION CONTROL BLANKET
NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR	
6	R6/60% DESIGN PLAN SET
No.	Revision/Issue

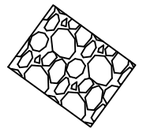
Firm Name and Address
NORTH STATE ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

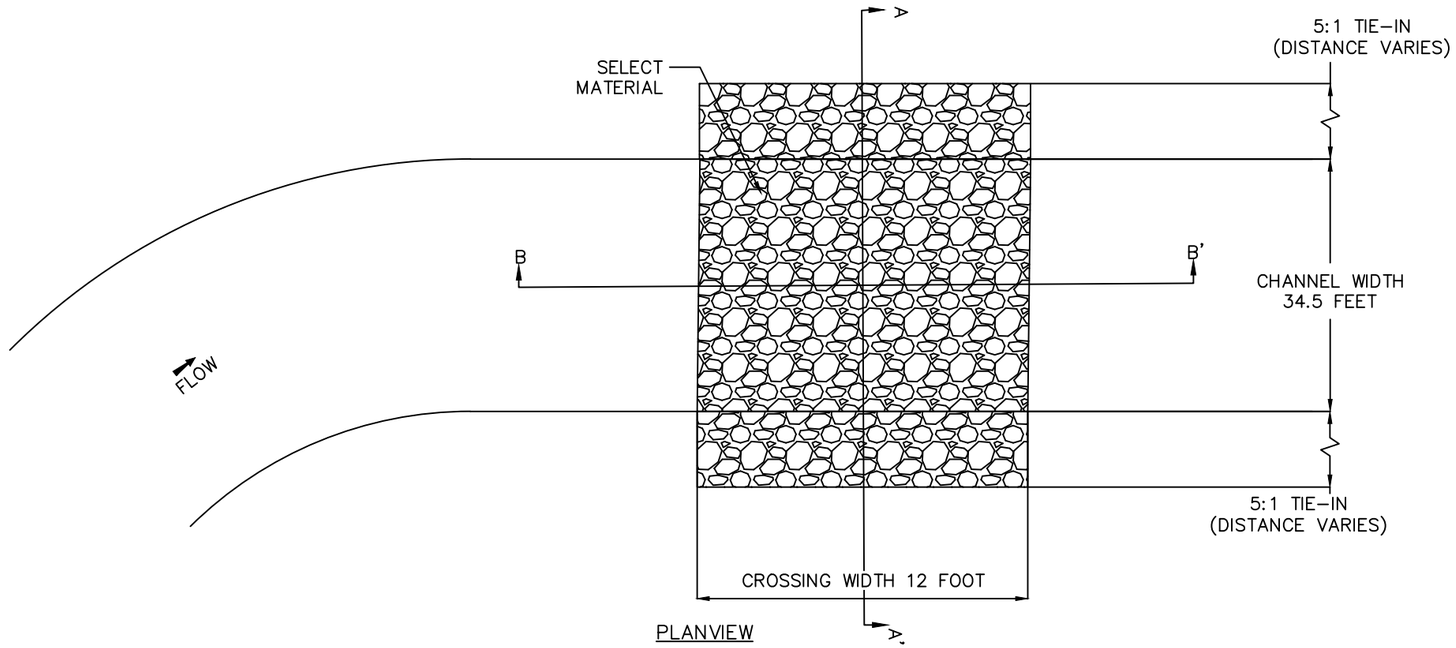
DETAIL – EROSION CONTROL BLANKET

Date	Sheet
4/17/2018	29OF 31
Scale NTS	

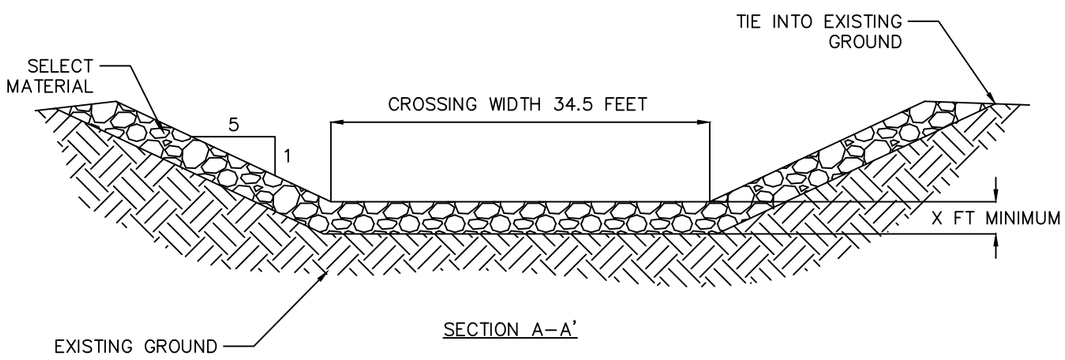
E:\dropbox (Gasp)\brewbaker-sorenson\CAD\sheets\dtl_brewbaker.dwg
2018/04/17 1:50 PM By: Tallwater Limited



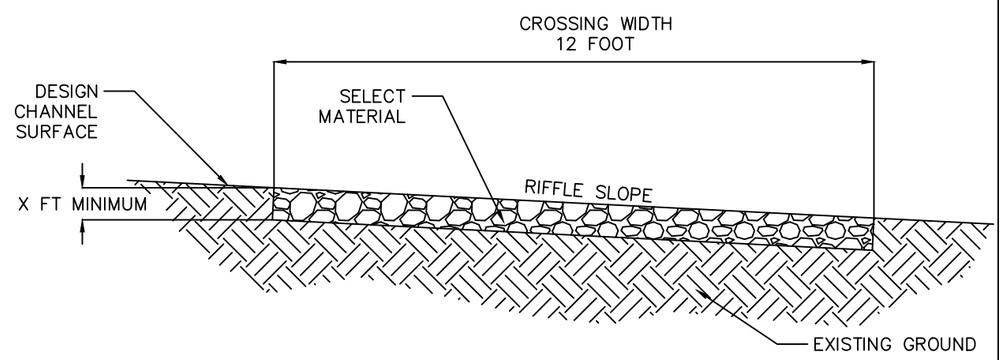
PLAN–SYMBOL



PLANVIEW



SECTION A–A'



SECTION B–B'

DETAIL – AGRICULTURAL CROSSING
NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR	
6	R6/60% DESIGN PLAN SET
No.	Revision/Issue

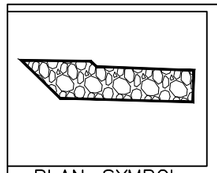
Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

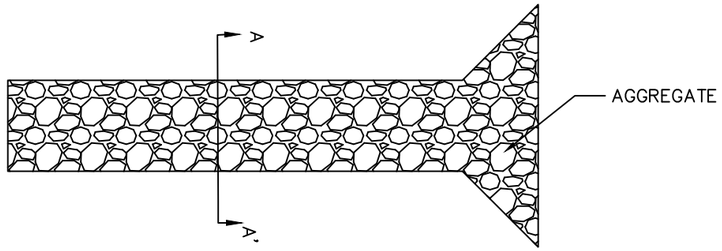
DETAIL – CROSSING

Date	Sheet
4/17/2018	30OF 31
Scale NTS	

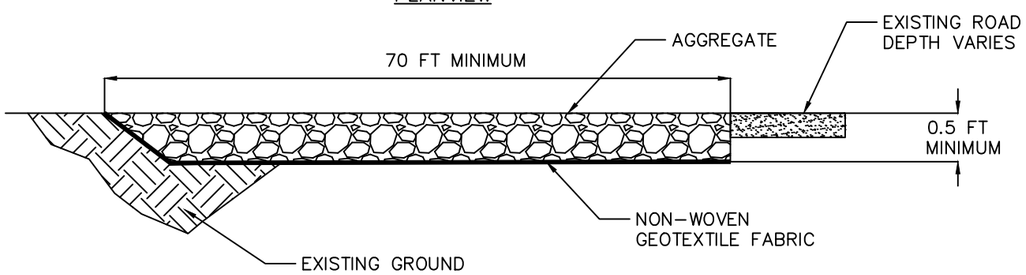
E:\dropbox (Gsec)\brewbaker-sorenson\CAD\sheets\dtl_brewbaker.dwg
2018/04/17 1:50 PM By: Tallwater Limited



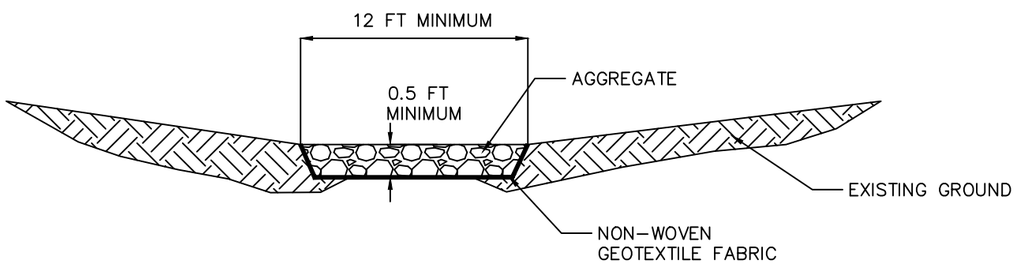
PLAN–SYMBOL



PLANVIEW



ELEVATION SECTION



SECTION A–A'

AGGREGATE GRADATION	
SIEVE SIZE	PERCENT BY WEIGHT PASSING THROUGH SQUARE MESH
75 MM (3 IN)	100
50 MM (2 IN)	0 – 25
19 MM ($\frac{3}{4}$ IN)	0 – 15

NOTE:

1. DETAIL ADAPTED FROM COLORADO DEPARTMENT OF TRANSPORTATION, M–208–1, VEHICLE TRACKING PAD JULY 4, 2012.

DETAIL – CONSTRUCTION ENTRANCE
NOT TO SCALE

General Notes

60% DESIGN
NOT FOR
CONSTRUCTION

Prepared By: DAB – 5SSR

No.	Revision/Issue
6	R6/60% DESIGN PLAN SET

Firm Name and Address
NORTH STATE
ENVIRONMENTAL, INC.
2889 Lowery St.
Winston Salem, NC 27101

Project Name:
NSE and 5SSR
LEFT HAND CREEK
RIPARIAN RESTORATION
60% DESIGN PLAN SET

DETAIL – CONSTRUTION
ENTRANCE

Date
4/17/2018

Scale
NTS

Sheet
31OF 31

E:\dropbox (ssss)\brewbaker-sorenson\CAD\sheets\dtl_brewbaker.dwg
2018/04/17 1:50 PM By: Tallwater Limited