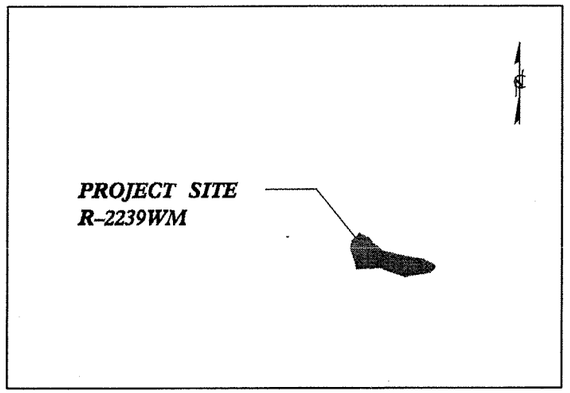
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R – 2239WM	1	67
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
6.7690017		P.E. & CONST.	

As-Built Plans

R-2239WM

PROJECT: 6.7690017

See Sheet 1-A For Index of Sheets



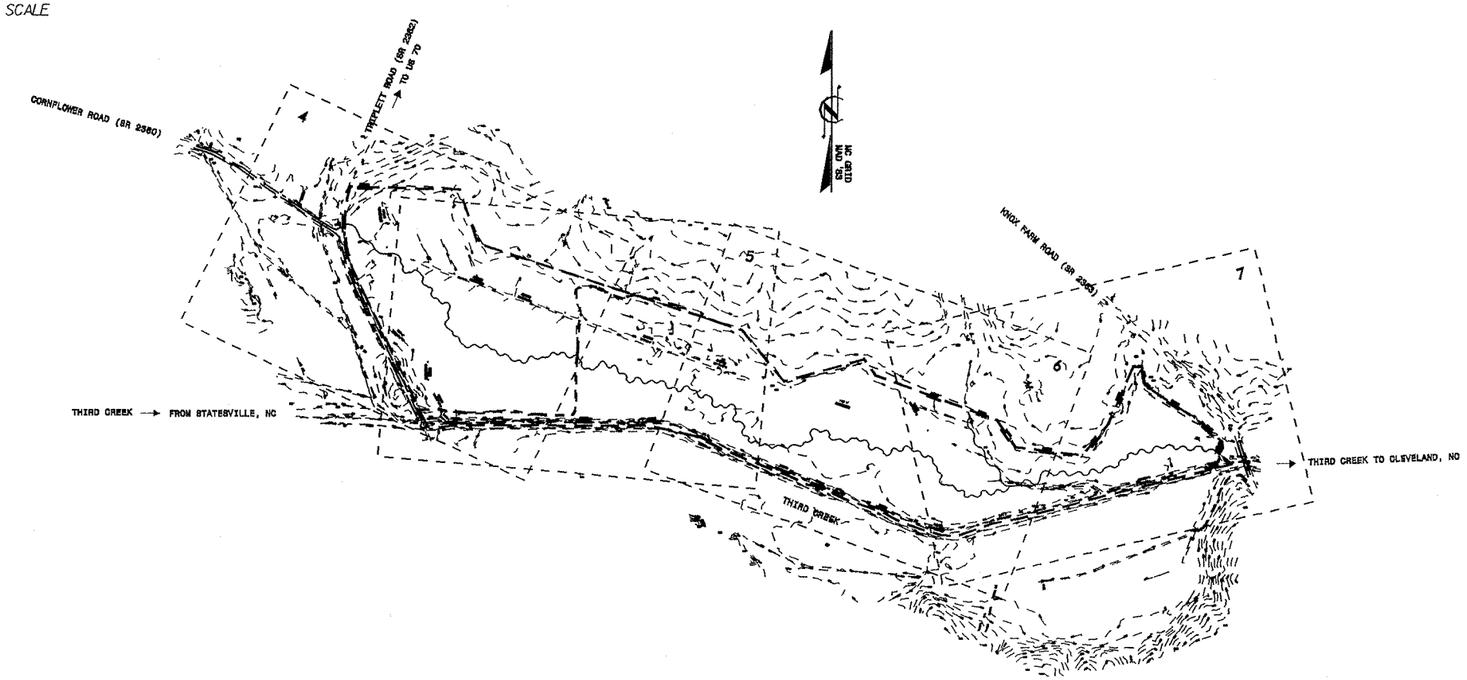
VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

LOCATION: SHEPHERDS TREE MITIGATON SITE LOCATED BETWEEN TRIPLETT ROAD (SR 2362) AND KNOX FARM ROAD (SR 2363) ADJACENT TO THIRD CREEK, SOUTHEAST OF STATESVILLE

TYPE OF WORK: GRADING, DITCH PLUG INSTALLATION, DITCH FILLING, PLANTING



PHASE I

GRAPHIC SCALES

0 50 100 200
PLANS

0 25 50 100
PROFILE (HORIZONTAL)

0 2.5 5 10
PROFILE (VERTICAL)

PROJECT LENGTH

TOTAL WETLAND RESTORATION = 15.0 ACRES

Prepared In the Office of:

2002 STANDARD SPECIFICATIONS

LETTING DATE:

DESIGN ENGINEER

SIGNATURE: *P.E.*

WETLAND SCIENTIST

SIGNATURE:

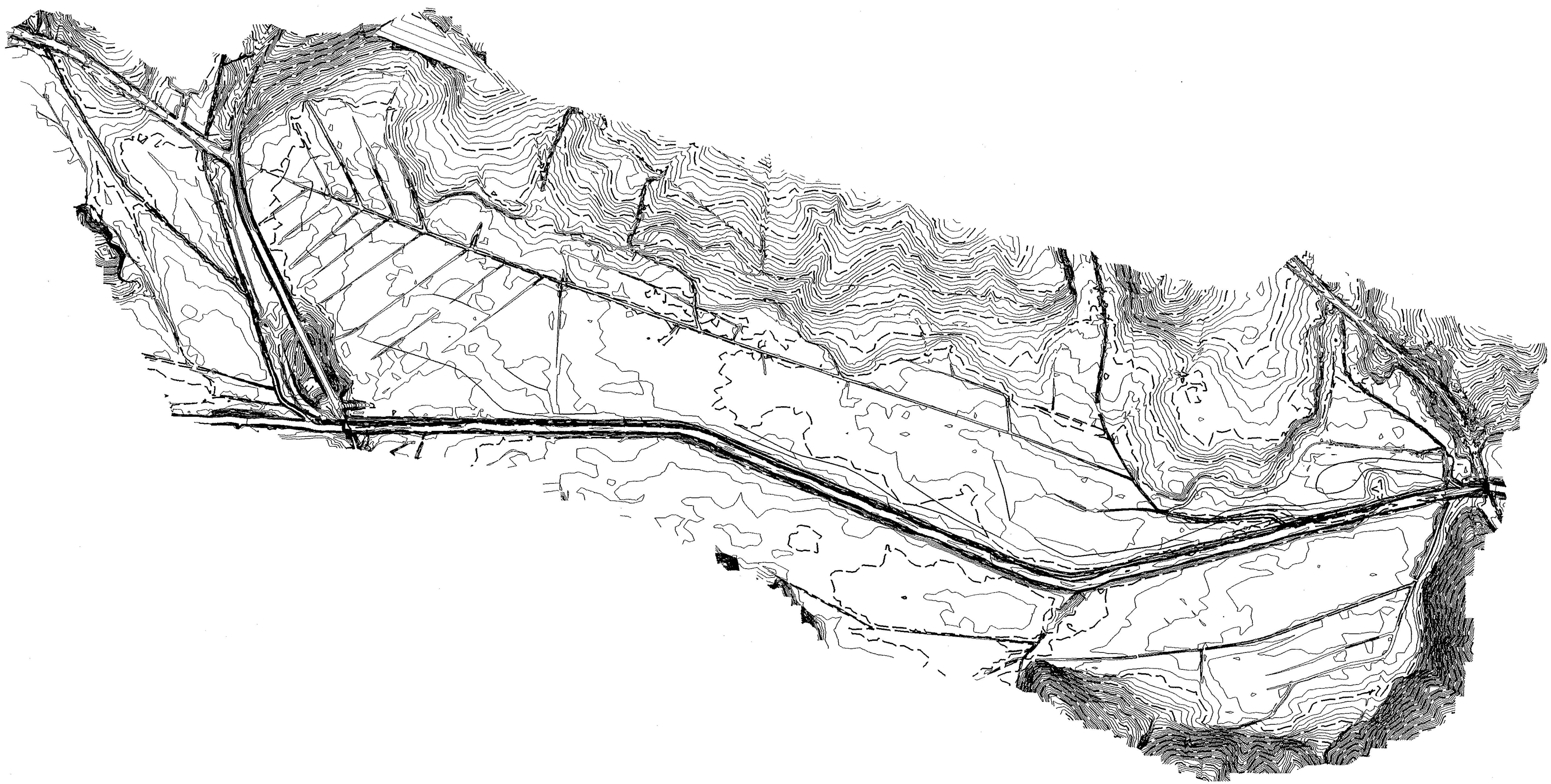
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER *P.E.*

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

PROJECT REFERENCE NO.
1298031 PHASE 1 GRADING



DATE OF ORIGINATION04-11-99		
DRAWN BY :		
CHECKED BY :		
REVISIONS		
NO.	DESCRIPTION	DATE
1		
2		
3		
4		
5		
6		

PROJECT NAME :

SHEPHERDS TREE
GRADING PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION

SHEET TITLE :

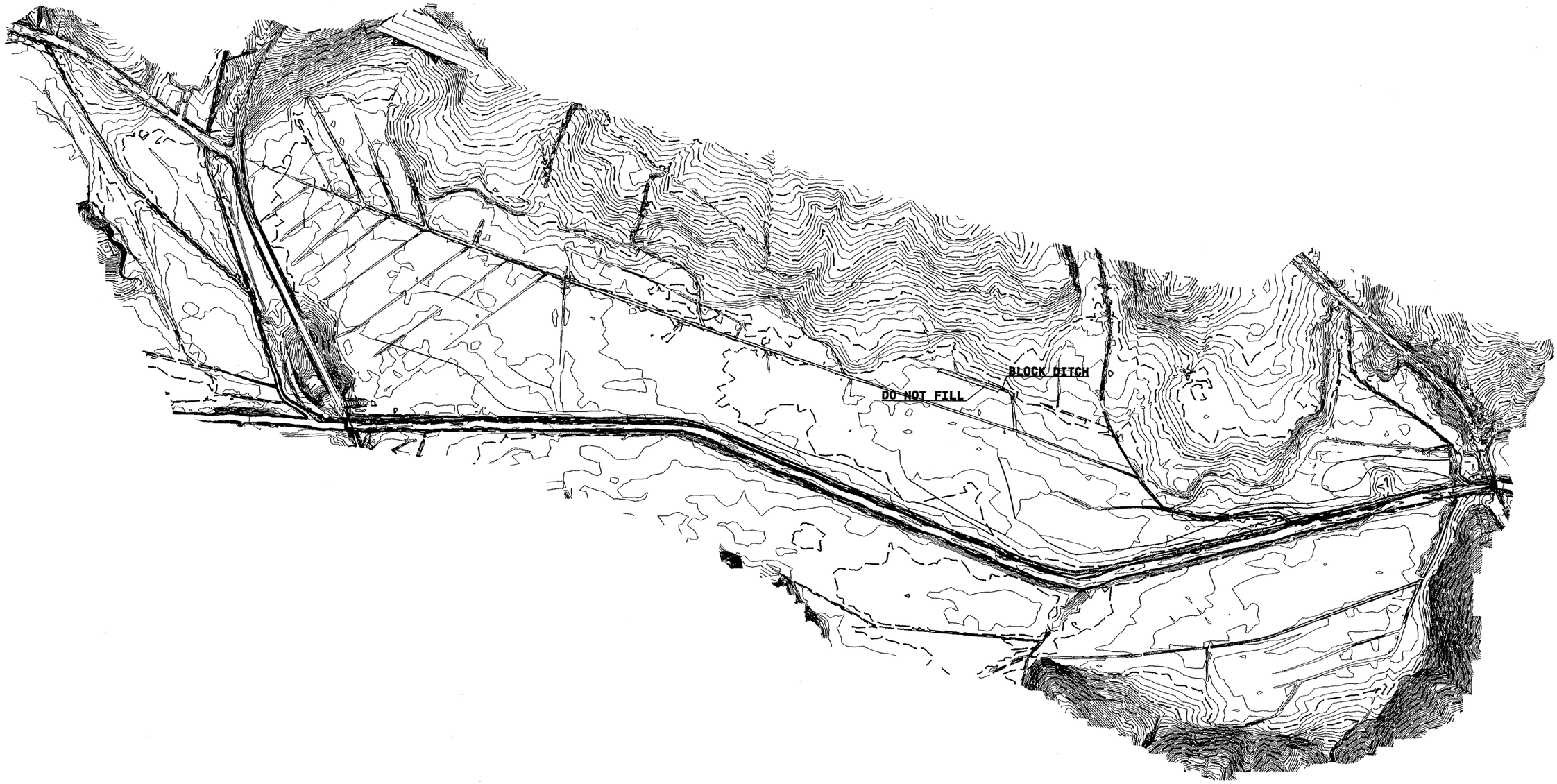
GRADING PLAN

SHEET NO. :

1 OF 2

KCI JOB NO. 1298031

PROJECT REFERENCE NO.
1298031 PHASE 1 GRADING



DATE OF ORIGINATION04-11-99		PROJECT NAME		STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION	SHEET TITLE GRADING PLAN
DRAWN BY		SHEPHERDS TREE GRADING PLAN			SHEET NO. 2 OF 2
CHECKED BY					KCI JOB NO. 1298031

REVISIONS		
NO.	DESCRIPTION	DATE
1		
2		
3		
4		
5		
6		

GRADING LEGEND		AREA
PHASE I LIMIT		34.8 Ac.
GRADING ONLY		1.5 Ac.
GRADING AND RIPPING		15.1 Ac.
PRESERVATION AREA (DO NOT DISTURB)		6.9 Ac.

0 600 1200

GRAPHICAL SCALE (1" = 600')

DATE OF DESIGNATION:	SCALE:
DRAWN BY:	
DESIGNED BY:	

REVISIONS

NO.	DESCRIPTION	DATE
1		
2		
3		
4		
5		

PROJECT TITLE:

SHEPHERDS TREE
GRADING PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION

SHEET TITLE:

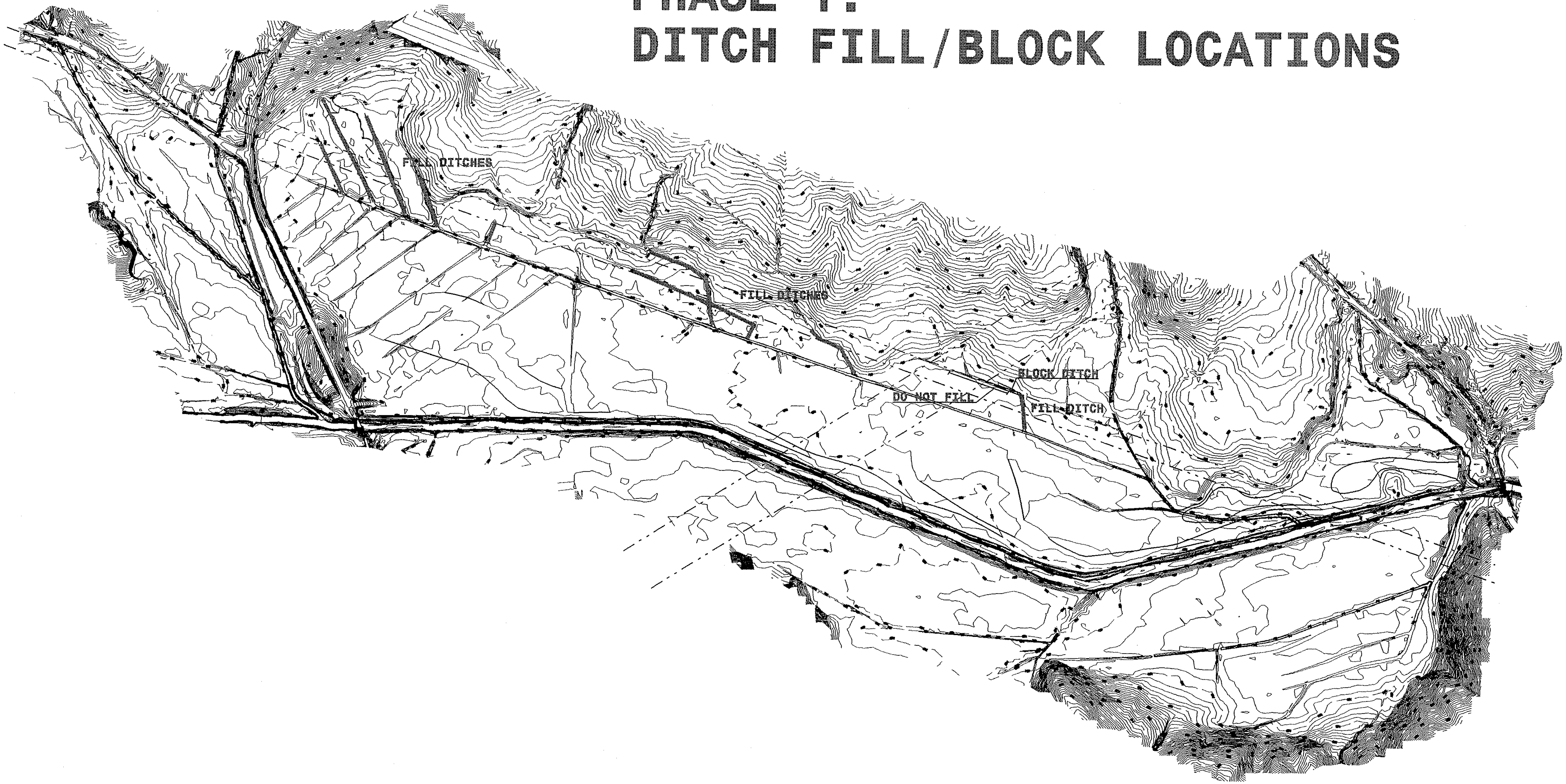
GRADING PLAN

SHEET NO.:

1 OF 2

RW PROJECT NO.:

PHASE 1: DITCH FILL/BLOCK LOCATIONS



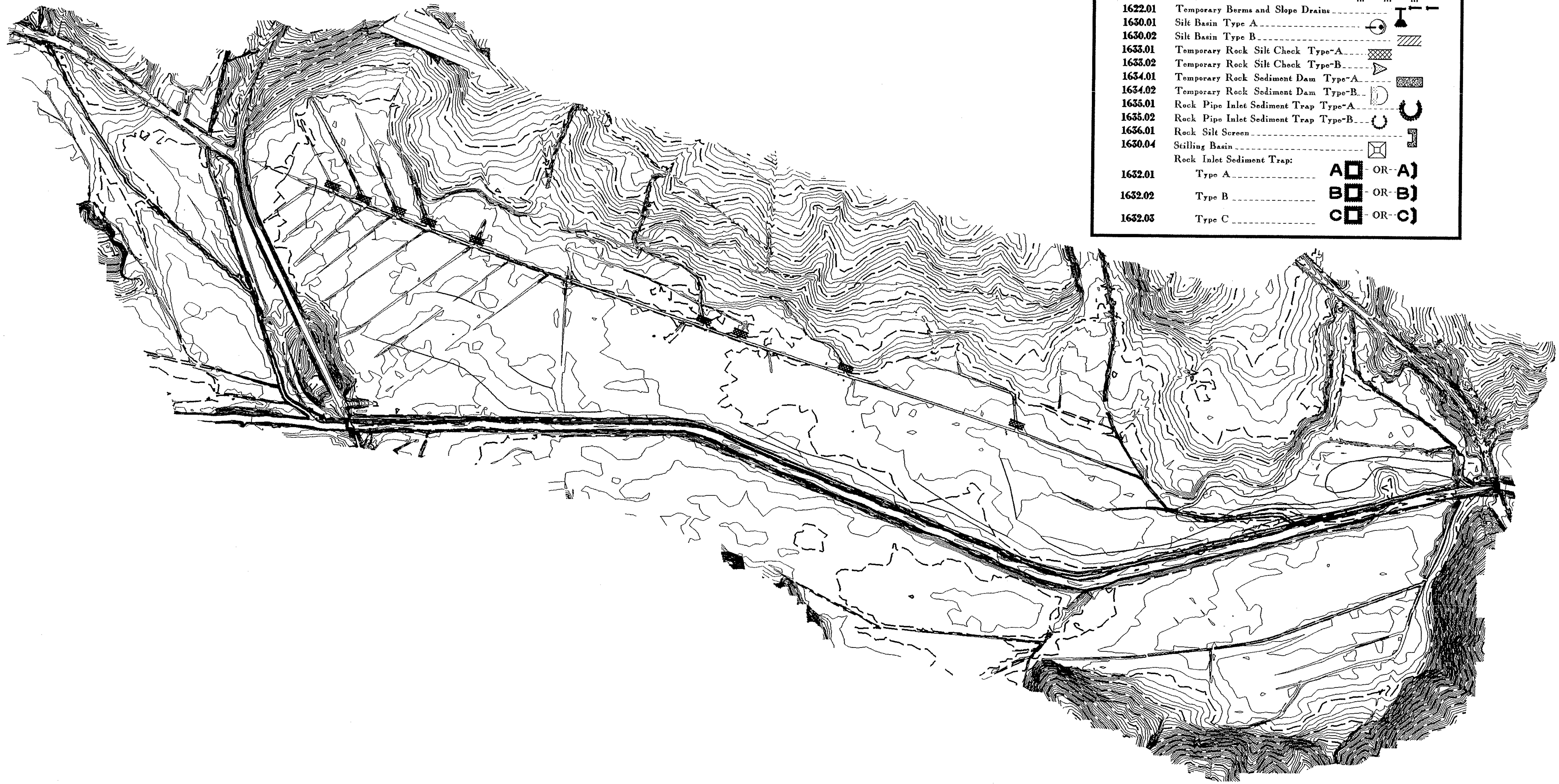
SHEPHERDS TREE
GRADING PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION

GRADING PLAN

2 OF 2

EROSION CONTROL PLAN



Std. #	Description	Symbol
	Reforestation	
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1622.01	Temporary Berms and Slope Drains	
1630.01	Silt Basin Type A	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Temporary Rock Silt Check Type-B	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1636.01	Rock Silt Screen	
1630.04	Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A - OR - A)
1632.02	Type B	B - OR - B)
1632.03	Type C	C - OR - C)

DATE OF ORIGINATION 04-11-99
DRAWN BY :
CHECKED BY :

REVISIONS		
NO.	DESCRIPTION	DATE
1		
2		
3		
4		
5		
6		

PROJECT NAME :
SHEPHERDS TREE
GRADING PLAN

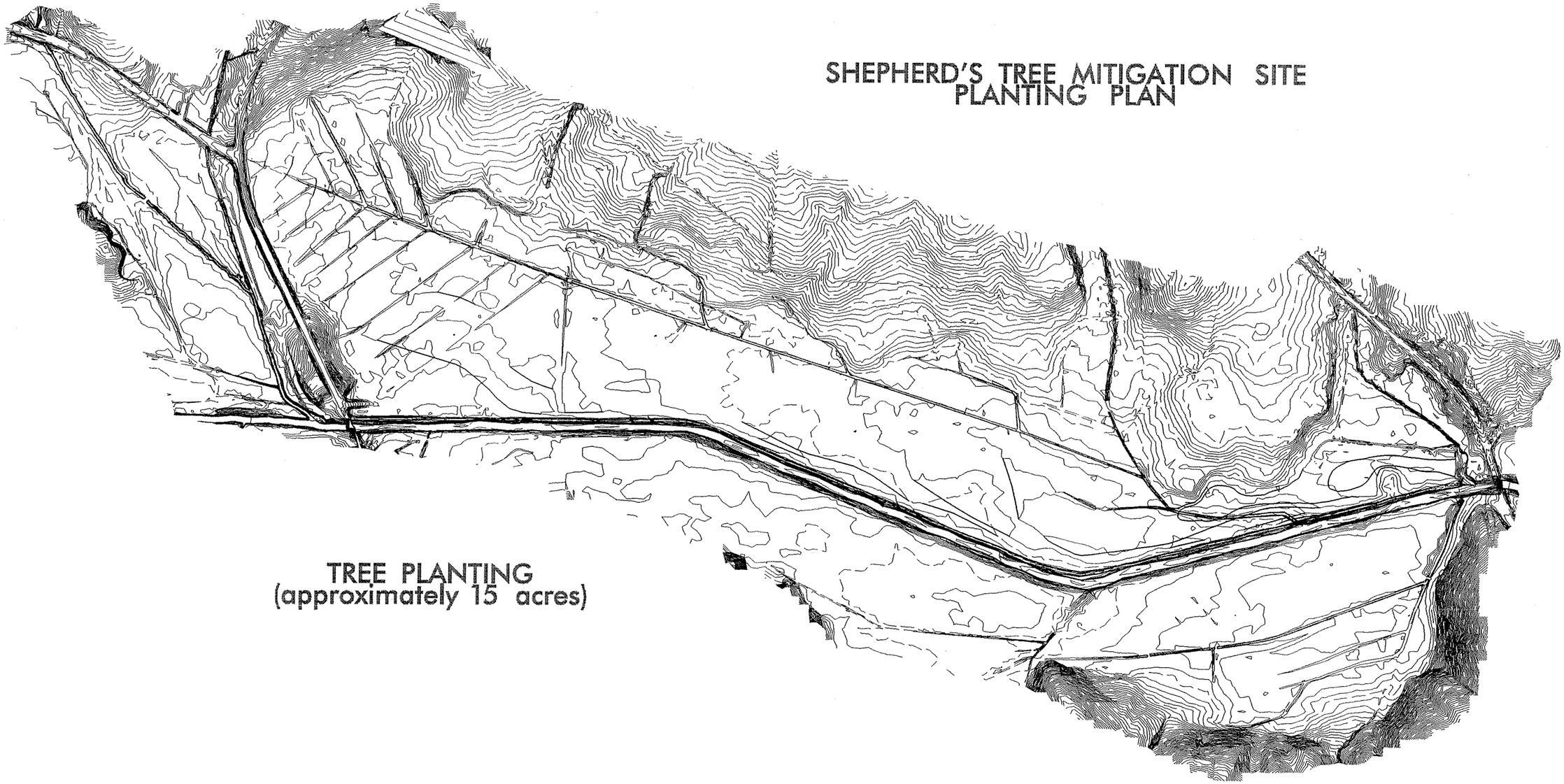
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION

SHEET TITLE :
GRADING PLAN

SHEET NO. :
1 OF 2

KCI JOB NO. 1298031

SHEPHERD'S TREE MITIGATION SITE
PLANTING PLAN



TREE PLANTING
(approximately 15 acres)

DATE OF ORIGINATION:	DESIGN:
DRAWN BY:	
CHECKED BY:	

NO.	DESCRIPTION	DATE
1		
2		
3		
4		
5		
6		

PROJECT NAME:

SHEPHERDS TREE
PLANTING PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION

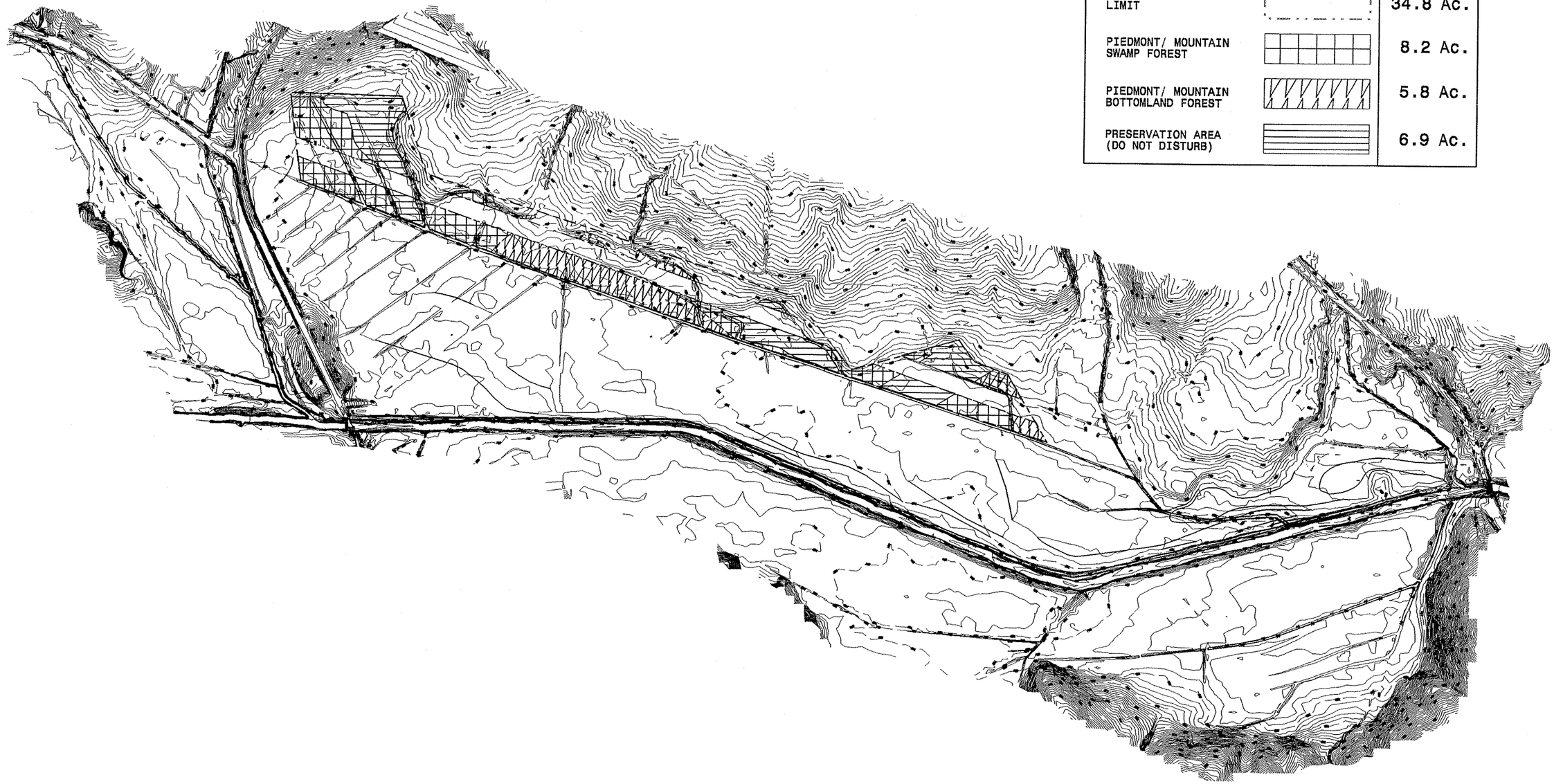
SHEET TITLE:

PLANTING PLAN

SHEET NO.:

1 OF 1

PLANTING LEGEND	AREA
PHASE I LIMIT	34.8 Ac.
PIEDMONT/ MOUNTAIN SWAMP FOREST	8.2 Ac.
PIEDMONT/ MOUNTAIN BOTTOMLAND FOREST	5.8 Ac.
PRESERVATION AREA (DO NOT DISTURB)	6.9 Ac.



DATE OF DRAWING: SCALE:
DRAWN BY:
DESIGNED BY:

REVISION

NO.	DESCRIPTION	DATE
1		
2		
3		
4		
5		
6		

PROJECT NAME:

SHEPHERDS TREE
PLANTING PLAN

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION

SHEET TITLE:

PLANTING PLAN

SHEET NO.:

1 OF 1

SIGNATURE:

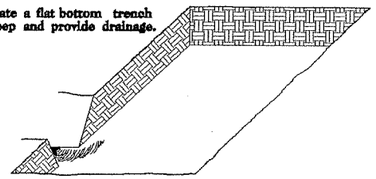
PLANTING DETAILS

SEEDLING / LINER BAREROOT PLANTING DETAIL

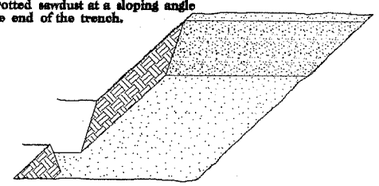
HEALING IN

1. Locate a healing-in site in a shady, well protected area.

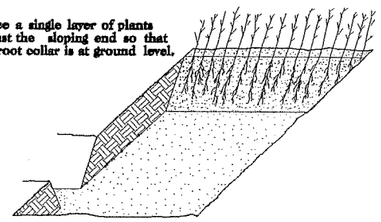
2. Excavate a flat bottom trench 12" deep and provide drainage.



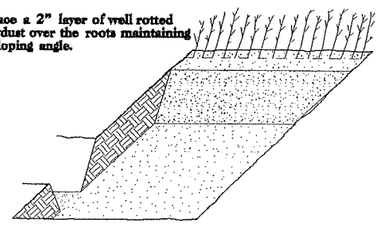
3. Backfill the trench with 2" well rotted sawdust. Place a 2" layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

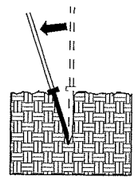


5. Place a 2" layer of well rotted sawdust over the roots maintaining a sloping angle.

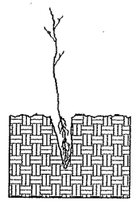


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

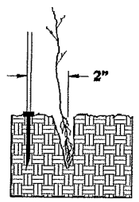
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



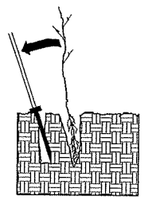
1. Insert planting bar as shown and pull handle toward planter.



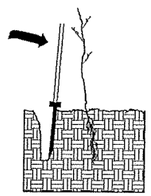
2. Remove planting bar and place seedling at correct depth.



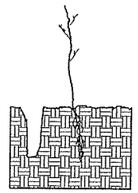
3. Insert planting bar 2" toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12" long, 4" wide and 1" thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches (10") below the root collar.

SHEPHERD'S TREE WETLAND PLANT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2204WM	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

WETLAND TREE REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

PIEDMONT/MOUNTAIN SWAMP FOREST

QUERCUS FALCATA VAR. PAGODAEFOLIA	CHERRYBARK OAK	12 - 18" SEEDLING
FRAXINUS PENNSYLVANICA	GREEN ASH	12 - 18" SEEDLING
QUERCUS LYRATA	OVERCUP OAK	12 - 18" SEEDLING
QUERCUS PHELLOS	WILLOW OAK	12 - 18" SEEDLING
QUERCUS NIGRA	WATER OAK	12 - 18" SEEDLING

TREE REFORESTATION SHALL BE PLANTED 6' TO 10' ON CENTER, RANDOM SPACING, AVERAGING 8' ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

PIEDMONT MOUNTAIN BOTTOMLAND FOREST

QUERCUS FALCATA VAR. PAGODAEFOLIA	CHERRYBARK OAK	12 - 18" SEEDLING
FRAXINUS PENNSYLVANICA	GREEN ASH	12 - 18" SEEDLING
LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 - 18" SEEDLING
QUERCUS PHELLOS	WILLOW OAK	12 - 18" SEEDLING
QUERCUS NIGRA	WATER OAK	12 - 18" SEEDLING

TREE REFORESTATION SHALL BE PLANTED 6' TO 10' ON CENTER, RANDOM SPACING, AVERAGING 8' ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

SEE PLAN SHEETS FOR AREAS TO BE PLANTED

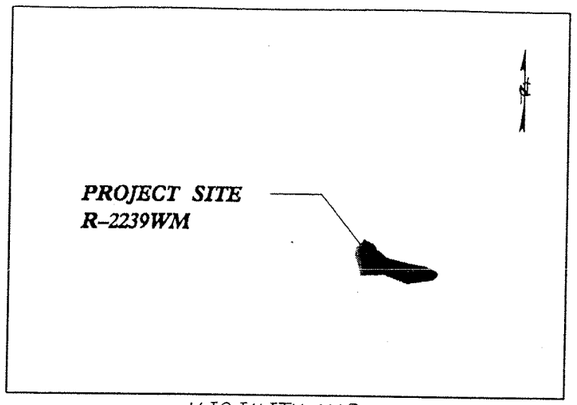
WETLAND REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT: 6.7690017T R-2239WM

See Sheet 1A For Index of Sheets



VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

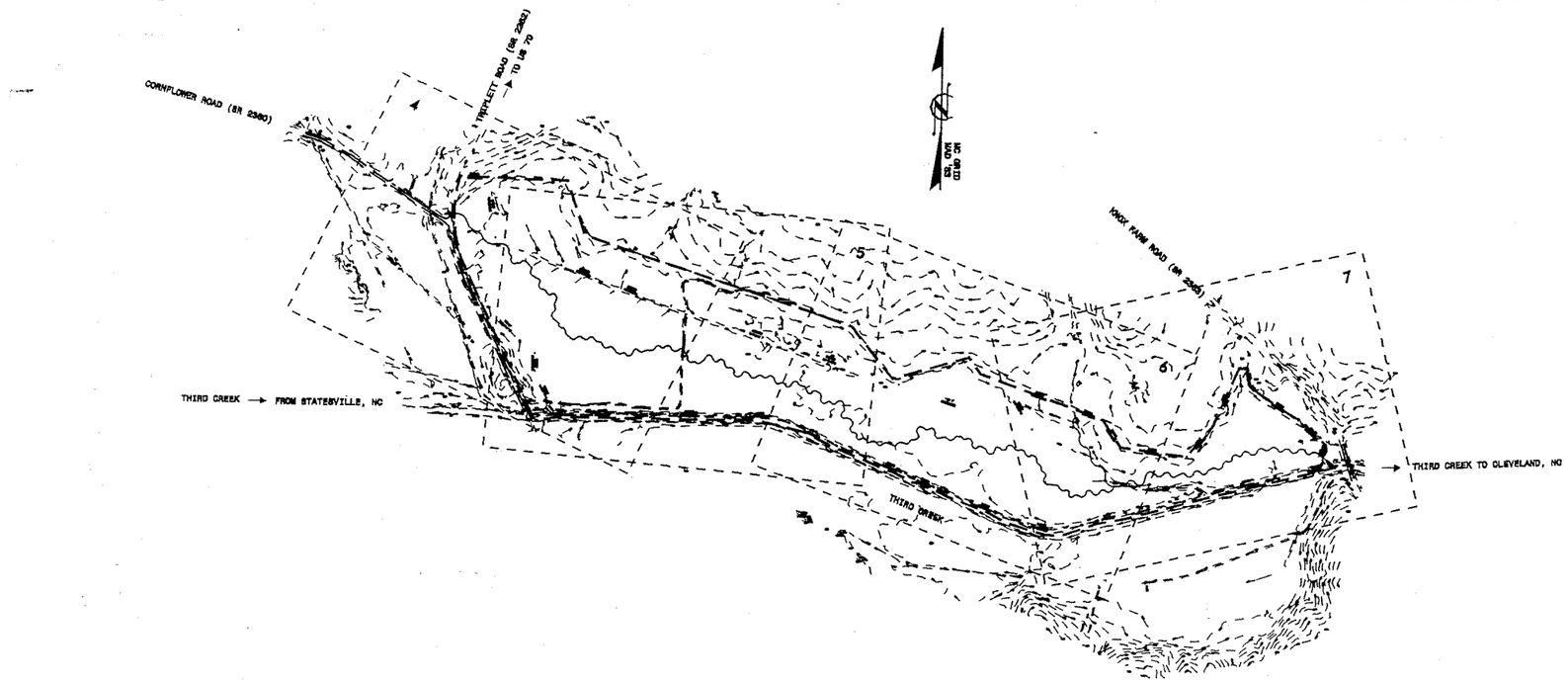
IREDELL COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R - 2239WM	1	67
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
6.7690017		P.E. & CONST.	

As-Built Plans

LOCATION: SHEPHERDS TREE MITIGATON SITE LOCATED BETWEEN TRIPLETT ROAD (SR 2362) AND KNOX FARM ROAD (SR 2363) ADJACENT TO THIRD CREEK, SOUTHEAST OF STATESVILLE

TYPE OF WORK: GRADING, CLEARING AND GRUBBING, MOWING, RIPPING, DISCING, DRAINAGE, AND STREAM RESTORATION



PHASE II

GRAPHIC SCALES

0 50 100 200
PLANS

0 25 50 100
PROFILE (HORIZONTAL)

0 2.5 5 10
PROFILE (VERTICAL)

PROJECT LENGTH

TOTAL WETLAND MITIGATION = 74.9 ACRES

LENGTH OF STREAM RESTORATION = 10,704 FEET

Prepared In the Office of:

2002 STANDARD SPECIFICATIONS

LETTING DATE:

DESIGN ENGINEER

SIGNATURE: P.E.

WETLAND SCIENTIST

SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	1A
RW. SHEET NO.	
ENGINEER	SCIENTIST

INDEX OF SHEETS

ROADWAY STANDARD DRAWINGS:
(REV. JAN. 15, 2002)

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - HIGHWAY DESIGN BRANCH - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 15, 2002 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
866.02	WOVEN WIRE FENCE WITH WOOD POST
866.04	BARBED WIRE FENCE WITH WOOD POSTS (ALTERNATE CATTLE GATE)
904.50	MOUNTING OF TYPE 'D', 'E', AND 'F' SIGNS ON 'U' CHANNEL POSTS

GENERAL NOTES:

BEARING AND DISTANCES:
ALL BEARINGS ARE NAD '83 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.
ALL INFORMATION IS BASED ON THE FOLLOWING NCGS CONTROL MONUMENTS.

"KIMMER"	N = 705,616.53	E = 1,497,413.15	ELEV.= 782.13'
"BEACON AZ"	N = 684,999.89	E = 1,463,959.23	ELEV.= 926.73'
"319 JAS"	N = 733,066.25	E = 1,477,188.81	ELEV.= 837.95'

ALL PROPERTY BOUNDARY DATA IS BASED ON DATA SUPPLIED BY NCDOT.

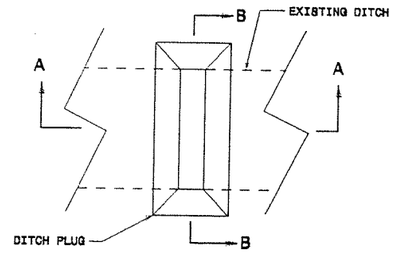
GRADING:
-THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED OR FUTURE SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING, ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.
-ALL EXCAVATED MATERIALS, INCLUDING NATURAL STONE MEETING SIZE LIMITATIONS, ARE TO BE SALVAGED FOR REUSE WITHIN THE PROJECT AT THE DISCRETION OF THE ENGINEER.
-ALL INFLECTION POINTS BETWEEN SLOPE ANGLES SHALL BE ROUNDED SLIGHTLY IN ORDER TO PROVIDE FOR SMOOTH TRANSITIONS AND A MORE NATURAL APPEARANCE.

SUBSURFACE PLANS:
-NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

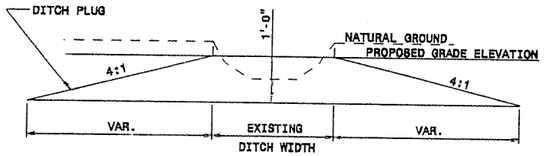
UTILITIES:
-UTILITY LOCATIONS NOTED ON PLANS ARE FOR INFORMATIONAL PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ANY EXISTING UTILITIES. CONTACT 'NC ONE CALL', 1-800-632-4949, A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION, AS WELL AS NCDOT, FOR INFORMATION.

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 DX FORKS RD.
RALEIGH, NC 27609-5291
•ENGINEERS • PLANNERS • ECOLOGISTS

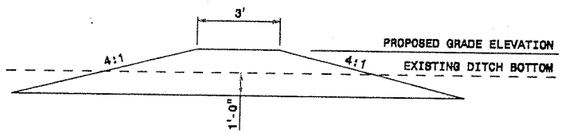
PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	2
RW SHEET NO.	
ENGINEER	SCIENTIST



PLAN VIEW



SECTION B-B



SECTION A-A

DITCH PLUG DETAIL

NOTES:
SEE PLAN SHEETS FOR LOCATIONS OF DITCH PLUGS.
SEE PROJECT SPECIAL PROVISIONS FOR MATERIAL SPECIFICATIONS.

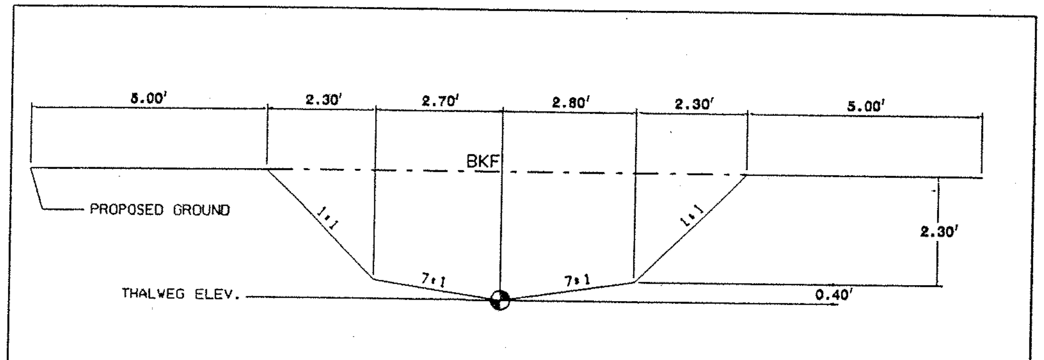
DETAIL SHEET 01

KCI Associates
of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5310
•ENGINEERS • PLANNERS • GEOLOGISTS

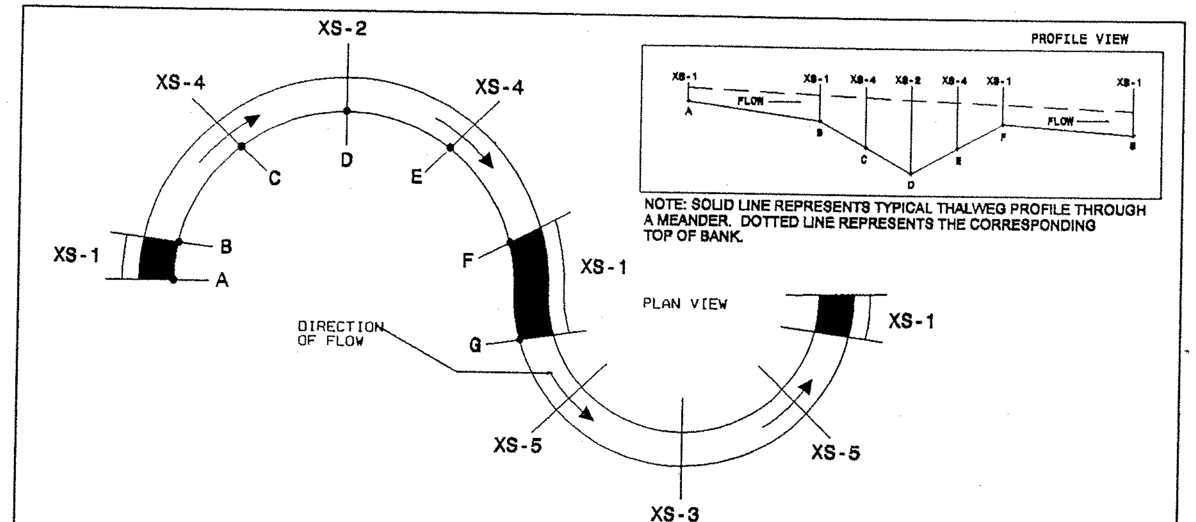
PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	2-A
RW SHEET NO.	
ENGINEER	SCIENTIST

TYPICAL CHANNEL CROSS SECTIONS

STREAM SEGMENT 1 - STATION 10+00 TO 88+22

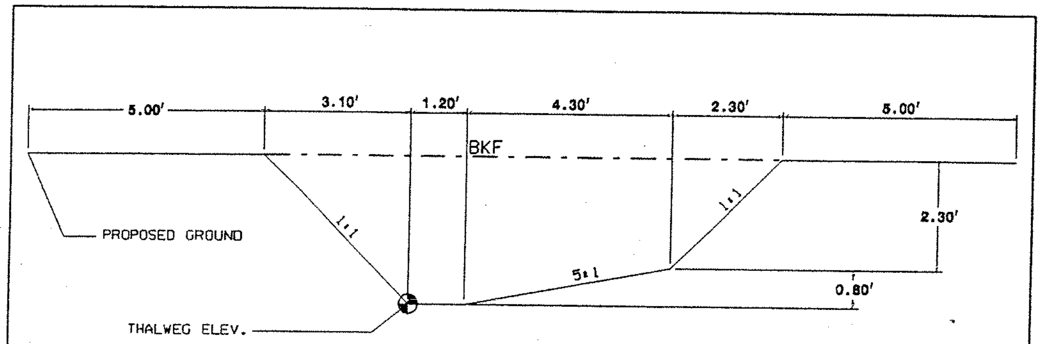


CROSS SECTION 1 - TYPICAL RIFFLE
SCALE: 1' - 2'



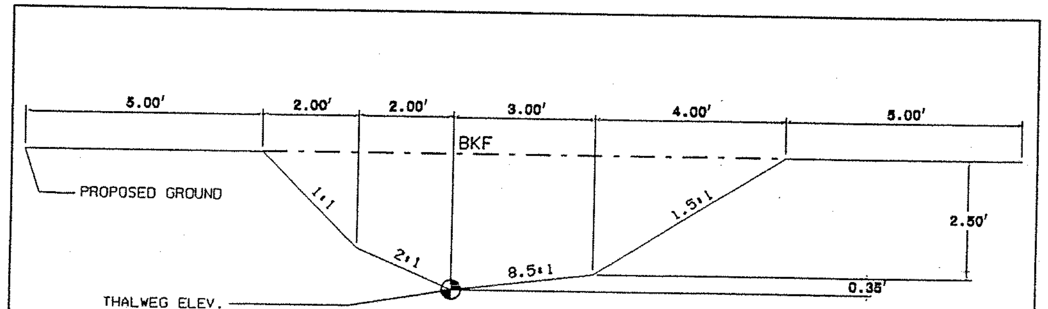
CROSS SECTION LOCATION DETAIL
SCALE: NTS

NOTE:
CHANNEL DIMENSIONS BETWEEN TYPICAL SECTIONS SHALL BE CONSTRUCTED TO PROVIDE FOR A SMOOTH TRANSITION.



CROSS SECTION 2 - TYPICAL POOL (LEFT)
SCALE: 1'-2'

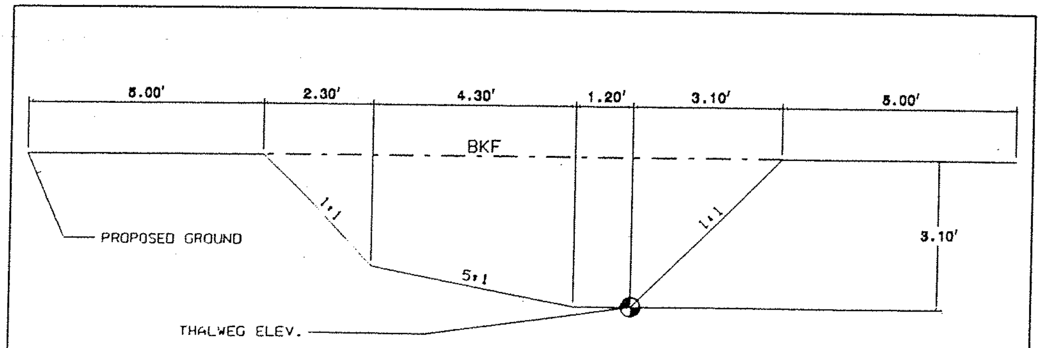
NOTE: CROSS SECTION 2 AND 3 ARE MIRROR IMAGES



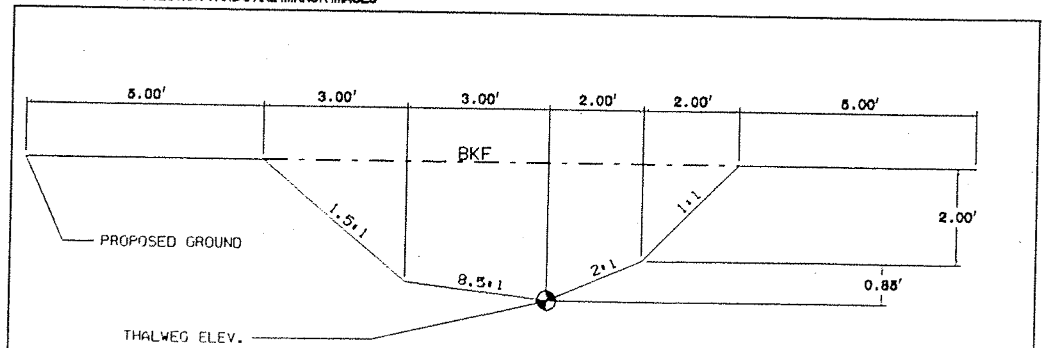
CROSS SECTION 4- TYPICAL RUN/ GLIDE (LEFT)
SCALE: 1'-2'

NOTE: CROSS SECTION 4 AND 5 ARE MIRROR IMAGES

NOTE:
THALWEG ELEVATIONS ARE EQUIVALENT TO THE CHANNEL INVERT ELEVATIONS THAT APPEAR ON THE PROFILE SHEETS (SEE SHEETS 35-39)



CROSS SECTION 3- TYPICAL POOL (RIGHT)
SCALE: 1'-2'



CROSS SECTION 5- TYPICAL RUN / GLIDE (RIGHT)
SCALE: 1'-2'

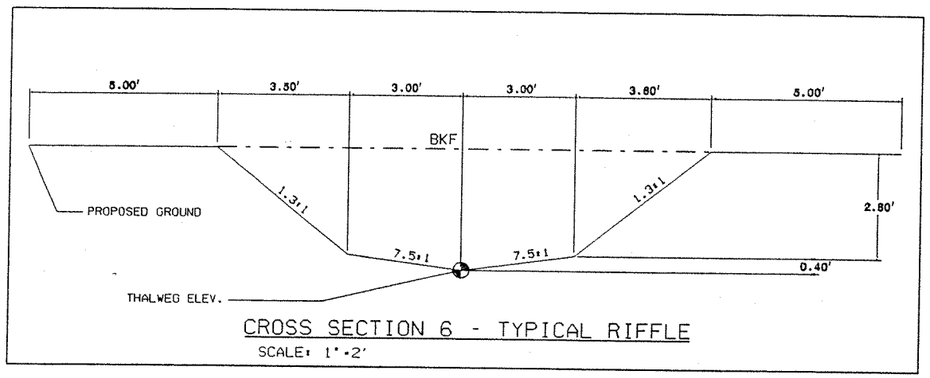
DETAIL SHEET 02

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609
ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2259WM	2-S
RW SHEET NO.	
ENGINEER	SCIENTIST

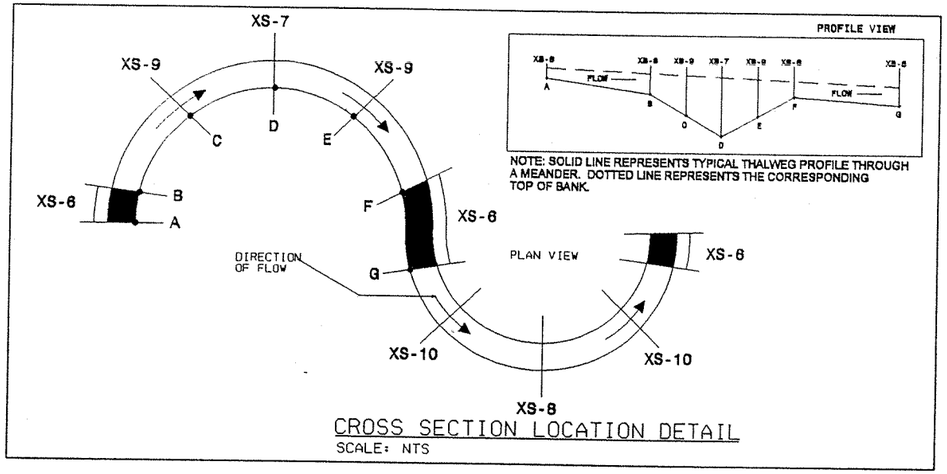
TYPICAL CHANNEL CROSS SECTIONS

STREAM SEGMENT 2 - STATION 88+22 TO 109+04



CROSS SECTION 6 - TYPICAL RIFFLE

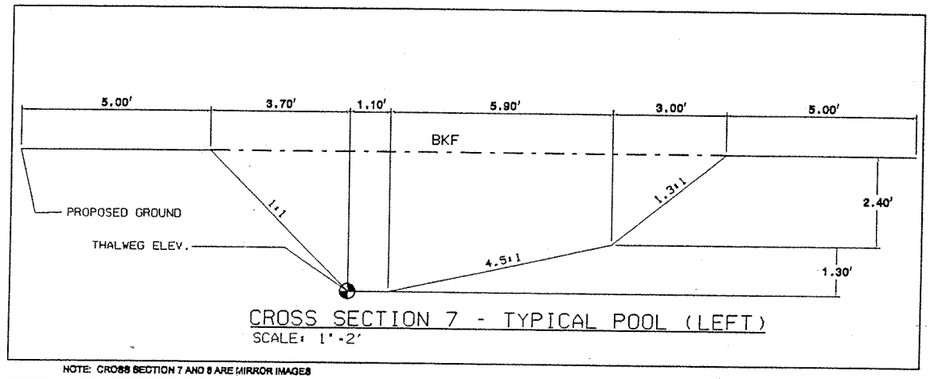
SCALE: 1"=2'



NOTE: SOLID LINE REPRESENTS TYPICAL THALWEG PROFILE THROUGH A MEANDER. DOTTED LINE REPRESENTS THE CORRESPONDING TOP OF BANK.

CROSS SECTION LOCATION DETAIL

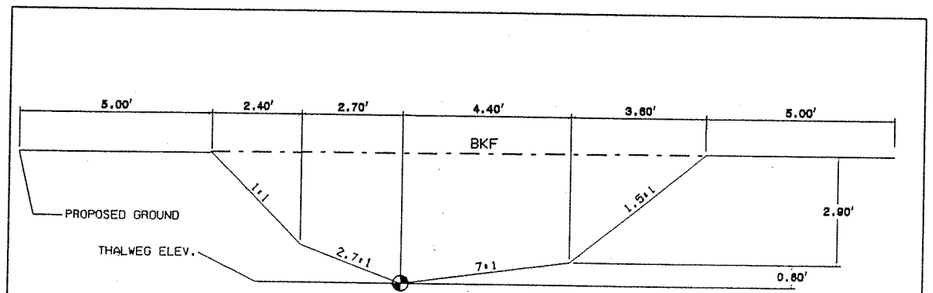
SCALE: NTS



CROSS SECTION 7 - TYPICAL POOL (LEFT)

SCALE: 1"=2'

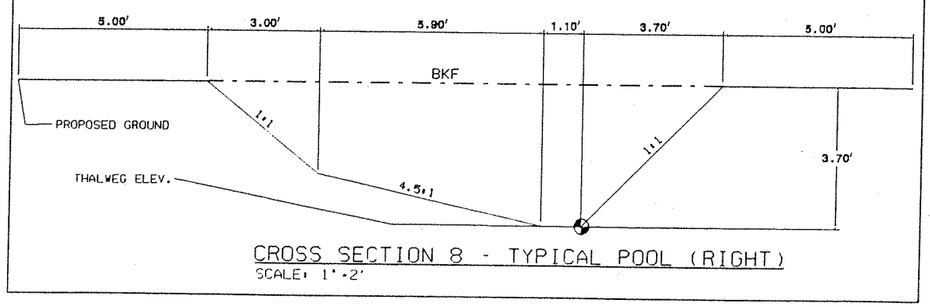
NOTE: CROSS SECTION 7 AND 8 ARE MIRROR IMAGES



CROSS SECTION 9 - TYPICAL RUN/ GLIDE (LEFT)

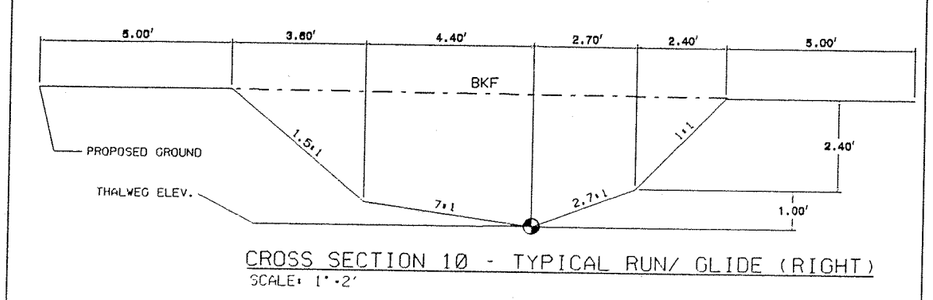
SCALE: 1"=2'

NOTE: CROSS SECTION 9 AND 10 ARE MIRROR IMAGES



CROSS SECTION 8 - TYPICAL POOL (RIGHT)

SCALE: 1"=2'



CROSS SECTION 10 - TYPICAL RUN/ GLIDE (RIGHT)

SCALE: 1"=2'

NOTE:
CHANNEL DIMENSIONS BETWEEN TYPICAL SECTIONS SHALL BE CONSTRUCTED TO PROVIDE FOR A SMOOTH TRANSITION.

NOTE:
THALWEG ELEVATIONS ARE EQUIVALENT TO THE CHANNEL INVERT ELEVATIONS THAT APPEAR ON THE PROFILE SHEETS (SEE SHEETS 35-39)

DETAIL SHEET 03

KCI Associates of North Carolina, P.A.
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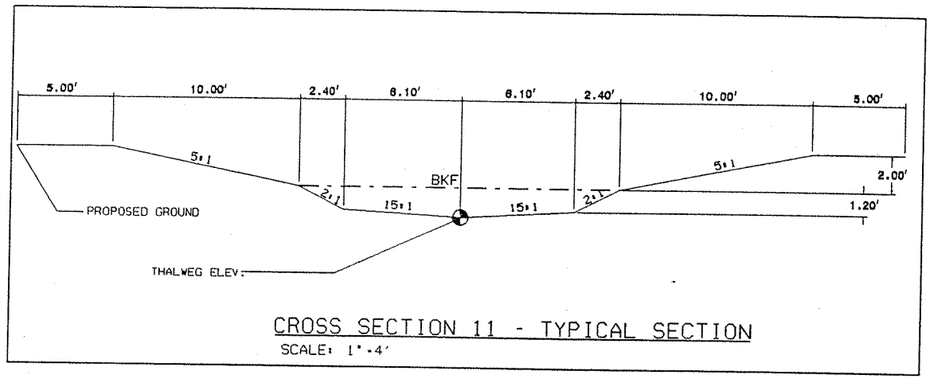
RALEIGH, NC 27609-5220
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	2-C
RW SHEET NO.	
ENGINEER	SCIENTIST

TYPICAL CHANNEL CROSS SECTIONS

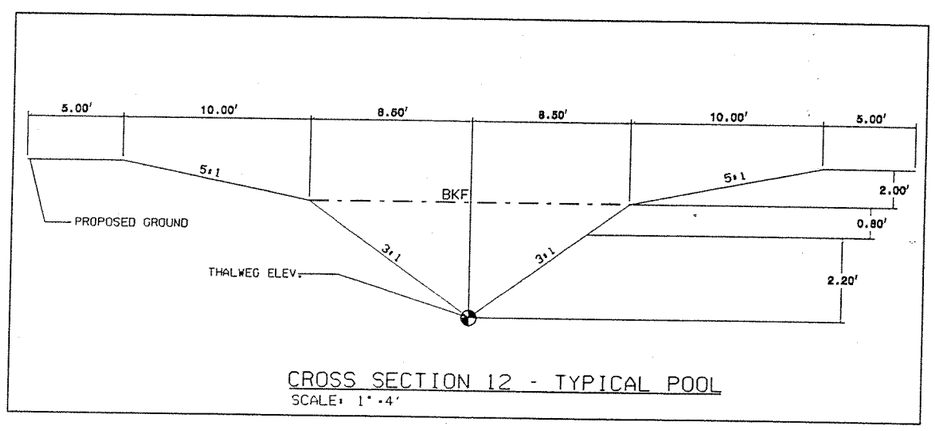
STREAM SEGMENT: TRIBUTARY - STATION 10+00T TO 17+99T



CROSS SECTION 11 - TYPICAL SECTION

SCALE: 1"=4'

NOTE:
THALWEG ELEVATIONS ARE EQUIVALENT TO THE CHANNEL INVERT ELEVATIONS THAT APPEAR ON THE PROFILE SHEETS (SEE SHEETS 35-39)



CROSS SECTION 12 - TYPICAL POOL

SCALE: 1"=4'

NOTE:
THALWEG ELEVATIONS ARE EQUIVALENT TO THE CHANNEL INVERT ELEVATIONS THAT APPEAR ON THE PROFILE SHEETS (SEE SHEETS 35-39)

KCI Associates of North Carolina, P.A.
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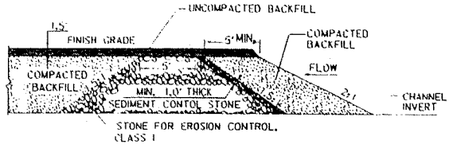
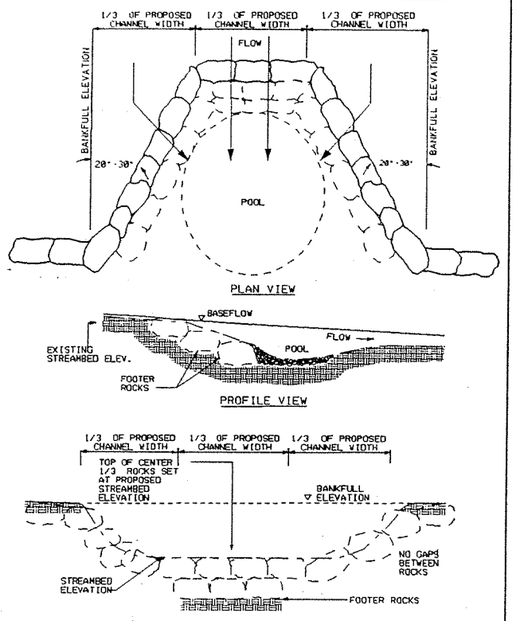
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	2-D
R/W SHEET NO.	
ENGINEER	SCIENTIST

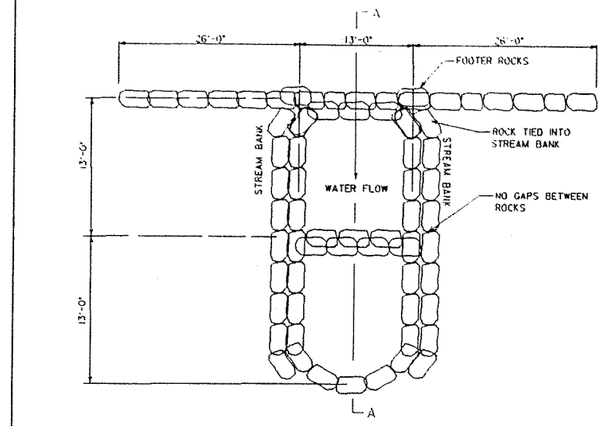


CHANNEL BLOCK
SCALE: NTS

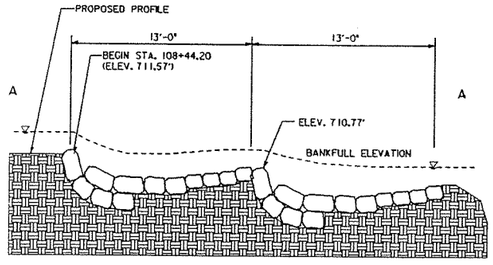


ROCK CROSS VANE
SCALE: NTS

*** NOTE: ALL ROCKS ARE STONE, CLASS BOULDER



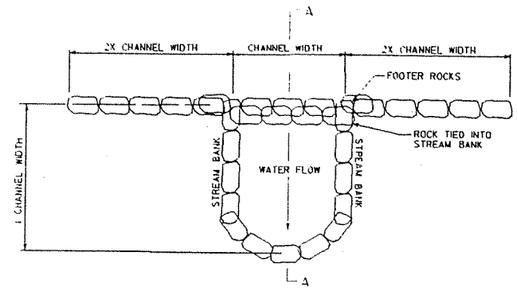
PLAN VIEW



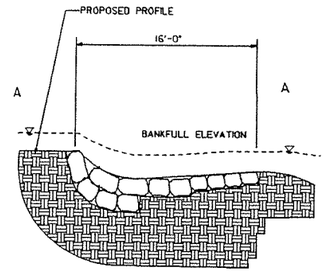
PROFILE VIEW

DOUBLE STEP POOL
SCALE: NTS

*** NOTE: ALL ROCKS ARE STONE, CLASS II



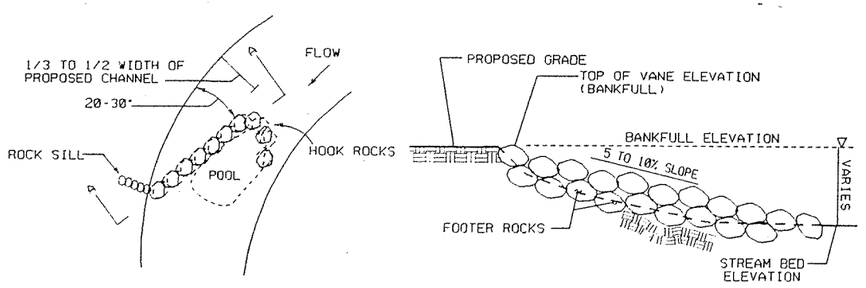
PLAN VIEW



PROFILE VIEW

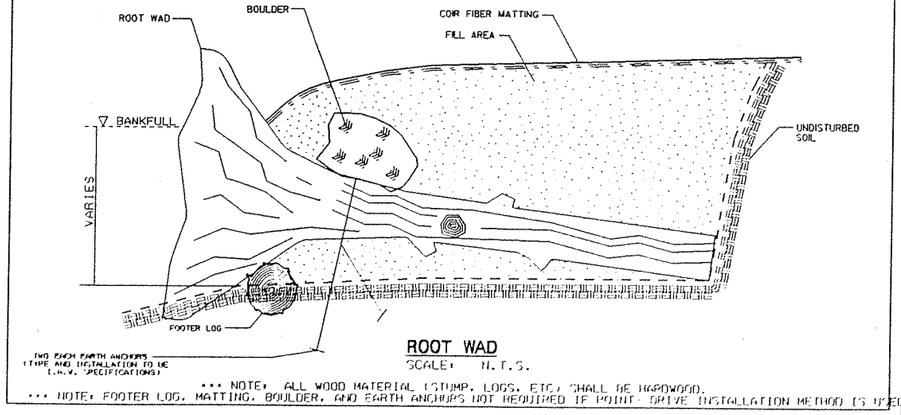
SINGLE STEP POOL
SCALE: NTS

*** NOTE: ALL ROCKS ARE STONE, CLASS II



J-VANE
SCALE: NTS

*** NOTE: ALL ROCKS ARE STONE, CLASS BOULDER.
*** NOTE: GAPS SHOULD BE PLACED ONLY BETWEEN THE HOOK ROCKS



ROOT WAD
SCALE: N.T.S.

*** NOTE: ALL WOOD MATERIAL (STUMP, LOGS, ETC.) SHALL BE HARDWOOD.
*** NOTE: FOOTER LOG, MATTING, BOULDER, AND EARTH ANCHORS NOT REQUIRED IF POINT DRIVE INSTALLATION METHOD IS USED

DETAIL SHEET 05

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 DUKE FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2238WM	3
R/W SHEET NO.	
ENGINEER	SCIENTIST

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF QUANTITIES

SECT.	QUANTITY	UNIT	ITEM DESCRIPTION
800	1	LS	MOBILIZATION
200	1	LS	CLEARING AND GRUBBING
1660	70	AC	MOWING
210	1	LS	DEMOLITION OF BUILDINGS AND APPURTENANCES
226	1	LS	GRADING
1630	310	CY	SILT EXCAVATION
SP	100	CY	IMPERVIOUS SELECT MATERIAL
SP	60	AC	RIPPING
SP	60	AC	DISCING
1056	400	SY	FILTER FABRIC FOR DRAINAGE
1660	60	AC	SEEDING AND MULCHING
1615	42	AC	TEMPORARY MULCH
1620	1500	LB	SEED FOR TEMPORARY SEEDING
1620	6	TON	FERTILIZER FOR TEMPORARY SEEDING
1661	400	LB	SEED FOR REPAIR SEEDING
1661	1	TON	FERTILIZER FOR REPAIR SEEDING
1662	1000	LB	SEED FOR SUPPLEMENTAL SEEDING
1665	30	TON	FERTILIZER TOPDRESSING
1610	215	TON	SEDIMENT CONTROL STONE
1610	50	TON	STONE FOR EROSION CONTROL, CLASS A
1610	250	TON	STONE FOR EROSION CONTROL, CLASS B
1610	40	TON	STONE FOR EROSION CONTROL, CLASS 1
1632	500	FT	¼" HARDWARE CLOTH
SP	300	TON	STONE, CLASS 2
SP	500	TON	STONE, BOULDER
SP	21	EA	ROOT WADS
SP	2000	SY	COIR MATTING
1060	300	SY	EROSION CONTROL MATTING FOR LEVEE BREAK
SP	2100	LF	TEMPORARY CHANNEL DIVERSION
SP	150	LF	IMPERVIOUS DIKE
866	10400	LF	WOVEN WIRE FENCE 47" FABRIC
866	800	EA	4" TIMBER FENCE POSTS, 8' LONG
866	2	EA	GATE, SGL, 52"x14'x14'
904	100	EA	SIGN ERECTION, TYPE F
1094	800	LF	SUPPORTS, 3-LB STEEL U-CHANNEL

SUMMARY OF EARTHWORK

IN CUBIC YARDS

SITE EXCAVATION =	49,000 CY
STREAM EXCAVATION =	9,500 CY
SITE EMBANKMENT =	37,500 CY
NET WASTE =	21,000 CY

KCI Associates
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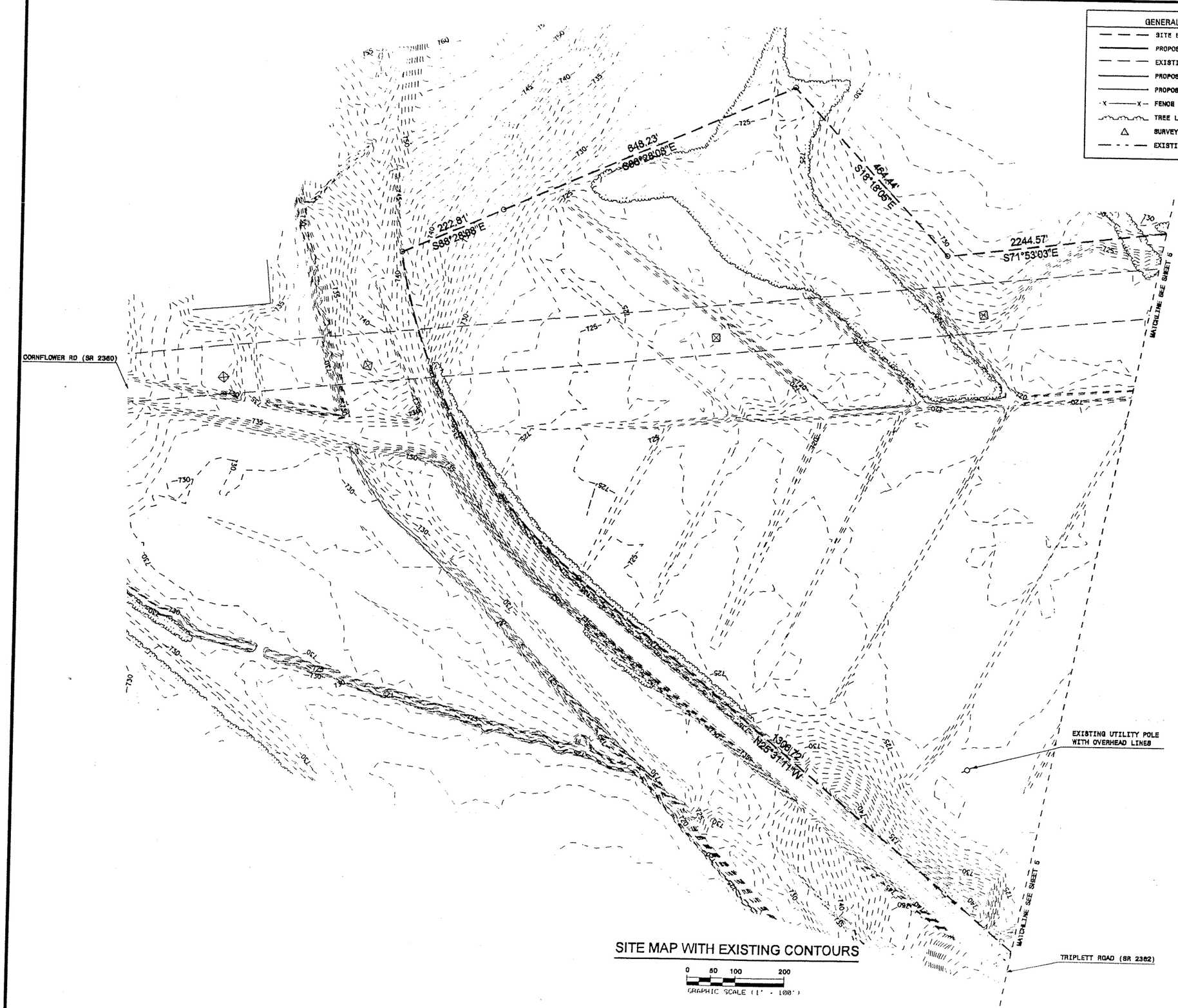
SUITE 200, LANDMARK CENTER I, 4601 AT FAIRS RD.
RALEIGH, NC 27609-5290
• ENGINEERS • PLANNERS • LANDSCAPE ARCHITECTS

GENERAL PLAN LEGEND	
	SITE BOUNDARY
	PROPOSED STREAM CHANNEL PLANFORM
	EXISTING CONTOUR LINES
	PROPOSED 5' CONTOUR LINES
	PROPOSED 1' CONTOUR LINES
-X-X-	FENCE LINE
	TREE LINE
△	SURVEY CONTROL POINT
	EXISTING PROPERTY LINE

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	4
RW SHEET NO.	
ENGINEER	SCIENTIST



SITE MAP WITH EXISTING CONTOURS

0 50 100 200
GRAPHIC SCALE (1" = 100')

SITE MAP W/ EXISTING CONTOURS 01

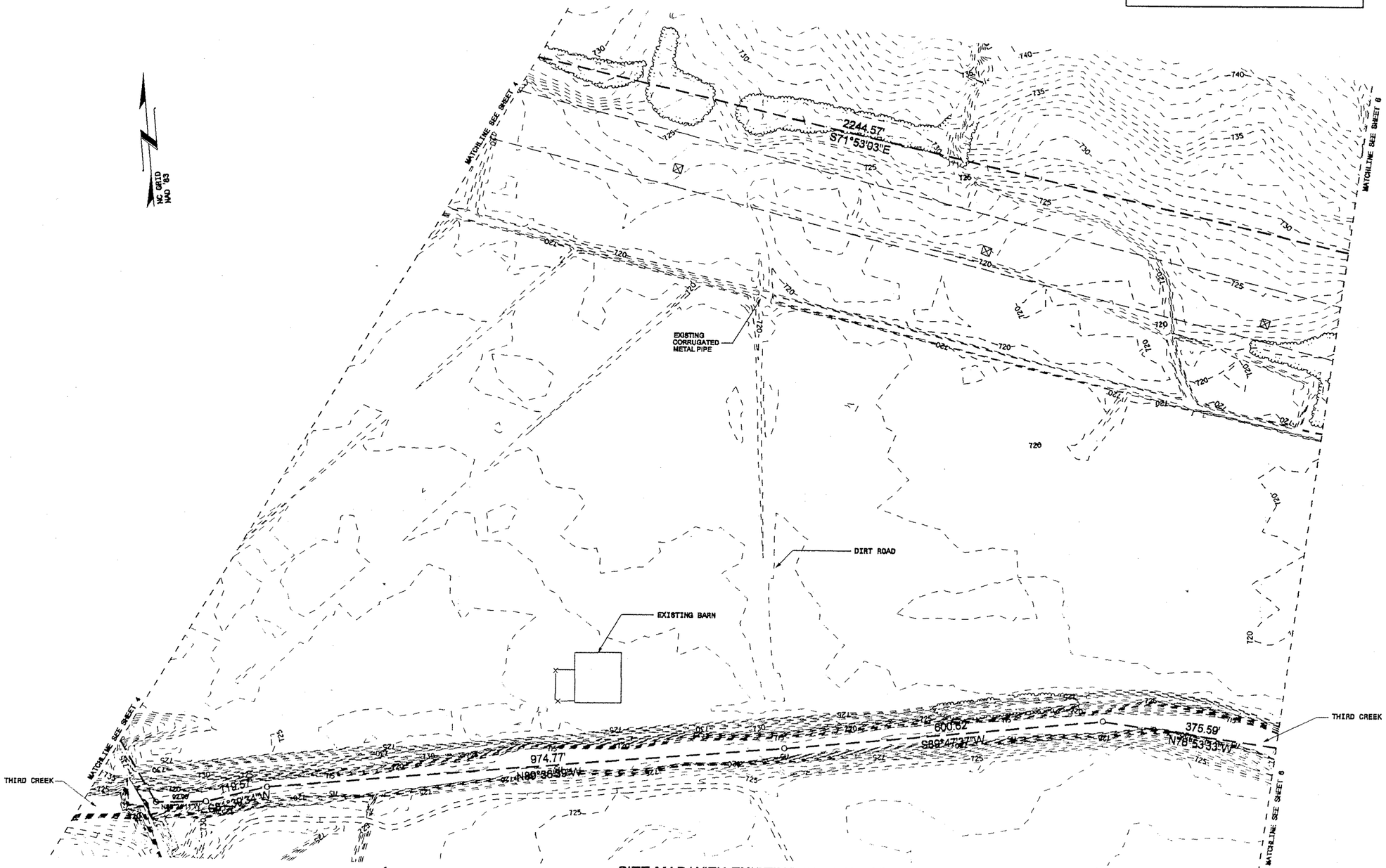
KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5290
•ENGINEERS • PLANNERS • TECHNOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2235WM	5
R/W SHEET NO.	
ENGINEER	SCIENTIST

GENERAL PLAN LEGEND

- SITE BOUNDARY
- PROPOSED STREAM CHANNEL PLANFORM
- EXISTING CONTOUR LINES
- PROPOSED 5' CONTOUR LINES
- PROPOSED 1' CONTOUR LINES
- FENCE LINE
- TREE LINE
- SURVEY CONTROL POINT
- EXISTING PROPERTY LINE

NC GRID NAD '83



SITE MAP WITH EXISTING CONTOURS

0 50 100 200

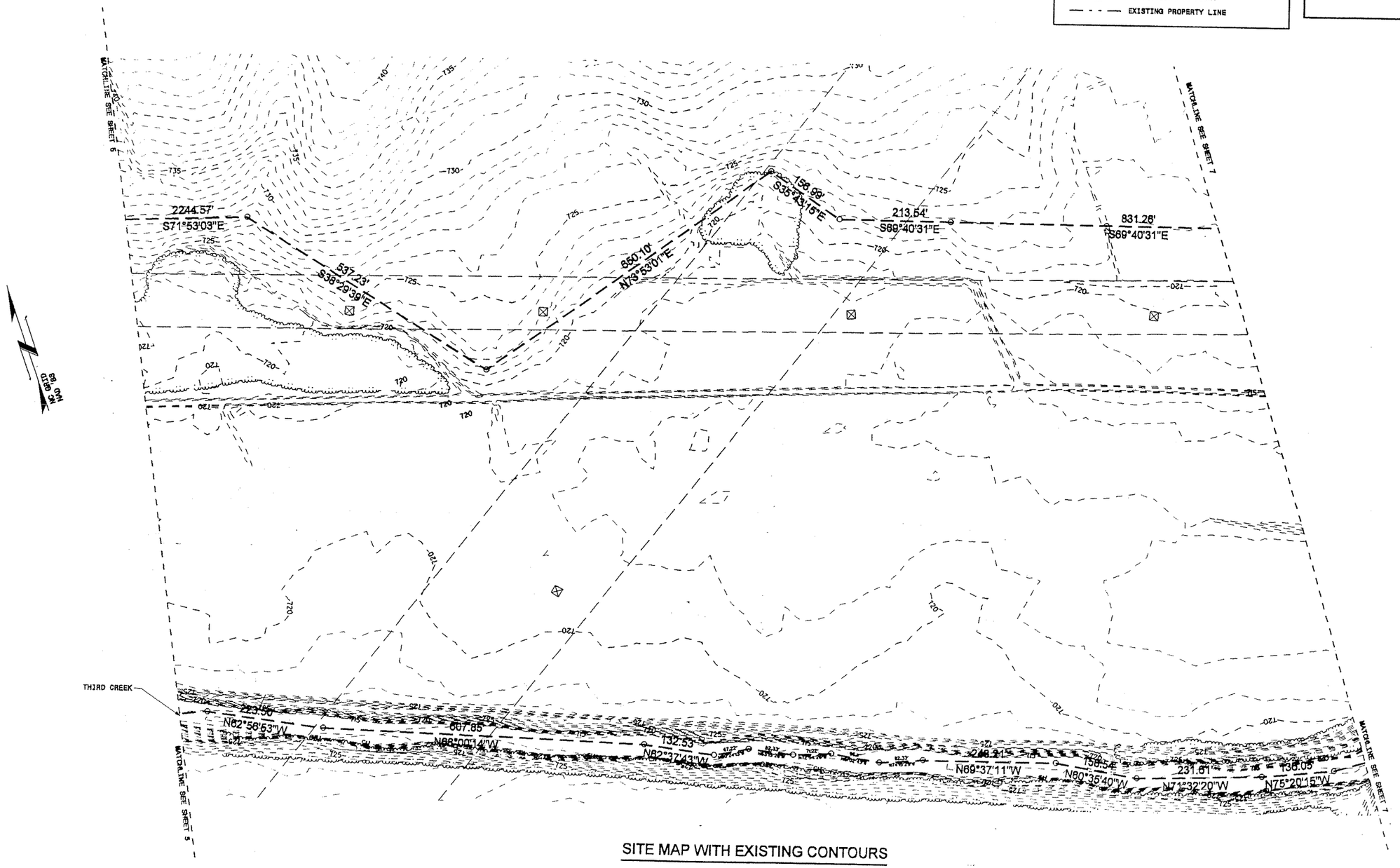
GRAPHIC SCALE (1" = 100')

SITE MAP W/ EXISTING CONTOURS 02

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5289
• ENGINEERS • PLANNERS • SCIENTISTS

GENERAL PLAN LEGEND	
	SITE BOUNDARY
	PROPOSED STREAM CHANNEL PLANFORM
	EXISTING CONTOUR LINES
	PROPOSED 5' CONTOUR LINES
	PROPOSED 1' CONTOUR LINES
-X-X-	FENCE LINE
	TREE LINE
△	SURVEY CONTROL POINT
	EXISTING PROPERTY LINE

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	6
RW SHEET NO.	
ENGINEER	SCIENTIST



SITE MAP WITH EXISTING CONTOURS

0 50 100 200
GRAPHIC SCALE (1" = 100')

SITE MAP W/ EXISTING CONTOURS 03

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5280
•ENGINEERS • PLANNERS • ECOLOGISTS

GENERAL PLAN LEGEND	
— — —	SITE BOUNDARY
———	PROPOSED STREAM CHANNEL PLANFORM
— — —	EXISTING CONTOUR LINES
———	PROPOSED 5' CONTOUR LINES
———	PROPOSED 1' CONTOUR LINES
-x——x-	FENCE LINE
~~	TREE LINE
△	SURVEY CONTROL POINT
— - - —	EXISTING PROPERTY LINE

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	7
RW SHEET NO.	
ENGINEER	SCIENTIST

NC GRID
NAD 83

KNOX FARM ROAD (SR 2363)

MATCHLINE SEE SHEET 6

MATCHLINE SEE SHEET 8

283.89'
S34°37'06"E

541.91'
S83°13'28"E

506.12'
N23°24'19"E

326.84'
N39°58'17"E

442.92'
S66°39'15"E

272.92'
S48°35'14"E

257.54'
S70°18'53"W

208.19'
S79°40'57"W

772.86'
S75°10'39"W

THIRD CREEK

SITE MAP WITH EXISTING CONTOURS

0 50 100 200
GRAPHIC SCALE (1" = 100')

SITE MAP W/ EXISTING CONTOURS 04

KCI Associates
of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5291
•ENGINEERS, • PLANNERS, • LANDSCAPE ARCHITECTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	8
R/W SHEET NO.	
ENGINEER	SCIENTIST

LIMITS LEGEND	
	LIMITS OF DISTURBANCE
	PHASE I LIMITS DO NOT DISTURB
	MOWING, RIPPING, & DISCING
	CLEARING & GRUBBING
	STREAM NON-RIP AREA 40' WIDE CENTERED ALONG STREAM

LIMITS OF OPERATION

0 50 100 200

GRAPHIC SCALE (1" = 100')

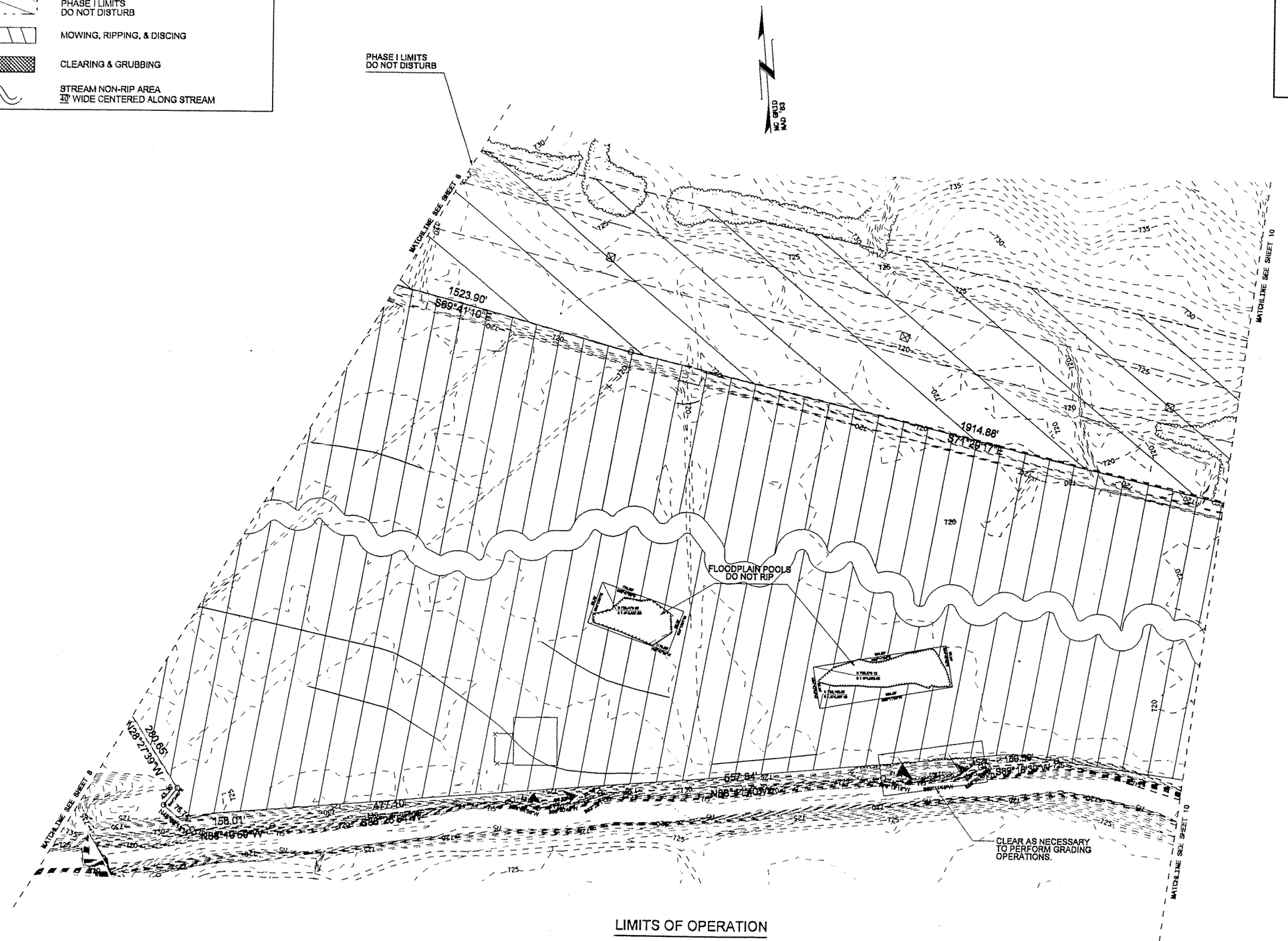
LIMITS SHEET 01

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
• ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	9
RW SHEET NO.	
ENGINEER	SCIENTIST

LIMITS LEGEND

- LIMITS OF DISTURBANCE
- PHASE I LIMITS DO NOT DISTURB
- MOWING, RIPPING, & DISCING
- CLEARING & GRUBBING
- STREAM NON-RIP AREA 40' WIDE CENTERED ALONG STREAM



LIMITS OF OPERATION

0 50 100 200

GRAPHIC SCALE (1" = 100')

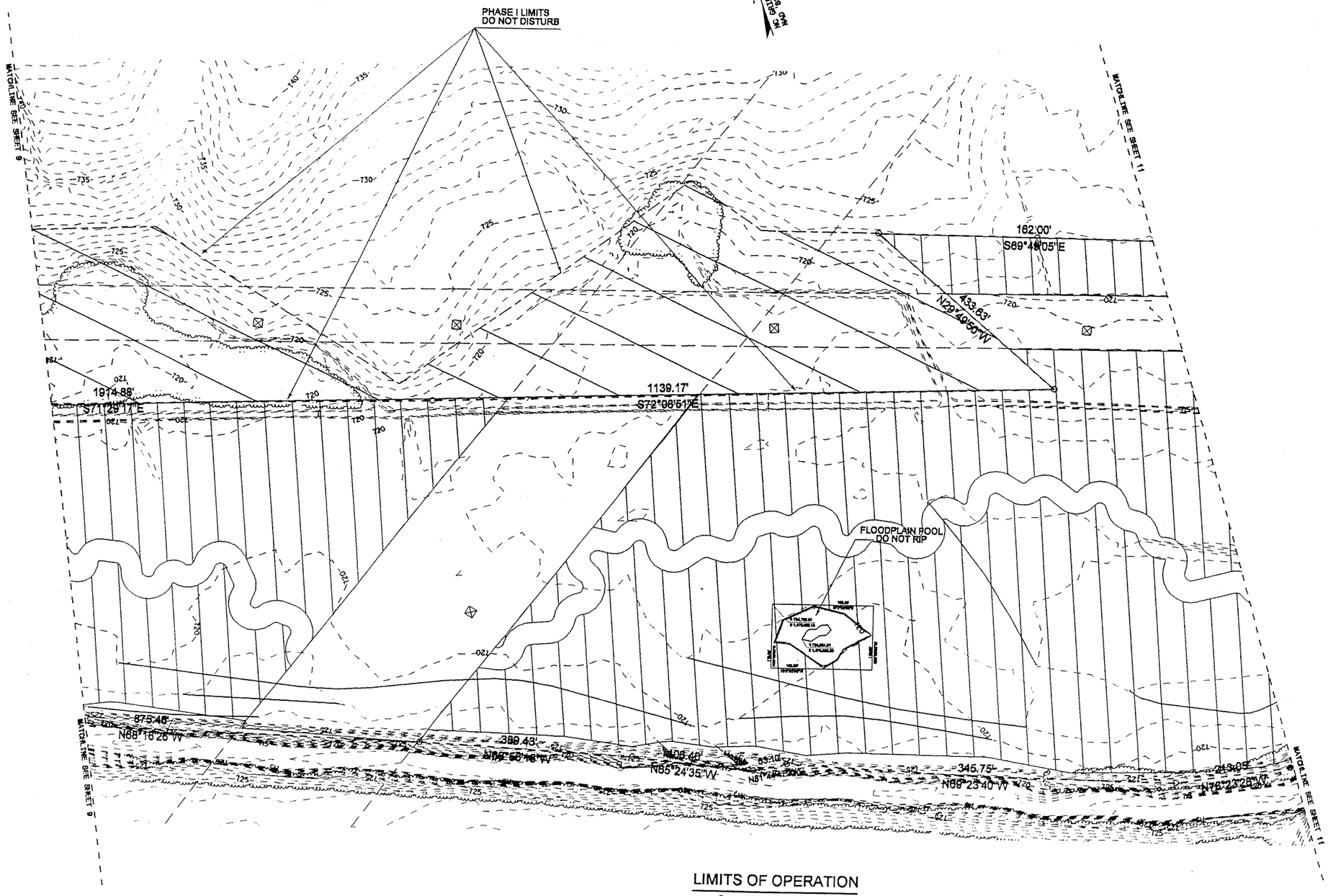
LIMITS SHEET 02

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5286
• ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
S - 2259WM	10
R/W SHEET NO.	
ENGINEER	SCIENTIST

LIMITS LEGEND

- LIMITS OF DISTURBANCE
- PHASE I LIMITS DO NOT DISTURB
- MOWING, RIPPING, & DISCING
- CLEARING & GRUBBING
- STREAM NON-RIP AREA 40' WIDE CENTERED ALONG STREAM



LIMITS OF OPERATION

0 50 100 200

GRAPHIC SCALE (1" = 100')

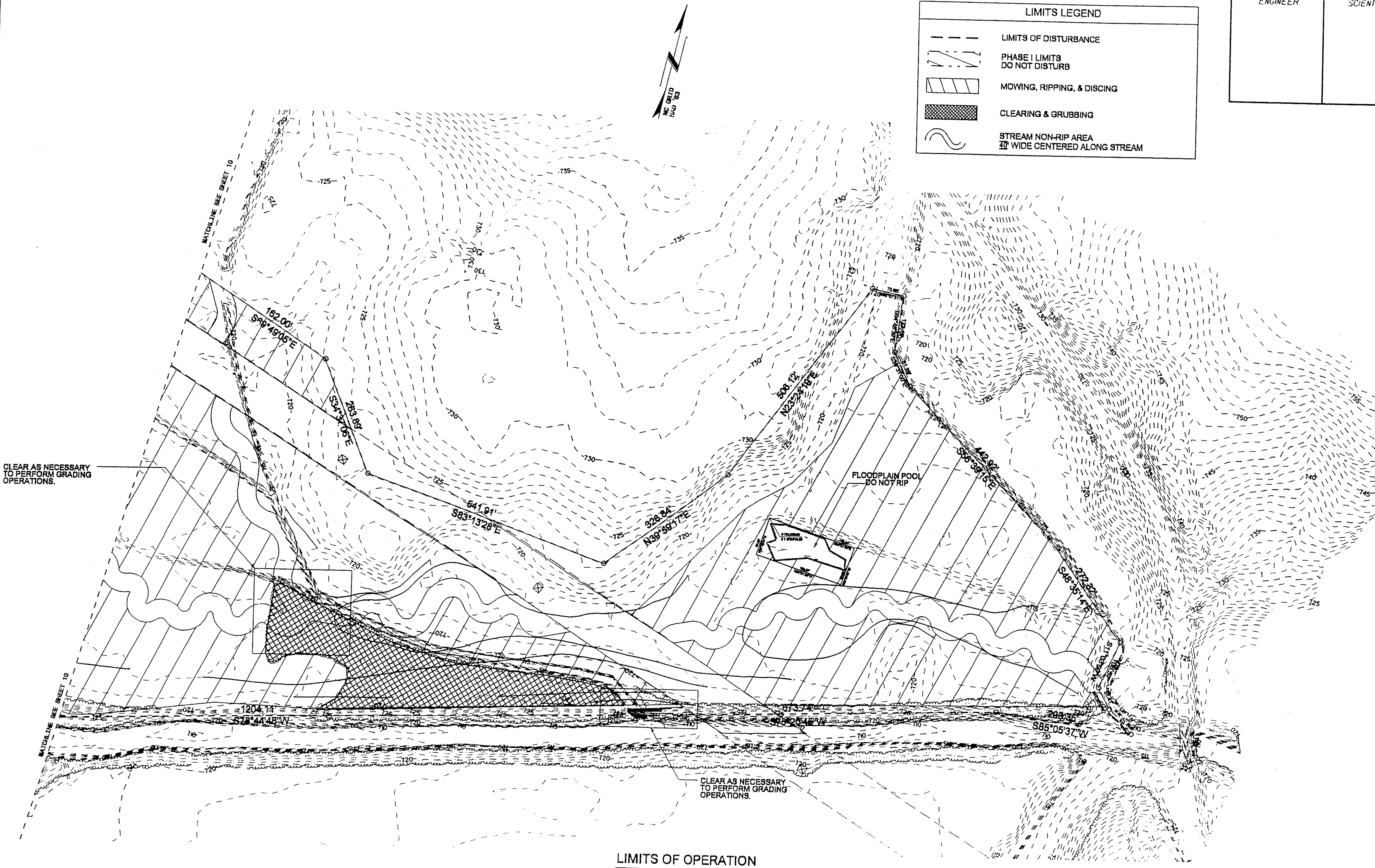
LIMITS SHEET 03

KCI Associates of North Carolina, P.A.
SUITE 250, LANDMARK CENTER I, 4601 DIX FORKS RD.
RALEIGH, NC 27609-5290
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	11
R/W SHEET NO.	
ENGINEER	SCIENTIST

LIMITS LEGEND

- LIMITS OF DISTURBANCE
- PHASE I LIMITS DO NOT DISTURB
- MOWING, RIPPING, & DISCING
- CLEARING & GRUBBING
- STREAM NON-RIP AREA 40' WIDE CENTERED ALONG STREAM



LIMITS OF OPERATION

0 50 100 200

GRAPHIC SCALE (1" = 100')

LIMITS SHEET 04

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
• ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	12
R/W SHEET NO.	
ENGINEER	SCIENTIST

INSTALL CATTLE GATE
PER STD. DRAWING 866.04

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

PHASE I LIMITS
DO NOT DISTURB

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

INSTALL CATTLE GATE
PER STD. DRAWING 866.04

S88°28'08"E 648.23'

S88°28'08"E 227.81'

S18°18'05"E 464.41'

S71°53'03"E 2244.57'

N25°31'11"W 1306.72'

SCE

DITCH PLUG
SEE DETAIL SHEET 2

RELOCATE EXISTING
UTILITY POLE
(LOCATION TBD)

MATCHLINE SEE SHEET 13

MATCHLINE SEE SHEET 13

NOTE: STABILIZED CONSTRUCTION ENTRANCES (SCE) HAVE BEEN INSTALLED AS PART OF PHASE I OPERATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN THE EXISTING SCE(S) THROUGH THE CONSTRUCTION PERIOD.

NO SCALE

GRADING LEGEND

- EXISTING MINOR CONTOURS
- 735 EXISTING MAJOR CONTOURS
- PROPOSED CONTOURS
- MITIGATION BOUNDARY
- SCE STABILIZED CONSTRUCTION ENTRANCE
- TREES
- TREELINE AND HEDGES
- UTILITY POLE
- DUKE POWER TOWER
- PROPOSED STREAM ALIGNMENT
- PHASE I LIMITS DO NOT DISTURB

GRADING PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

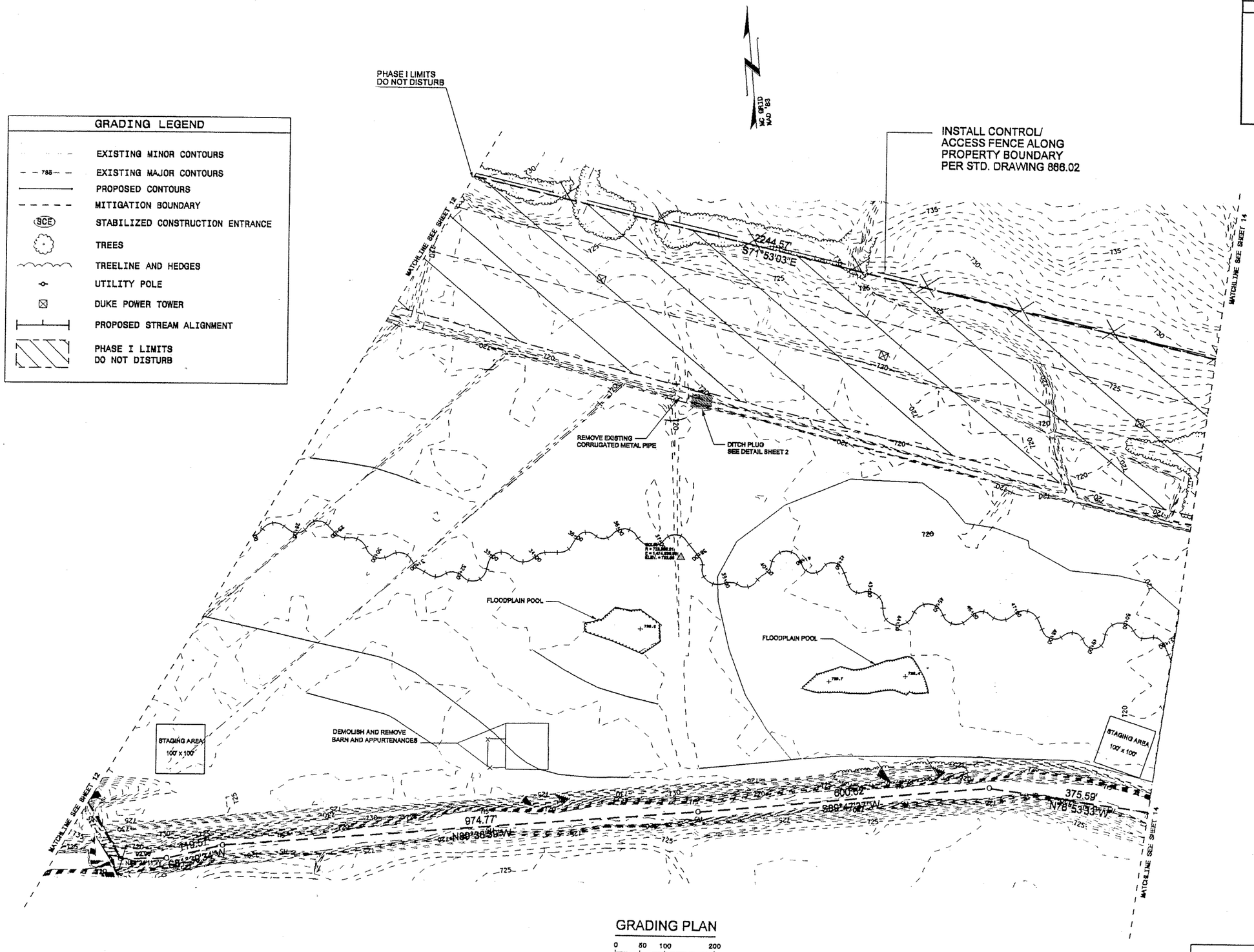
GRADING SHEET 01

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 CX FORKS RD.
RALEIGH, NC 27609-5290
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2259WM	13
RW SHEET NO.	
ENGINEER	SCIENTIST

GRADING LEGEND

- EXISTING MINOR CONTOURS
- 785 EXISTING MAJOR CONTOURS
- PROPOSED CONTOURS
- MITIGATION BOUNDARY
- SCE STABILIZED CONSTRUCTION ENTRANCE
- TREES
- TREELINE AND HEDGES
- UTILITY POLE
- DUKE POWER TOWER
- PROPOSED STREAM ALIGNMENT
- PHASE I LIMITS DO NOT DISTURB



GRADING PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

GRADING SHEET 02

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 DX FORKS RD.
RALEIGH, NC 27609-5290
• ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2359WM	14
R/W SHEET NO.	
ENGINEER	SCIENTIST

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

PHASE I LIMITS
DO NOT DISTURB

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

MATCHLINE SEE SHEET 15

MATCHLINE SEE SHEET 15

2244.57'
S71°53'03"E

537.23'
S38°29'39"E

660.10'
N73°53'04"E

186.99'
S35°43'15"E

213.54'
S69°40'31"E

831.28'
S69°40'31"E

DITCH PLUG
SEE DETAIL SHEET 2

FLOODPLAIN POOL

223.50'
N82°58'53"W

607.85'
N88°00'14"W

132.93'
N82°37'43"W

246.21'
N89°37'11"W

156.54'
N86°35'40"W

231.61'
N71°32'20"W

56.05'
N75°20'15"W

MATCHLINE SEE SHEET 15

MATCHLINE SEE SHEET 15

GRADING LEGEND

- EXISTING MINOR CONTOURS
- 735 EXISTING MAJOR CONTOURS
- PROPOSED CONTOURS
- MITIGATION BOUNDARY
- SCE STABILIZED CONSTRUCTION ENTRANCE
- TREES
- TREELINE AND HEDGES
- UTILITY POLE
- DUKE POWER TOWER
- PROPOSED STREAM ALIGNMENT
- PHASE I LIMITS DO NOT DISTURB

GRADING PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

GRADING SHEET 03

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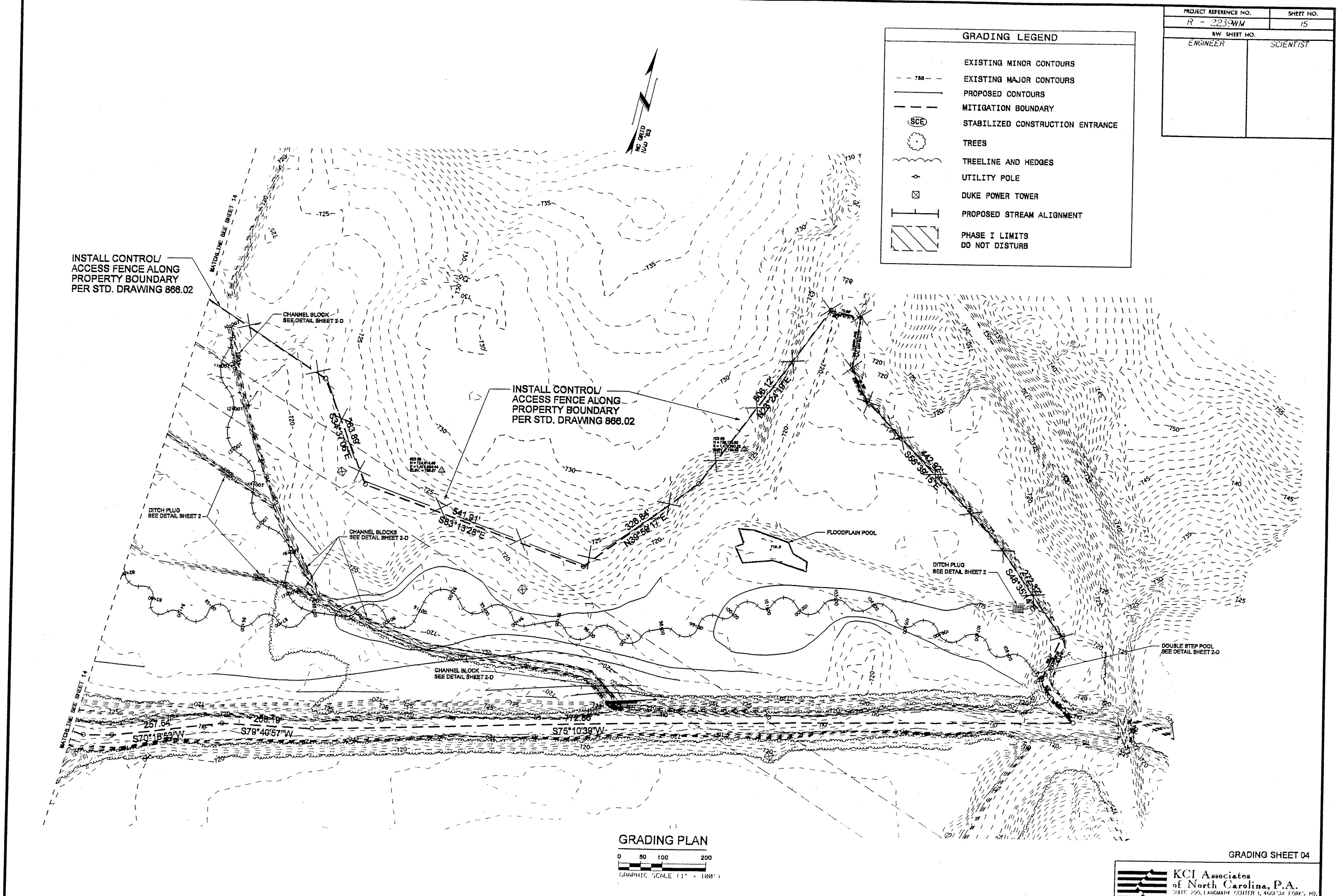
PROJECT REFERENCE NO.
R - 2239WM
SHEET NO.
15
RW SHEET NO.
ENGINEER
SCIENTIST
GRADING LEGEND
EXISTING MINOR CONTOURS
EXISTING MAJOR CONTOURS
PROPOSED CONTOURS
MITIGATION BOUNDARY
SCE
STABILIZED CONSTRUCTION ENTRANCE
TREES
TREELINE AND HEDGES
UTILITY POLE
DUKE POWER TOWER
PROPOSED STREAM ALIGNMENT
PHASE I LIMITS
DO NOT DISTURB
NC GRID
NAD 83
INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02
INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02
MATCHLINE SEE SHEET 14
CHANNEL BLOCK
SEE DETAIL SHEET 2-D
CHANNEL BLOCKS
SEE DETAIL SHEET 2-D
CHANNEL BLOCK
SEE DETAIL SHEET 2-D
DITCH PLUG
SEE DETAIL SHEET 2
DITCH PLUG
SEE DETAIL SHEET 2
FLOODPLAIN POOL
DOUBLE STEP POOL
SEE DETAIL SHEET 2-D
263.89'
S34°37'06"E
541.91'
S83°13'28"E
326.84'
N39°59'11"E
806.12
N39°24'18"E
442.92'
S56°39'15"E
273.32'
S48°35'14"E
257.54'
S70°18'53"W
268.19'
S79°40'57"W
772.66'
S75°10'39"W
MATCHLINE SEE SHEET 14
GRADING PLAN
0 50 100 200
GRAPHIC SCALE (1" = 100')
GRADING SHEET 04
KCI Associates
of North Carolina, P.A.
ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET
R - 2239WM	
R/W SHEET NO.	

ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14350 ENGINEER JOHN WALDO BLANTON

SCIENTI

FENCE MOVED
25' INSIDE
TO AVOID EXTENSIVE
CLEARING

CV#1 STA. 10+00
BED ELEV. 724.22'

CV#2 STA. 10+34.33
BED ELEV. 723.88'

CV#3 STA. 11+55.81
BED ELEV. 723.20'

CV#4 STA. 12+54.67
BED ELEV. 722.75'

CV#5 STA. 13+40.92
BED ELEV. 722.16'

CV#6 STA. 14+62.14
BED ELEV. 721.49'

CV#7 STA. 15+44.70
BED ELEV. 721.26'

CV#8 STA. 17+75.77
BED ELEV. 720.54'

JV#1 STA. 18+74.50
BED ELEV. 721.00'

CV#9 STA. 23+08.33
BED ELEV. 720.16'

JV#2 STA. 22+27.74
BED ELEV. 720.24'

JV#3 STA. 24+04.40
BED ELEV. 720.12'

CV#10 STA. 26+80.55
BED ELEV. 719.92'

MATCHLINE SEE SHEET 13

MATCHLINE SEE SHEET 13

STRUCTURES PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

NO 9810 83

STRUCTURES LEGEND

- PROPOSED STREAM ALIGNMENT
- CROSS VANE (CV)
- STEP POOL (SP)
- J - VANE (JV)
- ROOT WAD
- RIP RAP

(SEE DETAILS)

NOTE:
STRUCTURES ARE NOT DRAWN TO SCALE. ORIENTATION OF STRUCTURES ARE APPROXIMATE. INSTALLATION SHOULD FOLLOW DETAILS AND PROJECT SPECIAL PROVISIONS.

STRUCTURES

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RALEIGH, NC 27609-5310
• ENGINEERS • PLANNERS • SCIENTISTS

ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JAMES WALDO BLAKE

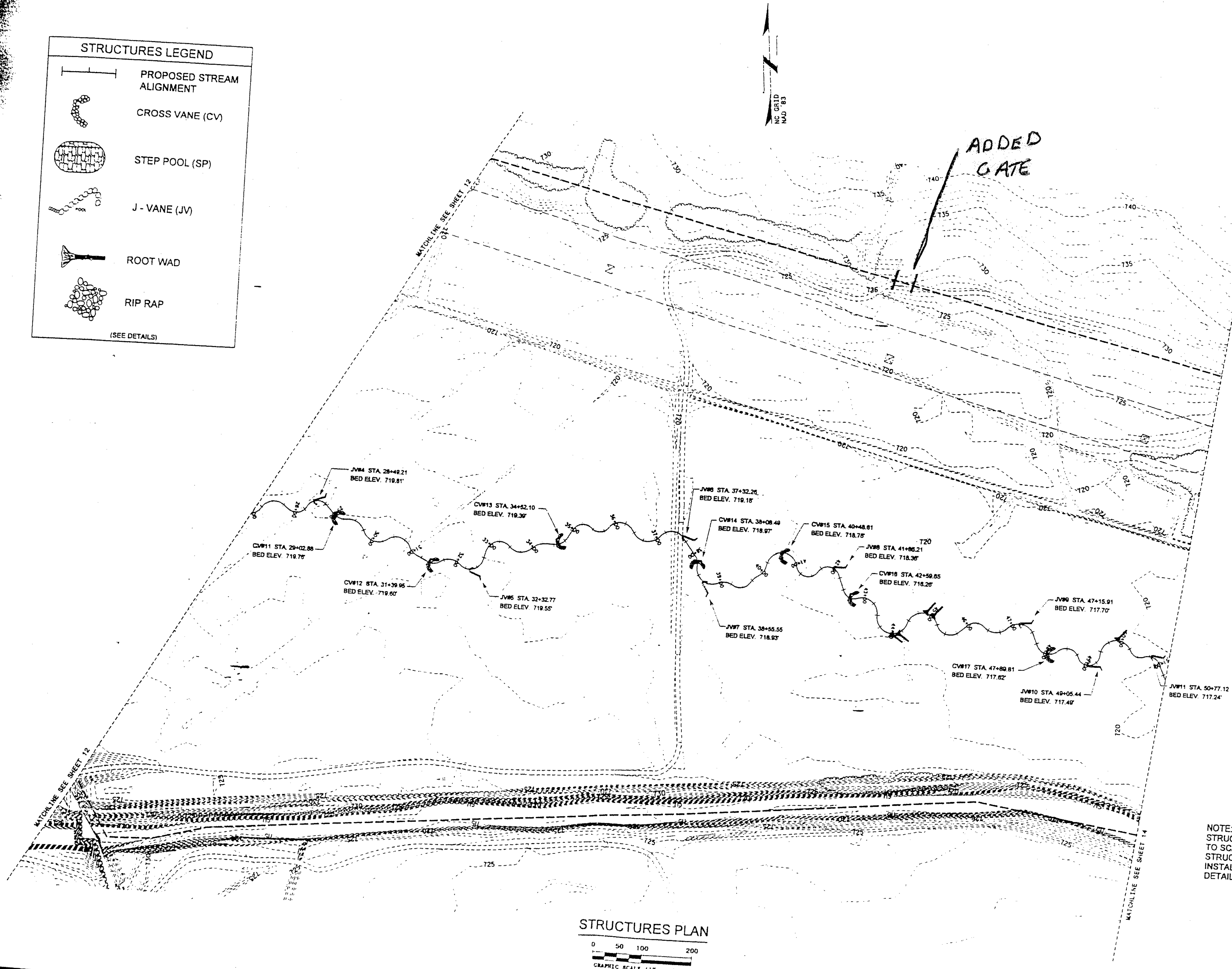
SCIENTIST

Society of Wetland Scientists Professional Wetland Scientist 7/22/02

STRUCTURES LEGEND

- PROPOSED STREAM ALIGNMENT
- CROSS VANE (CV)
- STEP POOL (SP)
- J - VANE (JV)
- ROOT WAD
- RIP RAP

(SEE DETAILS)


NC GRID NAD 83
ADDED GATE
MATCHLINE SEE SHEET 12
MATCHLINE SEE SHEET 14
JV#4 STA. 28+49.21 BED ELEV. 719.81'
CV#11 STA. 29+02.88 BED ELEV. 719.76'
CV#12 STA. 31+39.95 BED ELEV. 719.60'
JV#5 STA. 32+32.77 BED ELEV. 719.55'
CV#13 STA. 34+52.10 BED ELEV. 719.39'
JV#6 STA. 37+32.26 BED ELEV. 719.18'
CV#14 STA. 38+08.49 BED ELEV. 718.97'
JV#7 STA. 38+55.55 BED ELEV. 718.93'
CV#15 STA. 40+48.61 BED ELEV. 718.78'
JV#8 STA. 41+86.21 BED ELEV. 718.36'
CV#16 STA. 42+59.85 BED ELEV. 718.26'
JV#9 STA. 47+15.91 BED ELEV. 717.70'
CV#17 STA. 47+89.81 BED ELEV. 717.62'
JV#10 STA. 49+05.44 BED ELEV. 717.49'
JV#11 STA. 50+77.12 BED ELEV. 717.24'

NOTE:
STRUCTURES ARE NOT DRAWN TO SCALE. ORIENTATION OF STRUCTURES ARE APPROXIMATE. INSTALLATION SHOULD FOLLOW DETAILS AND PROJECT SPECIAL PROVISIONS.

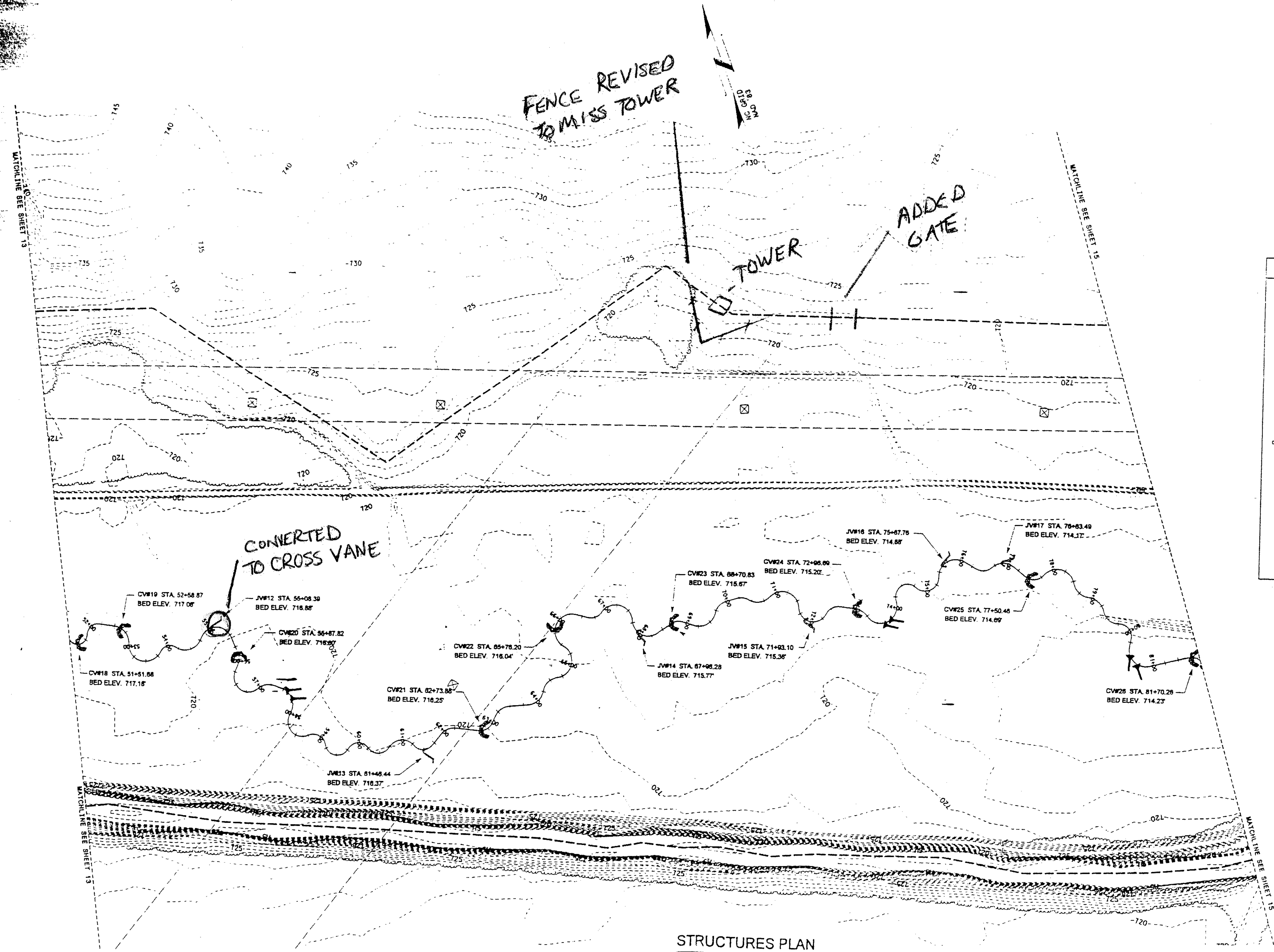
STRUCTURES PLAN

0 50 100 200
GRAPHIC SCALE (1" = 100')

STRUCTURES 02

KCI Associates of North Carolina, P.A.

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	18
RW SHEET NO.	
ENGINEER	SCIENTIST



FENCE REVISED TO MISS TOWER
TOWER
ADDED GATE
CONVERTED TO CROSS VANE
MATCHLINE SEE SHEET 13
MATCHLINE SEE SHEET 15
CV#19 STA. 52+58.87 BED ELEV. 717.06'
JV#12 STA. 55+08.39 BED ELEV. 716.88'
CV#20 STA. 56+87.82 BED ELEV. 716.60'
CV#18 STA. 51+51.68 BED ELEV. 717.18'
CV#21 STA. 62+73.88' BED ELEV. 716.25'
JV#13 STA. 61+48.44 BED ELEV. 716.37'
CV#22 STA. 65+76.20 BED ELEV. 716.04'
CV#23 STA. 68+70.83 BED ELEV. 715.67'
JV#14 STA. 67+96.28 BED ELEV. 715.77'
CV#24 STA. 72+96.69 BED ELEV. 715.20'
JV#15 STA. 71+93.10 BED ELEV. 715.36'
JV#16 STA. 75+67.76 BED ELEV. 714.88'
JV#17 STA. 78+83.49 BED ELEV. 714.12'
CV#25 STA. 77+50.46 BED ELEV. 714.69'
CV#26 STA. 81+70.26 BED ELEV. 714.23'

STRUCTURES PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

STRUCTURES LEGEND

- PROPOSED STREAM ALIGNMENT
- CROSS VANE (CV)
- STEP POOL (SP)
- J - VANE (JV)
- ROOT WAD
- RIP RAP

(SEE DETAILS)

NOTE:
STRUCTURES ARE NOT DRAWN TO SCALE. ORIENTATION OF STRUCTURES ARE APPROXIMATE. INSTALLATION SHOULD FOLLOW DETAILS AND PROJECT SPECIAL PROVISIONS.

STRUCTURES 03

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PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	19
R/W SHEET NO.	

ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14881 ENGINEER LINDA WALDO BLAKE

SCIENTIST

Society of Wetland Scientists Professional Wetland Scientist 000937 7/29/02

STRUCTURES LEGEND

- PROPOSED STREAM ALIGNMENT
- CROSS VANE (CV)
- STEP POOL (SP)
- J - VANE (JV)
- ROOT WAD
- RIP RAP

(SEE DETAILS)

NOTE:
STRUCTURES ARE NOT DRAWN TO SCALE. ORIENTATION OF STRUCTURES ARE APPROXIMATE. INSTALLATION SHOULD FOLLOW DETAILS AND PROJECT SPECIAL PROVISIONS.

NC GRID NAD 83

MATCHLINE SEE SHEET 14

MATCHLINE SEE SHEET 14

STOCK PILES FOR EXCESS MATERIAL

ADDED GATE

ADDED CROSS VANE

STEP POOL SEAL STRUCTURE

SSP#1 STA. 10+28.71 T
BED ELEV. 716.60'

SSP#2 STA. 11+05.01 T
BED ELEV. 716.31'

SSP#3 STA. 11+87.42 T
BED ELEV. 715.89'

SSP#4 STA. 12+74.05 T
BED ELEV. 715.39'

SSP#5 STA. 13+59.92 T
BED ELEV. 714.98'

SSP#6 STA. 14+82.05 T
BED ELEV. 714.61'

SSP#7 STA. 15+81.85 T
BED ELEV. 714.05'

SSP#8 STA. 17+01.94 T
BED ELEV. 713.48'

CV#27 STA. 85+10.20
BED ELEV. 713.87'

CV#28 STA. 87+77.70
BED ELEV. 713.52'

CV#29 STA. 88+72.94
BED ELEV. 713.42'

CV#30 STA. 91+93.15
BED ELEV. 713.21'

CV#31 STA. 94+95.98
BED ELEV. 712.92'

CV#32 STA. 99+13.82
BED ELEV. 712.86'

CV#33 STA. 104+47.32
BED ELEV. 711.99'

JV#18 STA. 83+32.16
BED ELEV. 714.07'

JV#19 STA. 87+22.78
BED ELEV. 713.58'

JV#20 STA. 90+23.44
BED ELEV. 713.32'

JV#21 STA. 94+03.13
BED ELEV. 713.02'

JV#22 STA. 97+52.04
BED ELEV. 712.72'

JV#23 STA. 104+11.32
BED ELEV. 712.04'

JV#24 STA. 108+14.95
BED ELEV. 711.59'

DSP STA. 108+51.71

STRUCTURES PLAN

0 50 100 200
GRAPHIC SCALE (1" = 100')

STRUCTURES 04

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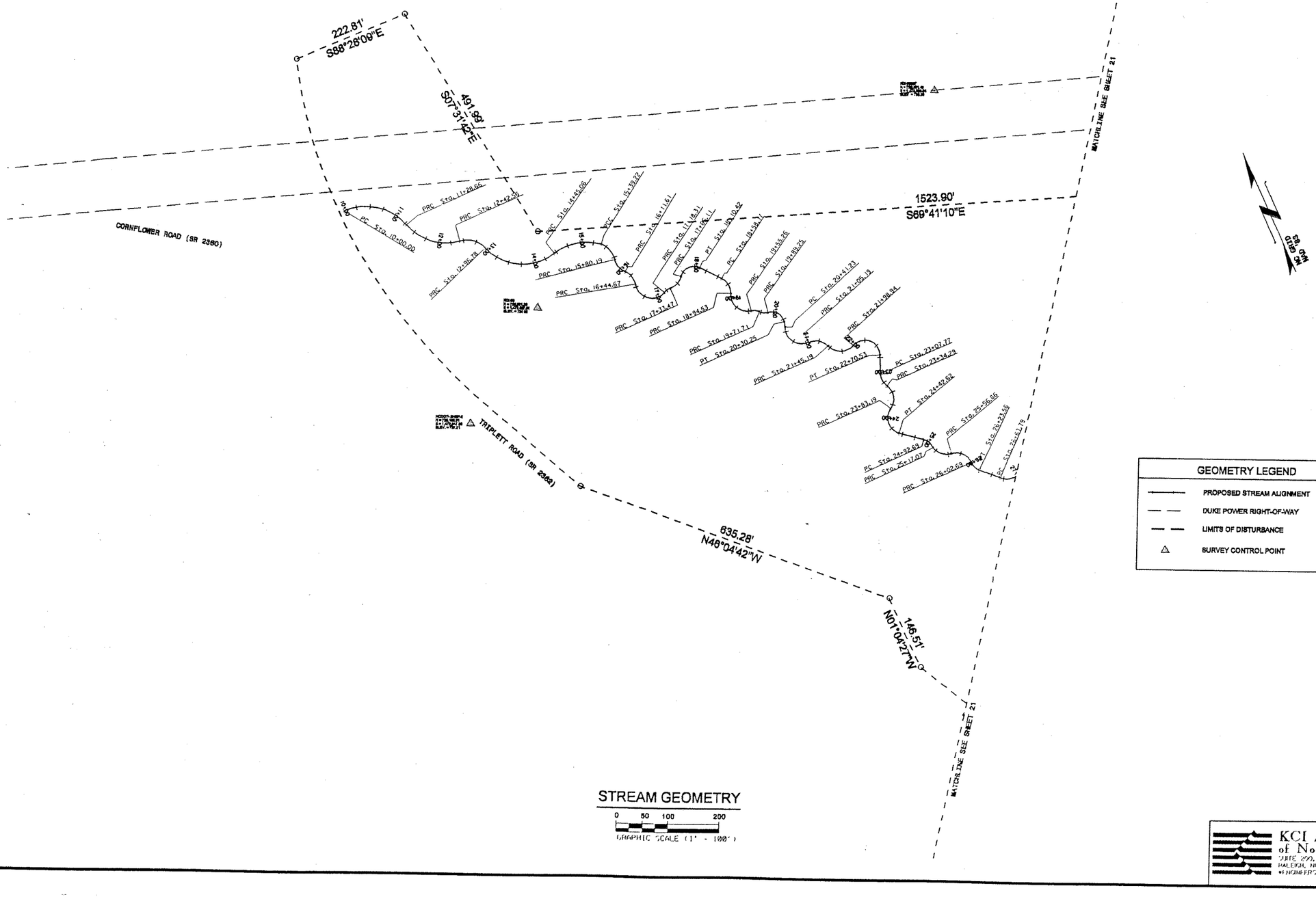
PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	20
RW SHEET NO.	
ENGINEER	SCIENTIST



STREAM GEOMETRY

0 50 100 200

GRAPHIC SCALE (1" = 100')

GEOMETRY LEGEND

- PROPOSED STREAM ALIGNMENT
- DUKE POWER RIGHT-OF-WAY
- LIMITS OF DISTURBANCE
- △ SURVEY CONTROL POINT

STREAM GEOMETRY 01

KCI Associates of North Carolina, P.A.
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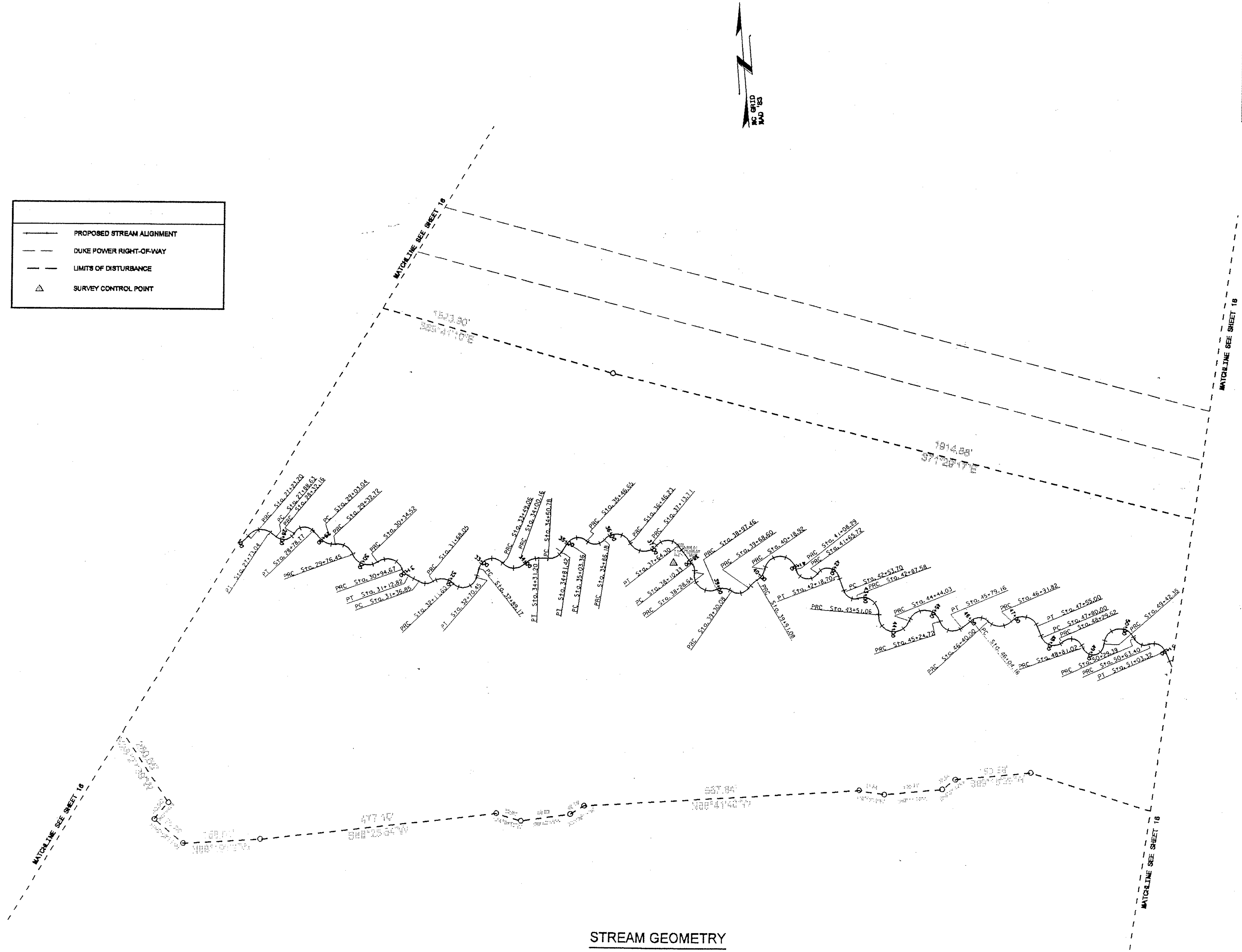
R - 2239WM	31
ENGINEER	SCIENTIST



STREAM GEOMETRY

0 50 100 200
GRAPHIC SCALE (1" = 100')

STREAM GEOMETRY 02

KCI Associates
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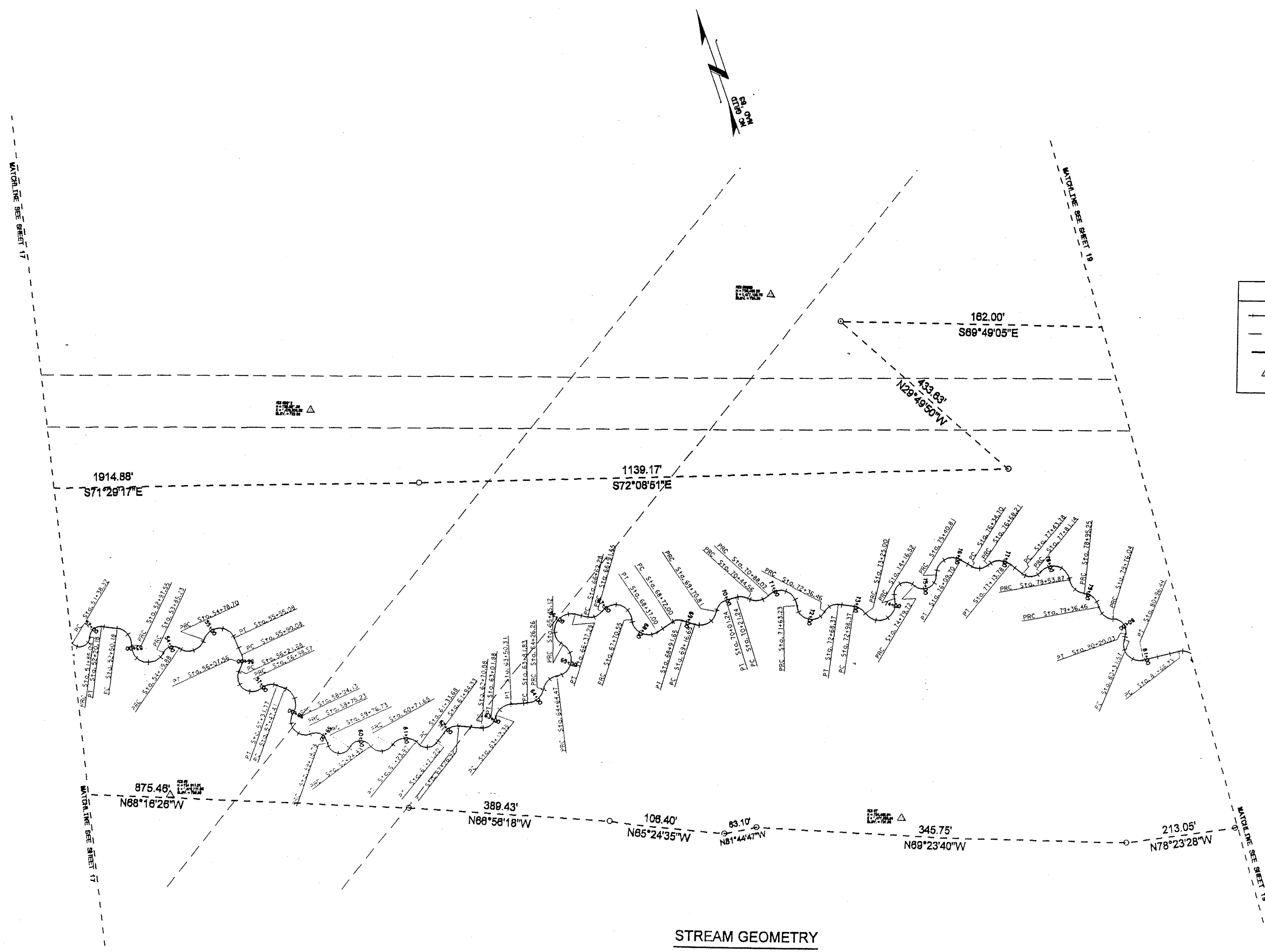
RALEIGH, NC 27609-5210
• ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	22
R/W SHEET NO.	
ENGINEER	SCIENTIST



GEOMETRY LEGEND

- PROPOSED STREAM ALIGNMENT
- DUKE POWER RIGHT-OF-WAY
- LIMITS OF DISTURBANCE
- SURVEY CONTROL POINT

STREAM GEOMETRY

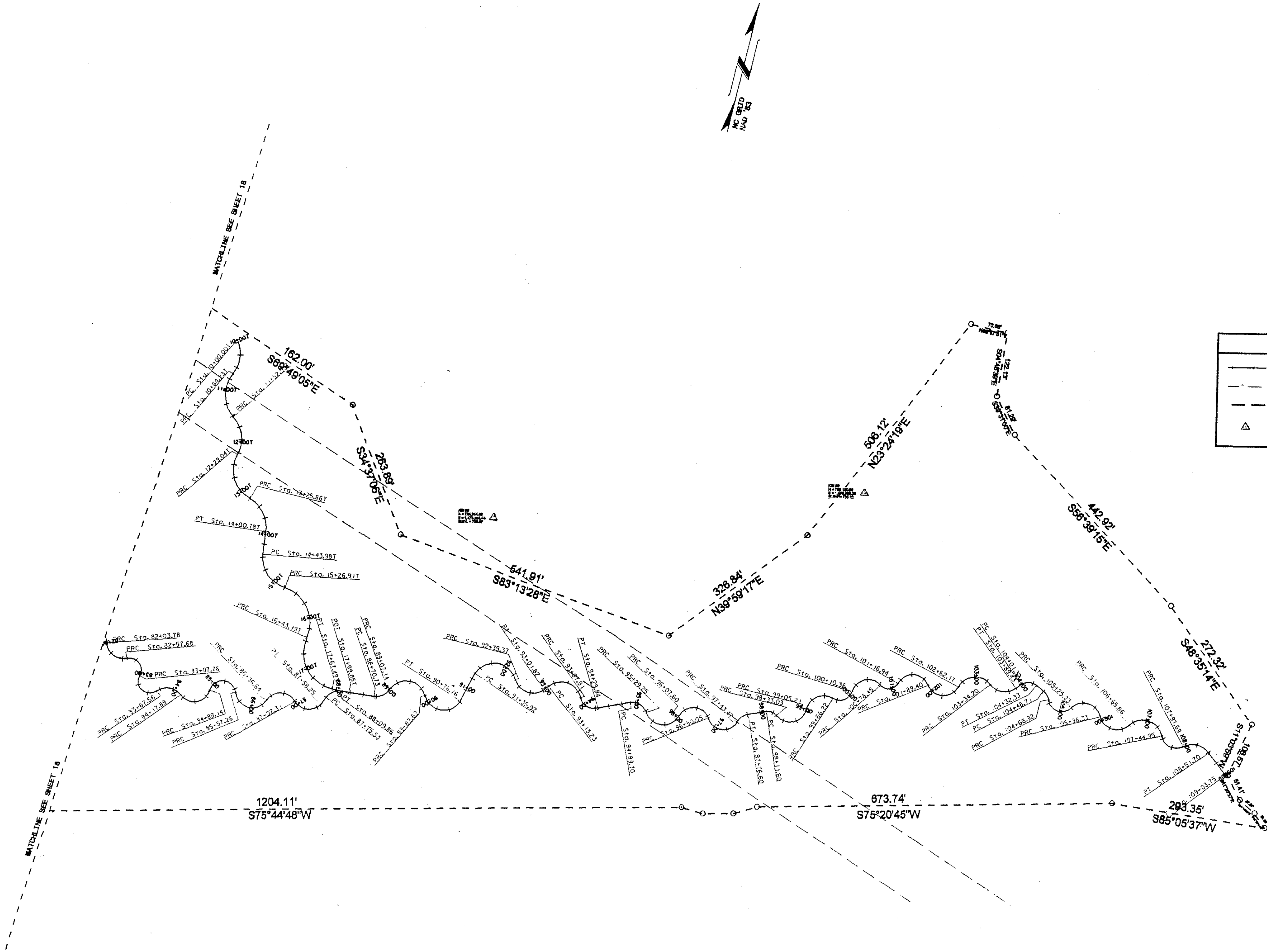
0 50 100 200

GRAPHIC SCALE (1" = 100')

STREAM GEOMETRY 03

KCI Associates of North Carolina, P.A.
SUITE 220, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5290
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	23
RW SHEET NO.	
ENGINEER	SCIENTIST



GEOMETRY LEGEND

- PROPOSED STREAM ALIGNMENT
- DUKE POWER RIGHT-OF-WAY
- LIMITS OF DISTURBANCE
- △ SURVEY CONTROL POINT

STREAM GEOMETRY

0 50 100 200

GRAPHIC SCALE (1" = 100')

STREAM GEOMETRY 04

KCI Associates of North Carolina, P.A.

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	24
RW SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 1

P.I. STATION	10+74.968	N 726,643.731	E 1,472,869.583
DELTA -	73° 42' 59.44" (RT)		
DEGREE -	57° 17' 44.81"		
TANGENT -	74.968		
LENGTH -	128.660		
RADIUS -	100.000		
EXTERNAL -	24.981		
LONG CHORD -	119.967		
MID. ORD. -	19.988		
P.C. STATION	10+00.000	N 726,643.905	E 1,472,794.615
P.T. STATION	11+28.660	N 726,571.722	E 1,472,890.436
C.C.		N 726,543.905	E 1,472,794.383
BACK	- S 89° 52' 01.78" E		
AHEAD	- S 16° 09' 02.33" E		
CHORD BEAR	- S 53° 00' 32.05" E		

CURVE DATA

CURVE 2

P.I. STATION	11+92.686	N 726,510.222	E 1,472,908.246
DELTA -	65° 15' 35.10" (LT)		
DEGREE -	57° 17' 44.81"		
TANGENT -	64.026		
LENGTH -	113.900		
RADIUS -	100.000		
EXTERNAL -	18.741		
LONG CHORD -	107.842		
MID. ORD. -	15.783		
P.C. STATION	11+28.660	N 726,571.722	E 1,472,890.436
P.T. STATION	12+42.559	N 726,500.660	E 1,472,971.554
C.C.		N 726,599.538	E 1,472,986.490
BACK	- S 16° 09' 02.33" E		
AHEAD	- S 81° 24' 37.43" E		
CHORD BEAR	- S 48° 46' 49.88" E		

CURVE DATA

CURVE 3

P.I. STATION	12+72.684	N 726,496.160	E 1,473,001.341
DELTA -	62° 08' 16.26" (RT)		
DEGREE -	114° 35' 29.61"		
TANGENT -	30.125		
LENGTH -	54.226		
RADIUS -	50.000		
EXTERNAL -	8.374		
LONG CHORD -	51.607		
MID. ORD. -	7.173		
P.C. STATION	12+42.559	N 726,500.660	E 1,472,971.554
P.T. STATION	12+96.785	N 726,467.724	E 1,473,011.284
C.C.		N 726,451.221	E 1,472,964.086
BACK	- S 81° 24' 37.43" E		
AHEAD	- S 19° 16' 21.17" E		
CHORD BEAR	- S 50° 20' 29.30" E		

CURVE DATA

CURVE 4

P.I. STATION	13+88.347	N 726,381.293	E 1,473,041.505
DELTA -	84° 57' 20.30" (LT)		
DEGREE -	57° 17' 44.81"		
TANGENT -	91.562		
LENGTH -	148.276		
RADIUS -	100.000		
EXTERNAL -	35.586		
LONG CHORD -	135.061		
MID. ORD. -	26.246		
P.C. STATION	12+96.785	N 726,467.724	E 1,473,011.284
P.T. STATION	14+45.060	N 726,403.797	E 1,473,130.259
C.C.		N 726,500.730	E 1,473,105.680
BACK	- S 19° 16' 21.17" E		
AHEAD	- N 75° 46' 18.53" E		
CHORD BEAR	- N 61° 45' 01.32" E		

CURVE DATA

CURVE 5

P.I. STATION	14+95.957	N 726,416.307	E 1,473,179.593
DELTA -	53° 56' 55.42" (RT)		
DEGREE -	57° 17' 44.81"		
TANGENT -	50.896		
LENGTH -	94.158		
RADIUS -	100.000		
EXTERNAL -	12.207		
LONG CHORD -	90.718		
MID. ORD. -	10.879		
P.C. STATION	14+45.060	N 726,403.797	E 1,473,130.259
P.T. STATION	15+39.219	N 726,383.782	E 1,473,218.741
C.C.		N 726,306.865	E 1,473,154.837
BACK	- N 75° 46' 18.53" E		
AHEAD	- S 50° 16' 46.05" E		
CHORD BEAR	- S 77° 15' 13.76" E		

CURVE DATA

CURVE 6

P.I. STATION	15+61.252	N 726,367.630	E 1,473,233.727
DELTA -	52° 15' 22.58" (RT)		
DEGREE -	127° 33' 06.16"		
TANGENT -	22.033		
LENGTH -	40.969		
RADIUS -	44.920		
EXTERNAL -	5.113		
LONG CHORD -	39.563		
MID. ORD. -	4.590		
P.C. STATION	15+39.219	N 726,383.782	E 1,473,218.741
P.T. STATION	15+80.187	N 726,345.892	E 1,473,230.127
C.C.		N 726,353.231	E 1,473,185.811
BACK	- S 42° 51' 14.47" E		
AHEAD	- S 9° 24' 08.11" W		
CHORD BEAR	- S 16° 43' 33.18" E		

CURVE DATA

CURVE 7

P.I. STATION	15+97.297	N 726,329.152	E 1,473,226.589
DELTA -	56° 15' 57.49" (LT)		
DEGREE -	179° 02' 57.50"		
TANGENT -	17.110		
LENGTH -	31.425		
RADIUS -	32.000		
EXTERNAL -	4.287		
LONG CHORD -	30.177		
MID. ORD. -	3.781		
P.C. STATION	15+80.187	N 726,345.892	E 1,473,230.127
P.T. STATION	16+11.612	N 726,316.913	E 1,473,238.545
C.C.		N 726,339.275	E 1,473,261.436
BACK	- S 11° 56' 06.94" W		
AHEAD	- S 44° 19' 50.54" E		
CHORD BEAR	- S 16° 11' 51.80" E		

CURVE DATA

CURVE 8

P.I. STATION	16+29.787	N 726,304.022	E 1,473,251.357
DELTA -	59° 11' 19.91" (RT)		
DEGREE -	179° 02' 57.54"		
TANGENT -	18.174		
LENGTH -	33.057		
RADIUS -	32.000		
EXTERNAL -	4.801		
LONG CHORD -	31.607		
MID. ORD. -	4.175		
P.C. STATION	16+11.612	N 726,316.913	E 1,473,238.545
P.T. STATION	16+44.670	N 726,286.416	E 1,473,246.847
C.C.		N 726,294.356	E 1,473,215.848
BACK	- S 44° 49' 20.86" E		
AHEAD	- S 14° 21' 59.05" W		
CHORD BEAR	- S 15° 13' 40.90" E		

CURVE DATA

CURVE 9

P.I. STATION	17+16.292	N 726,217.542	E 1,473,227.198
DELTA -	131° 51' 03.43" (LT)		
DEGREE -	179° 02' 57.51"		
TANGENT -	71.622		
LENGTH -	73.639		
RADIUS -	32.000		
EXTERNAL -	46.446		
LONG CHORD -	58.433		
MID. ORD. -	18.946		
P.C. STATION	16+44.670	N 726,286.416	E 1,473,246.847
P.T. STATION	17+18.309	N 726,248.858	E 1,473,291.612
C.C.		N 726,277.637	E 1,473,277.620
BACK	- S 15° 55' 20.67" W		
AHEAD	- N 64° 04' 17.23" E		
CHORD BEAR	- S 50° 00' 11.05" E		

CURVE DATA

CURVE 10

P.I. STATION	17+26.033	N 726,252.218	E 1,473,298.567
DELTA -	27° 08' 27.47" (RT)		
DEGREE -	179° 02' 57.59"		
TANGENT -	7.724		
LENGTH -	15.158		
RADIUS -	32.000		
EXTERNAL -	0.919		
LONG CHORD -	15.017		
MID. ORD. -	0.893		
P.C. STATION	17+18.309	N 726,248.858	E 1,473,291.612
P.T. STATION	17+33.467	N 726,252.034	E 1,473,306.289
C.C.		N 726,220.043	E 1,473,305.520
BACK	- N 64° 13' 10.94" E		
AHEAD	- S 88° 38' 21.59" E		
CHORD BEAR	- N 77° 47' 24.68" E		

CURVE DATA

CURVE 11

P.I. STATION	17+50.720	N 726,250.331	E 1,473,323.457
DELTA -	56° 39' 43.73" (LT)		
DEGREE -	179° 02' 57.49"		
TANGENT -	17.253		
LENGTH -	31.646		
RADIUS -	32.000		
EXTERNAL -	4.355		
LONG CHORD -	30.372		
MID. ORD. -	3.833		
P.C. STATION	17+33.467	N 726,252.034	E 1,473,306.289
P.T. STATION	17+65.113	N 726,263.738	E 1,473,334.315
C.C.		N 726,283.878	E 1,473,309.440
BACK	- S 84° 20' 04.74" E		
AHEAD	- N 39° 00' 11.53" E		
CHORD BEAR	- N 67° 20' 03.40" E		

CURVE DATA

CURVE 12

P.I. STATION	17+96.009	N 726,287.748	E 1,473,353.760
DELTA -	99° 50' 15.98" (RT)		
DEGREE -	220° 22' 39.64"		
TANGENT -	30.895		
LENGTH -	45.303		
RADIUS -	25.999		
EXTERNAL -	14.380		
LONG CHORD -	39.785		
MID. ORD. -	9.259		
P.C. STATION	17+65.113	N 726,263.738	E 1,473,334.315
P.T. STATION	18+10.417	N 726,264.487	E 1,473,374.094
C.C.		N 726,247.376	E 1,473,354.520
BACK	- N 39° 00' 11.53" E		
AHEAD	- S 41° 09' 32.49" E		
CHORD BEAR	- N 88° 55' 19.52" E		

COURSE FROM PT 12 TO PC 13 S 40° 21' 12.52" E DIST 47.753

CURVE DATA

CURVE 13

P.I. STATION	18+78.599	N 726,212.355	E 1,473,418.036
DELTA -	65° 06' 31.52" (RT)		
DEGREE -	179° 02' 57.52"		
TANGENT -	20.429		
LENGTH -	36.364		
RADIUS -	32.000		
EXTERNAL -	5.965		
LONG CHORD -	34.438		
MID. ORD. -	5.028		
P.C. STATION	18+58.170	N 726,228.096	E 1,473,405.014
P.T. STATION	18+94.533	N 726,193.917	E 1,473,409.238
C.C.		N 726,207.698	E 1,473,380.358
BACK	- S 39° 36' 01.24" E		
AHEAD	- S 25° 30' 30.29" W		
CHORD BEAR	- S 7° 02' 45.47" E		

CURVE DATA

CURVE 14

P.I. STATION	19+39.179	N 726,154.766	E 1,473,387.783
DELTA -	108° 44' 13.24" (LT)		
DEGREE -	179° 02' 57.54"		
TANGENT -	44.645		
LENGTH -	60.730		
RADIUS -	32.000		
EXTERNAL -	22.929		
LONG CHORD -	52.018		
MID. ORD. -	13.358		
P.C. STATION	18+94.533	N 726,193.917	E 1,473,409.238
P.T. STATION	19+55.264	N 726,147.024	E 1,473,431.752
C.C.		N 726,178.539	E 1,473,437.301
BACK	- S 28° 43' 24.21" W		
AHEAD	- S 80° 00' 49.03" E		
CHORD BEAR	- S 25° 38' 42.41" E		

CURVE DATA

CURVE 15

P.I. STATION	19+63.797	N 726,145.544	E 1,473,440.155
DELTA -	37° 39' 26.11" (RT)		
DEGREE -	228° 57' 13.43"		
TANGENT -	8.533		
LENGTH -	16.448		
RADIUS -	25.025		
EXTERNAL -	1.415		
LONG CHORD -	16.153		
MID. ORD. -	1.339		
P.C. STATION	19+55.264	N 726,147.024	E 1,473,431.752
P.T. STATION	19+71.711	N 726,139.238	E 1,473,445.905
C.C.		N 726,122.378	E 1,473,427.412
BACK	- S 80° 00' 49.03" E		
AHEAD	- S 42° 21' 22.93" E		
CHORD BEAR	- S 61° 11' 05.98" E		

CURVE DATA

CURVE 16

P.I. STATION	19+80.857	N 726,132.342	E 1,473,451.912
DELTA -	40° 13' 24.38" (LT)		
DEGREE -	229° 23' 49.49"		
TANGENT -	9.146		
LENGTH -	17.534		
RADIUS -	24.977		
EXTERNAL -	1.622		
LONG CHORD -	17.177		
MID. ORD. -	1.523		
P.C. STATION	19+71.711	N 726,139.238	E 1,473,445.905
P.T. STATION	19+89.246	N 726,130.955	E 1,473,460.952
C.C.		N 726,155.643	E 1,473,464.738
BACK	- S 41° 03' 28.32" E		
AHEAD	- S 81° 16' 52.71" E		
CHORD BEAR	- S 61° 10' 10.52" E		

STREAM GEOMETRY DATA 01

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.,
RALEIGH, NC 27609-5210
ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239NM	25
RW SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 17

P.I. STATION	20+16.044	N	726,127.384	E	1,473,487.577
DELTA -	93° 56' 38.61" (RT)				
DEGREE -	229° 12' 37.33"				
TANGENT -	26.803				
LENGTH -	41.008				
RADIUS -	24.997				
EXTERNAL -	11.654				
LONG CHORD -	36.562				
MID. ORD. -	7.948				
P.C. STATION	19+89.246	N	726,130.355	E	1,473,460.952
P.T. STATION	20+30.253	N	726,101.520	E	1,473,482.639
C.C.		N	726,106.125	E	1,473,458.070
BACK -	S 83° 22' 40.75" E				
AHEAD -	S 10° 36' 57.86" W				
CHORD BEAR -	S 36° 22' 51.44" E				

COURSE FROM PT 17 TO PC 18 S 15° 42' 08.00" W DIST 10.981

CURVE DATA

CURVE 18

P.I. STATION	20+91.003	N	726,045.562	E	1,473,459.247
DELTA -	114° 31' 11.29" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	49.768				
LENGTH -	63.960				
RADIUS -	32.000				
EXTERNAL -	27.168				
LONG CHORD -	53.832				
MID. ORD. -	14.693				
P.C. STATION	20+41.235	N	726,090.948	E	1,473,479.667
P.T. STATION	21+05.195	N	726,045.820	E	1,473,509.015
C.C.		N	726,077.819	E	1,473,508.849
BACK -	S 24° 13' 22.08" W				
AHEAD -	N 89° 42' 10.78" E				
CHORD BEAR -	S 33° 02' 13.57" E				

CURVE DATA

CURVE 19

P.I. STATION	21+28.281	N	726,045.939	E	1,473,532.102
DELTA -	71° 37' 04.75" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	23.087				
LENGTH -	39.999				
RADIUS -	32.000				
EXTERNAL -	7.459				
LONG CHORD -	37.445				
MID. ORD. -	6.049				
P.C. STATION	21+05.195	N	726,045.820	E	1,473,509.015
P.T. STATION	21+45.194	N	726,024.069	E	1,473,539.496
C.C.		N	726,013.820	E	1,473,509.181
BACK -	N 89° 42' 10.78" E				
AHEAD -	S 18° 40' 44.47" E				
CHORD BEAR -	S 54° 29' 16.84" E				

CURVE DATA

CURVE 20

P.I. STATION	21+80.884	N	725,990.258	E	1,473,550.926
DELTA -	96° 14' 27.80" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	35.690				
LENGTH -	53.751				
RADIUS -	32.000				
EXTERNAL -	15.935				
LONG CHORD -	47.651				
MID. ORD. -	10.638				
P.C. STATION	21+45.194	N	726,024.069	E	1,473,539.496
P.T. STATION	21+98.945	N	726,005.296	E	1,473,583.293
C.C.		N	726,034.317	E	1,473,569.810
BACK -	S 18° 40' 44.47" E				
AHEAD -	N 65° 04' 47.73" E				
CHORD BEAR -	S 66° 47' 58.37" E				

CURVE DATA

CURVE 21

P.I. STATION	22+74.550	N	726,037.153	E	1,473,651.859
DELTA -	136° 42' 48.96" (RT)				
DEGREE -	190° 59' 09.35"				
TANGENT -	75.605				
LENGTH -	71.583				
RADIUS -	30.000				
EXTERNAL -	51.339				
LONG CHORD -	55.770				
MID. ORD. -	18.935				
P.C. STATION	21+98.945	N	726,005.296	E	1,473,583.293
P.T. STATION	22+70.528	N	725,966.952	E	1,473,623.790
C.C.		N	725,978.090	E	1,473,595.934
BACK -	N 65° 04' 47.73" E				
AHEAD -	S 21° 47' 36.69" W				
CHORD BEAR -	S 46° 33' 47.79" E				

COURSE FROM PT 21 TO PC 22 S 21° 46' 48.76" W DIST 37.245

CURVE DATA

CURVE 22

P.I. STATION	23+21.848	N	725,919.029	E	1,473,605.473
DELTA -	47° 29' 03.48" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	14.075				
LENGTH -	26.520				
RADIUS -	32.000				
EXTERNAL -	2.959				
LONG CHORD -	25.768				
MID. ORD. -	2.708				
P.C. STATION	23+07.773	N	725,932.366	E	1,473,609.970
P.T. STATION	23+34.293	N	725,906.700	E	1,473,612.264
C.C.		N	725,922.140	E	1,473,640.293
BACK -	S 18° 38' 09.07" W				
AHEAD -	S 28° 50' 54.41" E				
CHORD BEAR -	S 5° 06' 22.67" E				

CURVE DATA

CURVE 23

P.I. STATION	23+64.953	N	725,879.845	E	1,473,627.057
DELTA -	87° 32' 58.56" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	30.660				
LENGTH -	48.897				
RADIUS -	32.000				
EXTERNAL -	12.317				
LONG CHORD -	44.277				
MID. ORD. -	8.894				
P.C. STATION	23+34.293	N	725,906.700	E	1,473,612.264
P.T. STATION	23+83.190	N	725,863.917	E	1,473,600.859
C.C.		N	725,891.260	E	1,473,584.235
BACK -	S 28° 50' 54.41" E				
AHEAD -	S 58° 42' 04.15" W				
CHORD BEAR -	S 14° 55' 34.87" W				

CURVE DATA

CURVE 24

P.I. STATION	24+25.970	N	725,841.693	E	1,473,564.305
DELTA -	106° 24' 21.90" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	42.780				
LENGTH -	59.428				
RADIUS -	32.000				
EXTERNAL -	21.424				
LONG CHORD -	51.249				
MID. ORD. -	12.833				
P.C. STATION	23+83.190	N	725,863.917	E	1,473,600.859
P.T. STATION	24+42.618	N	725,812.904	E	1,473,595.949
C.C.		N	725,836.574	E	1,473,617.483
BACK -	S 58° 42' 04.15" W				
AHEAD -	S 47° 42' 17.75" E				
CHORD BEAR -	S 5° 29' 53.20" W				

COURSE FROM PT 24 TO PC 25 S 51° 39' 54.31" E DIST 50.077

CURVE DATA

CURVE 25

P.I. STATION	25+05.506	N	725,773.371	E	1,473,644.837
DELTA -	43° 38' 10.36" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	12.811				
LENGTH -	24.371				
RADIUS -	32.000				
EXTERNAL -	2.469				
LONG CHORD -	23.786				
MID. ORD. -	2.292				
P.C. STATION	24+92.695	N	725,781.844	E	1,473,635.229
P.T. STATION	25+17.066	N	725,760.608	E	1,473,645.944
C.C.		N	725,757.843	E	1,473,614.064
BACK -	S 48° 35' 33.77" E				
AHEAD -	S 4° 57' 23.41" E				
CHORD BEAR -	S 26° 46' 28.59" E				

CURVE DATA

CURVE 26

P.I. STATION	25+39.844	N	725,738.324	E	1,473,650.661
DELTA -	70° 53' 14.19" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	22.778				
LENGTH -	39.591				
RADIUS -	32.000				
EXTERNAL -	7.279				
LONG CHORD -	37.114				
MID. ORD. -	5.930				
P.C. STATION	25+17.066	N	725,760.608	E	1,473,645.944
P.T. STATION	25+56.657	N	725,735.484	E	1,473,673.261
C.C.		N	725,767.235	E	1,473,677.250
BACK -	S 11° 57' 06.05" E				
AHEAD -	S 82° 50' 30.25" E				
CHORD BEAR -	S 47° 23' 43.15" E				

CURVE DATA

CURVE 27

P.I. STATION	25+84.680	N	725,731.933	E	1,473,701.059
DELTA -	82° 25' 10.14" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	28.023				
LENGTH -	46.032				
RADIUS -	32.000				
EXTERNAL -	10.536				
LONG CHORD -	42.164				
MID. ORD. -	7.926				
P.C. STATION	25+56.657	N	725,735.484	E	1,473,673.261
P.T. STATION	26+02.688	N	725,703.909	E	1,473,701.205
C.C.		N	725,703.742	E	1,473,669.206
BACK -	S 82° 43' 07.91" E				
AHEAD -	S 0° 17' 57.77" E				
CHORD BEAR -	S 41° 30' 32.84" E				

CURVE DATA

CURVE 28

P.I. STATION	26+13.513	N	725,693.099	E	1,473,701.750
DELTA -	37° 22' 36.10" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	10.824				
LENGTH -	20.875				
RADIUS -	32.000				
EXTERNAL -	1.781				
LONG CHORD -	20.507				
MID. ORD. -	1.687				
P.C. STATION	26+02.688	N	725,703.909	E	1,473,701.205
P.T. STATION	26+23.563	N	725,684.839	E	1,473,708.745
C.C.		N	725,705.520	E	1,473,733.165
BACK -	S 2° 53' 05.75" E				
AHEAD -	S 40° 15' 41.85" E				
CHORD BEAR -	S 21° 34' 23.80" E				

COURSE FROM PT 28 TO PC 29 S 46° 15' 15.28" E DIST 44.231

CURVE DATA

CURVE 29

P.I. STATION	27+05.395	N	725,626.634	E	1,473,766.211
DELTA -	99° 12' 08.30" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	37.601				
LENGTH -	55.405				
RADIUS -	32.000				
EXTERNAL -	17.375				
LONG CHORD -	48.739				
MID. ORD. -	11.261				
P.C. STATION	26+67.794	N	725,654.256	E	1,473,740.688
P.T. STATION	27+23.199	N	725,656.235	E	1,473,789.397
C.C.		N	725,675.968	E	1,473,764.205
BACK -	S 42° 43' 36.83" E				
AHEAD -	N 38° 04' 14.87" E				
CHORD BEAR -	N 87° 40' 19.02" E				

CURVE DATA

CURVE 30

P.I. STATION	27+54.777	N	725,680.773	E	1,473,809.274
DELTA -	89° 14' 22.14" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	31.578				
LENGTH -	49.841				
RADIUS -	32.000				
EXTERNAL -	12.957				
LONG CHORD -	44.953				
MID. ORD. -	9.223				
P.C. STATION	27+23.199	N	725,656.235	E	1,473,789.397
P.T. STATION	27+73.040	N	725,661.224	E	1,473,834.072
C.C.		N	725,636.093	E	1,473,814.202
BACK -	N 39° 00' 32.01" E				
AHEAD -	S 51° 45' 05.85" E				
CHORD BEAR -	N 83° 37' 43.08" E				

COURSE FROM PT 30 TO PC 31 S 48° 39' 41.23" E DIST 15.587

CURVE DATA

CURVE 31

P.I. STATION	28+18.305	N	725,630.259	E	1,473,867.070
DELTA -	99° 46' 50.98" (LT)				
DEGREE -	229° 10' 59.22"				
TANGENT -	29.678				
LENGTH -	43.538				
RADIUS -	25.000				
EXTERNAL -	13.805				
LONG CHORD -	38.241				
MID. ORD. -	8.894				
P.C. STATION	27+88.627	N	725,650.929	E	1,473,845.736
P.T. STATION	28+32.164	N	725,654.757	E	1,473,883.823
C.C.		N	725,668.868	E	1,473,863.188
BACK -	S 45° 51' 20.75" E				
AHEAD -	N 34° 21' 48.28" E				
CHORD BEAR -	N 84° 15' 13.77" E				

CURVE DATA

CURVE 32

P.I. STATION	28+65.838	N	725,682.554	E	1,473,902.833
DELTA -	106° 49' 06.20" (RT)				
DEGREE -	229° 10' 59.22"				
TANGENT -	33.674				
LENGTH -	46.608				
RADIUS -	25.000				
EXTERNAL -	16.940				
LONG CHORD -	40.146				
MID. ORD. -	10.098				
P.C. STATION	28+32.164	N	725,654.757	E	1,473,883.823
P.T. STATION	28+78.773	N	725,656.318	E	1,473,923.940
C.C.		N	725,640.646	E	1,473,904.462
BACK -	N 34° 21' 48.28" E				
AHEAD -	S 38° 49' 05.52" E				
CHORD BEAR -	N 87° 46' 21.38" E				

COURSE FROM PT 32 TO PC 33 S 38° 49' 05.52" E DIST 24.265

STREAM GEOMETRY DATA 02

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5296
•ENGINEERS • PLANNERS • ECOLOGISTS

CURVE DATA

CURVE 33
P.I. STATION 29+19.044 N 725,625.248 E 1,473,94
DELTA - 53° 08' 59.29" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 16.007
LENGTH - 29.684
RADIUS - 32.000
EXTERNAL - 3.780
LONG CHORD - 28.632
MID. ORD. - 3.381
P.C. STATION 29+03.038 N 725,637.412 E 1,473,93
P.T. STATION 29+32.722 N 725,626.280 E 1,473,96
C.C. N 725,658.213 E 1,473,96
BACK - S 40° 32' 39.88" E
AHEAD - N 86° 18' 20.83" E
CHORD BEAR - S 67° 07' 09.52" E

CURVE DATA

CURVE 34
P.I. STATION 29+58.775 N 725,627.958 E 1,473,99
DELTA - 78° 18' 04.51" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 26.053
LENGTH - 43.732
RADIUS - 32.000
EXTERNAL - 9.264
LONG CHORD - 40.407
MID. ORD. - 7.184
P.C. STATION 29+32.722 N 725,626.280 E 1,473,96
P.T. STATION 29+76.454 N 725,602.840 E 1,473,98
C.C. N 725,594.346 E 1,473,96
BACK - N 86° 18' 20.83" E
AHEAD - S 15° 23' 34.66" E
CHORD BEAR - S 54° 32' 36.91" E

CURVE DATA

CURVE 35
P.I. STATION 30+17.392 N 725,563.370 E 1,474,00
DELTA - 103° 58' 22.37" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 40.938
LENGTH - 58.069
RADIUS - 32.000
EXTERNAL - 19.961
LONG CHORD - 50.423
MID. ORD. - 12.293
P.C. STATION 29+76.454 N 725,602.840 E 1,473,98
P.T. STATION 30+34.523 N 725,583.446 E 1,474,04
C.C. N 725,611.334 E 1,474,02
BACK - S 15° 23' 34.66" E
AHEAD - N 60° 38' 02.97" E
CHORD BEAR - S 67° 22' 45.85" E

CURVE DATA

CURVE 36
P.I. STATION 30+78.317 N 725,607.233 E 1,474,08
DELTA - 107° 41' 22.17" (RT)
DEGREE - 179° 02' 57.81"
TANGENT - 43.794
LENGTH - 60.145
RADIUS - 32.000
EXTERNAL - 22.240
LONG CHORD - 51.675
MID. ORD. - 13.121
P.C. STATION 30+34.523 N 725,583.446 E 1,474,04
P.T. STATION 30+94.668 N 725,564.973 E 1,474,09
C.C. N 725,556.578 E 1,474,06
BACK - N 57° 06' 03.64" E
AHEAD - S 15° 12' 34.19" E
CHORD BEAR - S 69° 03' 15.27" E

CURVE DATA

CURVE 37
P.I. STATION 31+04.161 N 725,555.940 E 1,474,09
DELTA - 41° 22' 04.67" (LT)
DEGREE - 227° 53' 17.76"
TANGENT - 9.492
LENGTH - 18.153
RADIUS - 25.142
EXTERNAL - 1.732
LONG CHORD - 17.761
MID. ORD. - 1.621
P.C. STATION 30+94.668 N 725,564.973 E 1,474,09
P.T. STATION 31+12.821 N 725,572.699 E 1,474,11
C.C.
BACK - S 17° 53' 45.14" E
AHEAD - S 59° 15' 49.80" E
CHORD BEAR - S 38° 34' 47.47" E

COURSE FROM PT 37 TO PC 38 S 57° 32' 25.15" E DIST 24.025

CURVE DATA

CURVE 38
P.I. STATION 31+54.849 N 725,526.620 E 1,474,13
DELTA - 71° 30' 52.37" (LT)
DEGREE - 229° 10' 59.22"
TANGENT - 18.002
LENGTH - 31.204
RADIUS - 25.000
EXTERNAL - 5.807
LONG CHORD - 29.218
MID. ORD. - 4.713
P.C. STATION 31+36.846 N 725,538.194 E 1,474,12
P.T. STATION 31+68.050 N 725,536.029 E 1,474,15
C.C. N 725,557.343 E 1,474,14
BACK - S 49° 59' 33.54" E
AHEAD - N 56° 29' 34.09" E
CHORD BEAR - S 85° 44' 59.73" E

CURVE DATA

CURVE 39
P.I. STATION 31+93.951 N 725,548.055 E 1,474,176.672
DELTA - 77° 56' 53.86" (RT)
DEGREE - 178° 58' 07.66"
TANGENT - 25.401
LENGTH - 43.554
RADIUS - 32.014
EXTERNAL - 9.165
LONG CHORD - 40.272
MID. ORD. - 7.125
P.C. STATION 31+68.050 N 725,536.029 E 1,474,153.733
P.T. STATION 32+11.605 N 725,528.133 E 1,474,193.223
C.C. N 725,507.675 E 1,474,168.598
BACK - N 62° 19' 55.83" E
AHEAD - S 39° 43' 10.31" E
CHORD BEAR - S 78° 41' 37.24" E

CURVE DATA

CURVE 40
P.I. STATION 32+60.510 N 725,490.516 E 1,474,224.475
DELTA - 120° 24' 51.71" (LT)
DEGREE - 204° 37' 40.03"
TANGENT - 48.905
LENGTH - 58.846
RADIUS - 28.000
EXTERNAL - 28.353
LONG CHORD - 48.598
MID. ORD. - 14.088
P.C. STATION 32+11.605 N 725,528.133 E 1,474,193.223
P.T. STATION 32+70.450 N 725,536.511 E 1,474,241.094
C.C. N 725,546.026 E 1,474,214.760
BACK - S 39° 43' 10.31" E
AHEAD - N 19° 51' 57.98" E
CHORD BEAR - N 80° 04' 23.83" E

COURSE FROM PT 40 TO PC 41 N 19° 51' 57.98" E DIST 18.717

CURVE DATA

CURVE 41
P.I. STATION 33+40.271 N 725,602.177 E 1,474,264.821
DELTA - 122° 33' 49.79" (RT)
DEGREE - 204° 37' 40.02"
TANGENT - 51.105
LENGTH - 59.896
RADIUS - 28.000
EXTERNAL - 30.273
LONG CHORD - 49.112
MID. ORD. - 14.546
P.C. STATION 32+89.167 N 725,554.114 E 1,474,247.454
P.T. STATION 33+49.063 N 725,561.671 E 1,474,295.981
C.C. N 725,544.598 E 1,474,273.788
BACK - N 19° 51' 57.98" E
AHEAD - S 37° 34' 12.23" E
CHORD BEAR - N 81° 08' 52.87" E

CURVE DATA

CURVE 42
P.I. STATION 33+81.910 N 725,535.636 E 1,474,316.009
DELTA - 91° 29' 46.86" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 32.847
LENGTH - 51.101
RADIUS - 32.000
EXTERNAL - 13.858
LONG CHORD - 45.842
MID. ORD. - 9.670
P.C. STATION 33+49.063 N 725,561.671 E 1,474,295.981
P.T. STATION 34+00.164 N 725,556.337 E 1,474,341.512
C.C. N 725,581.182 E 1,474,321.345
BACK - S 37° 34' 12.23" E
AHEAD - N 50° 56' 00.90" E
CHORD BEAR - S 83° 19' 05.66" E

CURVE DATA

CURVE 43
P.I. STATION 34+16.525 N 725,566.648 E 1,474,354.215
DELTA - 44° 51' 39.64" (RT)
DEGREE - 144° 33' 27.49"
TANGENT - 16.361
LENGTH - 31.033
RADIUS - 39.635
EXTERNAL - 3.244
LONG CHORD - 30.247
MID. ORD. - 2.999
P.C. STATION 34+00.164 N 725,556.337 E 1,474,341.512
P.T. STATION 34+31.197 N 725,564.996 E 1,474,370.492
C.C. N 725,525.564 E 1,474,366.491
BACK - N 50° 56' 00.90" E
AHEAD - S 84° 12' 19.45" E
CHORD BEAR - N 73° 21' 50.73" E

COURSE FROM PT 43 TO PC 44 S 84° 44' 22.63" E DIST 19.588

CURVE DATA

CURVE 44
P.I. STATION 34+67.549 N 725,561.000 E 1,474,406.617
DELTA - 57° 49' 18.96" (LT)
DEGREE - 188° 45' 28.61"
TANGENT - 16.764
LENGTH - 30.633
RADIUS - 30.354
EXTERNAL - 4.322
LONG CHORD - 29.349
MID. ORD. - 3.763
P.C. STATION 34+50.785 N 725,563.200 E 1,474,389.998
P.T. STATION 34+81.418 N 725,573.895 E 1,474,417.329
C.C. N 725,593.392 E 1,474,393.981
BACK - S 82° 27' 32.02" E
AHEAD - N 39° 43' 09.02" E
CHORD BEAR - N 68° 37' 48.50" E

COURSE FROM PT 44 TO PC 45 N 35° 53' 11.52" E DIST 21.940

CURVE DATA

CURVE 45
P.I. STATION 35+32.745 N 725,614.526 E 1,474,448.65
DELTA - 99° 13' 21.14" (RT)
DEGREE - 229° 10' 59.22"
TANGENT - 29.387
LENGTH - 43.294
RADIUS - 25.000
EXTERNAL - 13.582
LONG CHORD - 38.083
MID. ORD. - 8.801
P.C. STATION 35+03.358 N 725,591.674 E 1,474,430.18
P.T. STATION 35+46.652 N 725,592.626 E 1,474,468.25
C.C. N 725,575.956 E 1,474,449.62
BACK - N 38° 57' 22.38" E
AHEAD - S 41° 49' 16.48" E
CHORD BEAR - N 88° 34' 02.95" E

CURVE DATA

CURVE 46
P.I. STATION 35+71.907 N 725,574.227 E 1,474,485.55
DELTA - 90° 34' 55.28" (LT)
DEGREE - 229° 10' 59.22"
TANGENT - 25.255
LENGTH - 39.524
RADIUS - 25.000
EXTERNAL - 10.536
LONG CHORD - 35.534
MID. ORD. - 7.412
P.C. STATION 35+46.652 N 725,592.626 E 1,474,468.25
P.T. STATION 35+86.176 N 725,591.712 E 1,474,503.77
C.C. N 725,609.751 E 1,474,486.47
BACK - S 43° 14' 04.06" E
AHEAD - N 46° 11' 00.66" E
CHORD BEAR - S 88° 31' 31.70" E

CURVE DATA

CURVE 47
P.I. STATION 36+33.236 N 725,627.354 E 1,474,534.51
DELTA - 115° 11' 46.14" (RT)
DEGREE - 191° 49' 55.12"
TANGENT - 47.060
LENGTH - 60.051
RADIUS - 29.868
EXTERNAL - 25.871
LONG CHORD - 50.435
MID. ORD. - 13.863
P.C. STATION 35+86.176 N 725,591.712 E 1,474,503.77
P.T. STATION 36+46.227 N 725,584.374 E 1,474,553.67
C.C. N 725,572.208 E 1,474,526.43
BACK - N 40° 46' 05.76" E
AHEAD - S 24° 02' 08.10" E
CHORD BEAR - S 81° 38' 01.17" E

CURVE DATA

CURVE 48
P.I. STATION 36+99.894 N 725,533.966 E 1,474,572.08
DELTA - 116° 33' 21.09" (LT)
DEGREE - 172° 42' 40.40"
TANGENT - 53.668
LENGTH - 67.486
RADIUS - 33.174
EXTERNAL - 29.919
LONG CHORD - 56.437
MID. ORD. - 15.731
P.C. STATION 36+46.227 N 725,584.374 E 1,474,553.67
P.T. STATION 37+13.712 N 725,572.479 E 1,474,608.95
C.C. N 725,595.760 E 1,474,584.85
BACK - S 20° 04' 25.03" E
AHEAD - N 43° 29' 13.89" E
CHORD BEAR - S 78° 21' 05.57" E

PROJECT REFERENCE NO. R - 2239WM
SHEET NO. 26
R/W SHEET NO.
ENGINEER
SCIENTIST

STREAM GEOMETRY DATA 03

KCI Associates of North Carolina, P.A.
SUITE 300, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5286
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PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	27
R/W SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 49					
P.I. STATION	37+49.243	N	725,538.307	E	1,474,622.953
DELTA -	102° 31' 41.82" (RT)				
DEGREE -	204° 39' 23.22"				
TANGENT -	35.531				
LENGTH -	50.586				
RADIUS -	27.996				
EXTERNAL -	17.239				
LONG CHORD -	43.980				
MID. ORD. -	10.669				
P.C. STATION	37+13.712	N	725,572.979	E	1,474,608.952
P.T. STATION	37+64.299	N	725,569.043	E	1,474,652.756
C.C.		N	725,553.753	E	1,474,629.309
BACK - N	43° 22' 13.89" E				
AHEAD - S	33° 06' 04.29" E				
CHORD BEAR - S	84° 51' 55.20" E				

COURSE FROM PT 49 TO PC 50 S 33° 06' 03.12" E DIST 46.029

CURVE DATA

CURVE 50					
P.I. STATION	38+20.052	N	725.522.337	E	1,474,683.203
DELTA -	47° 41' 37.87" (RT)				
DEGREE -	260° 26' 07.30"				
TANGENT -	9.725				
LENGTH -	18.313				
RADIUS -	22.000				
EXTERNAL -	2.053				
LONG CHORD -	17.789				
MID. ORD. -	1.878				
P.C. STATION	38+10.328	N	725,530.484	E	1,474,677.892
P.T. STATION	38+28.641	N	725,512.926	E	1,474,680.753
C.C.		N	725,518.469	E	1,474,659.463
BACK - S	33° 06' 04.29" E				
AHEAD - S	14° 35' 33.58" W				
CHORD BEAR - S	9° 15' 15.35" E				

CURVE DATA

CURVE 51					
P.I. STATION	38+87.843	N	725.455.634	E	1,474,665.838
DELTA -	123° 12' 55.67" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	59.202				
LENGTH -	68.816				
RADIUS -	32.000				
EXTERNAL -	35.297				
LONG CHORD -	56.302				
MID. ORD. -	16.784				
P.C. STATION	38+28.641	N	725,512.926	E	1,474,680.753
P.T. STATION	38+97.457	N	725,474.540	E	1,474,721.940
C.C.		N	725,504.864	E	1,474,711.721
BACK - S	14° 35' 33.58" W				
AHEAD - N	71° 22' 37.91" E				
CHORD BEAR - S	47° 00' 54.25" E				

CURVE DATA

CURVE 52					
P.I. STATION	39+15.286	N	725.480.233	E	1,474,738.835
DELTA -	57° 25' 00.06" (RT)				
DEGREE -	176° 00' 02.86"				
TANGENT -	17.829				
LENGTH -	32.623				
RADIUS -	32.554				
EXTERNAL -	4.563				
LONG CHORD -	31.275				
MID. ORD. -	4.002				
P.C. STATION	38+97.457	N	725,474.540	E	1,474,721.940
P.T. STATION	39+30.080	N	725,469.063	E	1,474,752.731
C.C.		N	725,443.690	E	1,474,732.336
BACK - N	71° 22' 37.91" E				
AHEAD - S	51° 12' 22.03" E				
CHORD BEAR - S	79° 54' 52.06" E				

CURVE DATA

CURVE 53					
P.I. STATION	39+54.416	N	725.454.052	E	1,474,771.886
DELTA -	88° 46' 53.76" (LT)				
DEGREE -	230° 28' 51.18"				
TANGENT -	24.336				
LENGTH -	38.520				
RADIUS -	24.859				
EXTERNAL -	9.929				
LONG CHORD -	34.780				
MID. ORD. -	7.095				
P.C. STATION	39+30.080	N	725,469.063	E	1,474,752.731
P.T. STATION	39+68.600	N	725,472.883	E	1,474,787.301
C.C.		N	725,488.630	E	1,474,768.065
BACK - S	51° 54' 56.22" E				
AHEAD - N	39° 18' 10.01" E				
CHORD BEAR - N	83° 41' 36.90" E				

CURVE DATA

CURVE 54					
P.I. STATION	39+80.016	N	725.481.717	E	1,474,794.532
DELTA -	24° 45' 51.25" (RT)				
DEGREE -	110° 11' 02.98"				
TANGENT -	11.416				
LENGTH -	22.475				
RADIUS -	52.000				
EXTERNAL -	1.238				
LONG CHORD -	22.301				
MID. ORD. -	1.210				
P.C. STATION	39+68.600	N	725,472.883	E	1,474,787.301
P.T. STATION	39+91.076	N	725,486.710	E	1,474,804.799
C.C.		N	725,439.946	E	1,474,827.540
BACK - N	39° 18' 10.01" E				
AHEAD - N	64° 04' 01.26" E				
CHORD BEAR - N	51° 41' 05.64" E				

CURVE DATA

CURVE 55					
P.I. STATION	40+05.949	N	725,493.214	E	1,474,818.175
DELTA -	49° 51' 26.06" (LT)				
DEGREE -	179° 02' 57.66"				
TANGENT -	14.873				
LENGTH -	27.846				
RADIUS -	32.000				
EXTERNAL -	3.288				
LONG CHORD -	26.975				
MID. ORD. -	2.931				
P.C. STATION	39+91.076	N	725,486.710	E	1,474,804.799
P.T. STATION	40+18.921	N	725,507.632	E	1,474,821.826
C.C.		N	725,515.487	E	1,474,790.805
BACK - N	64° 04' 01.26" E				
AHEAD - N	14° 12' 35.20" E				
CHORD BEAR - N	39° 08' 18.23" E				

CURVE DATA

CURVE 56					
P.I. STATION	42+00.601	N	725.683.754	E	1,474,866.423
DELTA -	160° 01' 17.33" (RT)				
DEGREE -	179° 02' 57.51"				
TANGENT -	181.680				
LENGTH -	89.373				
RADIUS -	32.000				
EXTERNAL -	152.477				
LONG CHORD -	63.030				
MID. ORD. -	26.449				
P.C. STATION	40+18.921	N	725,507.632	E	1,474,821.826
P.T. STATION	41+08.294	N	725,502.993	E	1,474,884.684
C.C.		N	725,499.777	E	1,474,852.847
BACK - N	14° 12' 35.20" E				
AHEAD - S	5° 46' 07.48" E				
CHORD BEAR - S	85° 46' 46.14" E				

CURVE DATA

CURVE 57					
P.I. STATION	41+69.375	N	725.442.222	E	1,474,890.824
DELTA -	137° 05' 53.79" (LT)				
DEGREE -	238° 43' 56.74"				
TANGENT -	61.081				
LENGTH -	57.428				
RADIUS -	24.000				
EXTERNAL -	41.627				
LONG CHORD -	44.675				
MID. ORD. -	15.223				
P.C. STATION	41+08.294	N	725,502.993	E	1,474,884.684
P.T. STATION	41+65.722	N	725,490.918	E	1,474,927.697
C.C.		N	725,505.406	E	1,474,908.563
BACK - S	5° 46' 07.48" E				
AHEAD - N	37° 07' 58.73" E				
CHORD BEAR - S	74° 19' 04.37" E				

CURVE DATA

CURVE 58					
P.I. STATION	42+13.321	N	725.528.866	E	1,474,956.431
DELTA -	126° 29' 06.98" (RT)				
DEGREE -	238° 43' 56.63"				
TANGENT -	47.600				
LENGTH -	52.982				
RADIUS -	24.000				
EXTERNAL -	29.308				
LONG CHORD -	42.860				
MID. ORD. -	13.195				
P.C. STATION	41+65.722	N	725,490.918	E	1,474,927.697
P.T. STATION	42+18.704	N	725,483.199	E	1,474,969.856
C.C.		N	725,476.430	E	1,474,946.830
BACK - N	37° 07' 58.73" E				
AHEAD - S	16° 22' 54.29" E				
CHORD BEAR - S	79° 37' 27.79" E				

COURSE FROM PT 58 TO PC 59 S 16° 22' 54.29" E DIST 35.000

CURVE DATA

CURVE 59					
P.I. STATION	42+75.037	N	725.429.152	E	1,474,985.744
DELTA -	88° 14' 17.76" (LT)				
DEGREE -	260° 26' 07.30"				
TANGENT -	21.334				
LENGTH -	33.881				
RADIUS -	22.000				
EXTERNAL -	8.645				
LONG CHORD -	30.631				
MID. ORD. -	6.206				
P.C. STATION	42+53.704	N	725,449.619	E	1,474,979.727
P.T. STATION	42+87.585	N	725,434.537	E	1,475,006.387
C.C.		N	725,455.824	E	1,475,000.834
BACK - S	16° 22' 54.29" E				
AHEAD - N	75° 22' 47.95" E				
CHORD BEAR - S	60° 30' 03.17" E				

CURVE DATA

CURVE 60					
P.I. STATION	43+36.536	N	725.446.892	E	1,475,053.754
DELTA -	113° 39' 12.73" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	48.951				
LENGTH -	63.476				
RADIUS -	32.000				
EXTERNAL -	26.482				
LONG CHORD -	53.569				
MID. ORD. -	14.490				
P.C. STATION	42+87.585	N	725,434.537	E	1,475,006.387
P.T. STATION	43+51.061	N	725,398.548	E	1,475,046.067
C.C.		N	725,403.573	E	1,475,014.464
BACK - N	75° 22' 47.95" E				
AHEAD - S	9° 02' 00.68" W				
CHORD BEAR - S	47° 47' 35.69" E				

CURVE DATA

CURVE 61					
P.I. STATION	46+20.570	N	725,132.382	E	1,475,003.7[illegible]
DELTA -	166° 27' 26.76" (LT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	269.509				
LENGTH -	92.967				
RADIUS -	32.000				
EXTERNAL -	239.402				
LONG CHORD -	63.554				
MID. ORD. -	28.227				
P.C. STATION	43+51.061	N	725,398.548	E	1,475,046.0[illegible]
P.T. STATION	44+44.028	N	725,381.239	E	1,475,107.2[illegible]
C.C.		N	725,393.524	E	1,475,077.6[illegible]
BACK - S	9° 02' 00.68" W				
AHEAD - N	22° 34' 33.92" E				
CHORD BEAR - S	74° 11' 42.70" E				

CURVE DATA

CURVE 62					
P.I. STATION	45+43.929	N	725,473.484	E	1,475,145.5[illegible]
DELTA -	144° 28' 39.46" (RT)				
DEGREE -	179° 02' 57.52"				
TANGENT -	99.901				
LENGTH -	80.692				
RADIUS -	32.000				
EXTERNAL -	72.901				
LONG CHORD -	60.950				
MID. ORD. -	22.238				
P.C. STATION	44+44.028	N	725,381.239	E	1,475,107.2[illegible]
P.T. STATION	45+24.720	N	725,376.123	E	1,475,167.[illegible]
C.C.		N	725,368.954	E	1,475,136.7[illegible]
BACK - N	22° 34' 33.92" E				
AHEAD - S	12° 56' 46.62" E				
CHORD BEAR - S	85° 11' 06.35" E				

CURVE DATA

CURVE 63					
P.I. STATION	45+65.765	N	725,336.121	E	1,475,177.[illegible]
DELTA -	111° 23' 54.44" (LT)				
DEGREE -	204° 37' 40.02"				
TANGENT -	41.045				
LENGTH -	54.440				
RADIUS -	28.000				
EXTERNAL -	21.686				
LONG CHORD -	46.261				
MID. ORD. -	12.221				
P.C. STATION	45+24.720	N	725,376.123	E	1,475,167.[illegible]
P.T. STATION	45+79.159	N	725,359.277	E	1,475,211.[illegible]
C.C.		N	725,382.396	E	1,475,195.2[illegible]
BACK - S	12° 56' 46.62" E				
AHEAD - N	55° 39' 18.93" E				
CHORD BEAR - S	68° 38' 43.84" E				

COURSE FROM PT 63 TO PC 64 N 55° 39' 18.93" E DIST 25.000

CURVE DATA

CURVE 64					
P.I. STATION	46+26.370	N	725.385.912	E	1,475,250.0[illegible]
DELTA -	85° 33' 50.06" (RT)				
DEGREE -	238° 43' 56.69"				
TANGENT -	22.210				
LENGTH -	35.841				
RADIUS -	24.000				
EXTERNAL -	8.700				
LONG CHORD -	32.602				
MID. ORD. -	6.385				
P.C. STATION	46+04.159	N	725,373.382	E	1,475,231.6[illegible]
P.T. STATION	46+40.000	N	725,368.598	E	1,475,263.8[illegible]
C.C.		N	725,353.566	E	1,475,245.2[illegible]
BACK - N	55° 39' 18.93" E				
AHEAD - S	38° 46' 51.01" E				
CHORD BEAR - S	81° 33' 46.04" E				

STREAM GEOMETRY DATA 04

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5286
ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	28
RW SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 65						
P.I. STATION	46+73.547	N	725,342.403	E	1,475,284.971	
DELTA -	32° 47' 20.38"	(LT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	33.597					
LENGTH -	51.823					
RADIUS -	32.000					
EXTERNAL -	14.398					
LONG CHORD -	46.343					
MID. ORD. -	9.930					
P.C. STATION	46+40.000	N	725,368.598	E	1,475,263.928	
P.T. STATION	46+91.823	N	725,364.700	E	1,475,310.107	
C.C.		N	725,388.641	E	1,475,288.874	
BACK - S	38° 46' 51.01" E					
AHEAD - N	48° 25' 48.61" E					
CHORD BEAR - S	85° 10' 31.20" E					

CURVE DATA

CURVE 66						
P.I. STATION	47+40.281	N	725,396.853	E	1,475,346.360	
DELTA -	113° 07' 13.55"	(RT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	48.457					
LENGTH -	63.178					
RADIUS -	32.000					
EXTERNAL -	26.070					
LONG CHORD -	53.406					
MID. ORD. -	14.366					
P.C. STATION	46+91.823	N	725,364.700	E	1,475,310.107	
P.T. STATION	47+55.002	N	725,350.887	E	1,475,361.695	
C.C.		N	725,340.760	E	1,475,331.340	
BACK - N	48° 25' 48.61" E					
AHEAD - S	18° 26' 57.83" E					
CHORD BEAR - S	75° 00' 34.61" E					

COURSE FROM PT 66 TO PC 67 S 18° 26' 57.83" E DIST 25.000

CURVE DATA

CURVE 67						
P.I. STATION	48+16.683	N	725,292.376	E	1,475,381.215	
DELTA -	109° 20' 27.24"	(LT)				
DEGREE -	220° 22' 06.18"					
TANGENT -	36.681					
LENGTH -	49.617					
RADIUS -	26.000					
EXTERNAL -	18.961					
LONG CHORD -	42.424					
MID. ORD. -	10.965					
P.C. STATION	47+80.002	N	725,327.172	E	1,475,369.607	
P.T. STATION	48+29.619	N	725,314.853	E	1,475,410.203	
C.C.		N	725,335.400	E	1,475,394.271	
BACK - S	18° 26' 57.83" E					
AHEAD - N	52° 12' 34.93" E					
CHORD BEAR - S	73° 07' 11.45" E					

CURVE DATA

CURVE 68						
P.I. STATION	48+69.106	N	725,339.050	E	1,475,441.408	
DELTA -	113° 16' 29.27"	(RT)				
DEGREE -	220° 22' 06.18"					
TANGENT -	39.487					
LENGTH -	51.402					
RADIUS -	26.000					
EXTERNAL -	21.278					
LONG CHORD -	43.431					
MID. ORD. -	11.702					
P.C. STATION	48+29.619	N	725,314.853	E	1,475,410.203	
P.T. STATION	48+81.022	N	725,300.823	E	1,475,451.305	
C.C.		N	725,294.306	E	1,475,426.135	
BACK - N	52° 12' 34.93" E					
AHEAD - S	14° 30' 55.80" E					
CHORD BEAR - S	71° 09' 10.43" E					

CURVE DATA

CURVE 69						
P.I. STATION	50+04.032	N	725,181.739	E	1,475,482.136	
DELTA -	159° 43' 12.37"	(LT)				
DEGREE -	260° 26' 07.30"					
TANGENT -	123.010					
LENGTH -	61.328					
RADIUS -	22.000					
EXTERNAL -	102.962					
LONG CHORD -	43.313					
MID. ORD. -	18.127					
P.C. STATION	48+81.022	N	725,300.823	E	1,475,451.305	
P.T. STATION	49+42.350	N	725,304.127	E	1,475,494.491	
C.C.		N	725,306.337	E	1,475,472.603	
BACK - S	14° 30' 55.80" E					
AHEAD - N	5° 45' 51.83" E					
CHORD BEAR - N	85° 37' 28.01" E					

CURVE DATA

CURVE 70						
P.I. STATION	50+91.895	N	725,452.917	E	1,475,509.511	
DELTA -	155° 50' 37.60"	(RT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	149.545					
LENGTH -	87.040					
RADIUS -	32.000					
EXTERNAL -	120.931					
LONG CHORD -	62.583					
MID. ORD. -	25.304					
P.C. STATION	49+42.350	N	725,304.127	E	1,475,494.491	
P.T. STATION	50+29.389	N	725,311.010	E	1,475,556.695	
C.C.		N	725,300.913	E	1,475,526.330	
BACK - N	5° 45' 51.83" E					
AHEAD - S	18° 23' 30.57" E					
CHORD BEAR - N	83° 41' 10.63" E					

CURVE DATA

CURVE 71						
P.I. STATION	50+50.847	N	725,290.648	E	1,475,563.465	
DELTA -	88° 34' 11.18"	(LT)				
DEGREE -	260° 26' 07.30"					
TANGENT -	21.458					
LENGTH -	34.008					
RADIUS -	22.000					
EXTERNAL -	8.732					
LONG CHORD -	30.722					
MID. ORD. -	6.251					
P.C. STATION	50+29.384	N	725,311.010	E	1,475,556.695	
P.T. STATION	50+63.392	N	725,296.908	E	1,475,583.989	
C.C.		N	725,317.951	E	1,475,577.571	
BACK - S	18° 23' 30.57" E					
AHEAD - N	73° 02' 18.25" E					
CHORD BEAR - S	62° 40' 36.16" E					

CURVE DATA

CURVE 72						
P.I. STATION	50+88.495	N	725,304.230	E	1,475,607.995	
DELTA -	87° 58' 35.18"	(RT)				
DEGREE -	220° 22' 06.18"					
TANGENT -	25.098					
LENGTH -	39.922					
RADIUS -	26.000					
EXTERNAL -	10.137					
LONG CHORD -	36.115					
MID. ORD. -	7.293					
P.C. STATION	50+63.398	N	725,296.908	E	1,475,583.989	
P.T. STATION	51+03.320	N	725,280.498	E	1,475,616.160	
C.C.		N	725,272.039	E	1,475,591.571	
BACK - N	73° 02' 18.25" E					
AHEAD - S	18° 59' 06.58" E					
CHORD BEAR - S	62° 58' 24.16" E					

COURSE FROM PT 72 TO PC 73 S 18° 59' 06.58" E DIST 35.000

CURVE DATA

CURVE 73						
P.I. STATION	51+91.790	N	725,196.840	E	1,475,644.944	
DELTA -	140° 52' 32.45"	(LT)				
DEGREE -	301° 33' 24.24"					
TANGENT -	53.470					
LENGTH -	46.716					
RADIUS -	19.000					
EXTERNAL -	37.745					
LONG CHORD -	35.807					
MID. ORD. -	12.638					
P.C. STATION	51+38.320	N	725,247.401	E	1,475,627.548	
P.T. STATION	51+85.036	N	725,247.041	E	1,475,663.355	
C.C.		N	725,253.583	E	1,475,645.517	
BACK - S	18° 59' 06.58" E					
AHEAD - N	20° 08' 20.98" E					
CHORD BEAR - S	89° 25' 22.80" E					

CURVE DATA

CURVE 74						
P.I. STATION	52+08.314	N	725,268.895	E	1,475,671.368	
DELTA -	95° 53' 22.73"	(RT)				
DEGREE -	272° 50' 13.36"					
TANGENT -	23.278					
LENGTH -	35.145					
RADIUS -	21.000					
EXTERNAL -	10.350					
LONG CHORD -	31.185					
MID. ORD. -	6.933					
P.C. STATION	51+85.036	N	725,247.041	E	1,475,663.355	
P.T. STATION	52+20.182	N	725,258.681	E	1,475,692.288	
C.C.		N	725,239.811	E	1,475,683.065	
BACK - N	20° 08' 20.98" E					
AHEAD - S	63° 58' 16.29" E					
CHORD BEAR - N	68° 05' 02.34" E					

COURSE FROM PT 74 TO PC 75 S 63° 58' 16.29" E DIST 30.000

CURVE DATA

CURVE 75						
P.I. STATION	52+79.411	N	725,232.689	E	1,475,745.505	
DELTA -	84° 49' 06.09"	(RT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	29.229					
LENGTH -	47.372					
RADIUS -	32.000					
EXTERNAL -	11.340					
LONG CHORD -	43.163					
MID. ORD. -	8.373					
P.C. STATION	52+50.182	N	725,245.516	E	1,475,719.244	
P.T. STATION	52+97.553	N	725,205.373	E	1,475,735.103	
C.C.		N	725,216.761	E	1,475,705.153	
BACK - S	63° 58' 16.29" E					
AHEAD - S	20° 50' 49.80" W					
CHORD BEAR - S	21° 33' 43.25" E					

CURVE DATA

CURVE 76						
P.I. STATION	54+54.737	N	725,058.480	E	1,475,679.162	
DELTA -	156° 59' 08.17"	(LT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	157.184					
LENGTH -	87.677					
RADIUS -	32.000					
EXTERNAL -	128.408					
LONG CHORD -	62.714					
MID. ORD. -	25.616					
P.C. STATION	52+97.553	N	725,205.373	E	1,475,735.103	
P.T. STATION	53+85.230	N	725,171.812	E	1,475,788.080	
C.C.		N	725,193.985	E	1,475,765.008	
BACK - S	20° 50' 49.80" W					
AHEAD - N	43° 51' 41.63" E					
CHORD BEAR - S	57° 38' 44.94" E					

CURVE DATA

CURVE 77						
P.I. STATION	54+08.761	N	725,188.778	E	1,475,804.385	
DELTA -	99° 16' 28.43"	(RT)				
DEGREE -	286° 28' 44.03"					
TANGENT -	23.531					
LENGTH -	34.653					
RADIUS -	20.000					
EXTERNAL -	10.882					
LONG CHORD -	30.478					
MID. ORD. -	7.048					
P.C. STATION	53+85.230	N	725,171.812	E	1,475,788.080	
P.T. STATION	54+19.884	N	725,169.952	E	1,475,818.502	
C.C.		N	725,157.954	E	1,475,802.500	
BACK - N	43° 51' 41.63" E					
AHEAD - S	36° 51' 49.94" E					
CHORD BEAR - S	86° 30' 04.16" E					

CURVE DATA

CURVE 78						
P.I. STATION	54+61.815	N	725,136.404	E	1,475,843.657	
DELTA -	105° 18' 05.98"	(LT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	41.931					
LENGTH -	58.812					
RADIUS -	32.000					
EXTERNAL -	20.747					
LONG CHORD -	50.877					
MID. ORD. -	12.587					
P.C. STATION	54+19.884	N	725,169.952	E	1,475,818.502	
P.T. STATION	54+78.695	N	725,169.521	E	1,475,869.377	
C.C.		N	725,189.149	E	1,475,844.104	
BACK - S	36° 51' 49.94" E					
AHEAD - N	37° 50' 04.08" E					
CHORD BEAR - S	89° 30' 52.93" E					

CURVE DATA

CURVE 79						
P.I. STATION	55+59.460	N	725,233.308	E	1,475,918.916	
DELTA -	136° 46' 18.29"	(RT)				
DEGREE -	179° 02' 57.52"					
TANGENT -	80.765					
LENGTH -	76.388					
RADIUS -	32.000					
EXTERNAL -	54.873					
LONG CHORD -	59.500					
MID. ORD. -	20.213					
P.C. STATION	54+78.695	N	725,169.521	E	1,475,869.377	
P.T. STATION	55+55.083	N	725,152.901	E	1,475,926.508	
C.C.		N	725,149.893	E	1,475,894.650	
BACK - N	37° 50' 04.08" E					
AHEAD - S	5° 23' 37.63" E					
CHORD BEAR - S	73° 46' 46.78" E					

COURSE FROM PT 79 TO PC 80 S 5° 23' 37.63" E DIST 35.000

CURVE DATA

CURVE 80						
P.I. STATION	55+99.310	N	725,108.869	E	1,475,930.666	
DELTA -	45° 30' 31.30"	(RT)				
DEGREE -	260° 26' 07.30"					
TANGENT -	9.227					
LENGTH -	17.474					
RADIUS -	22.000					
EXTERNAL -	1.857					
LONG CHORD -	17.018					
MID. ORD. -	1.712					
P.C. STATION	55+90.083	N	725,118.056	E	1,475,929.798	
P.T. STATION	56+07.557	N	725,101.813	E	1,475,924.720	
C.C.		N	725,115.988	E	1,475,907.896	
BACK - S	5° 23' 37.63" E					
AHEAD - S	40° 06' 53.66" W					
CHORD BEAR - S	17° 21' 38.02" W					

COURSE FROM PT 80 TO PC 81 S 41° 16' 45.38" W DIST 14.122

STREAM GEOMETRY DATA 05

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5720
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PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	29
RW SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 81
P.I. STATION 57+56.473 N 724,997.837 E 1,475,318.174
DELTA - 156° 23' 25.72" (LT)
DEGREE - 203° 22' 54.67"
TANGENT - 134.744
LENGTH - 76.395
RADIUS - 28.172
EXTERNAL - 109.534
LONG CHORD - 55.151
MID. ORD. - 22.408
P.C. STATION 56+21.679 N 725,091.200 E 1,475,315.404
P.T. STATION 56+98.574 N 725,044.446 E 1,475,344.657
C.C. N 725,070.880 E 1,475,934.510
BACK - S 46° 09' 39.25" W
AHEAD - N 69° 46' 13.53" E
CHORD BEAR - S 32° 02' 03.61" E

CURVE DATA

CURVE 82
P.I. STATION 57+16.843 N 725,050.763 E 1,475,961.799
DELTA - 59° 26' 38.09" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 18.269
LENGTH - 33.200
RADIUS - 32.000
EXTERNAL - 4.848
LONG CHORD - 31.731
MID. ORD. - 4.210
P.C. STATION 56+98.574 N 725,044.446 E 1,475,944.657
P.T. STATION 57+31.774 N 725,039.214 E 1,475,975.954
C.C. N 725,014.420 E 1,475,955.723
BACK - N 69° 46' 13.53" E
AHEAD - S 50° 47' 08.39" E
CHORD BEAR - S 80° 30' 27.43" E

COURSE FROM PT 82 TO PC 83 S 50° 47' 08.39" E DIST 15.638

CURVE DATA

CURVE 83
P.I. STATION 57+86.611 N 725,004.544 E 1,476,018.420
DELTA - 101° 32' 51.09" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 39.199
LENGTH - 56.715
RADIUS - 32.000
EXTERNAL - 18.602
LONG CHORD - 49.578
MID. ORD. - 11.764
P.C. STATION 57+47.412 N 725,029.327 E 1,475,988.070
P.T. STATION 58+04.127 N 724,979.749 E 1,475,988.088
C.C. N 725,004.534 E 1,475,967.889
BACK - S 50° 47' 08.39" E
AHEAD - S 50° 45' 42.70" W
CHORD BEAR - S 0° 00' 42.84" E

CURVE DATA

CURVE 84
P.I. STATION 58+94.297 N 724,922.712 E 1,475,918.241
DELTA - 145° 29' 54.41" (LT)
DEGREE - 204° 37' 40.02"
TANGENT - 90.170
LENGTH - 71.104
RADIUS - 28.000
EXTERNAL - 66.418
LONG CHORD - 53.481
MID. ORD. - 19.696
P.C. STATION 58+04.127 N 724,979.749 E 1,475,988.088
P.T. STATION 58+75.231 N 724,930.158 E 1,476,008.104
C.C. N 724,958.062 E 1,476,005.761
BACK - S 50° 45' 42.70" W
AHEAD - N 85° 15' 48.29" E
CHORD BEAR - S 21° 59' 14.51" E

CURVE DATA

CURVE 85
P.I. STATION 59+05.937 N 724,932.693 E 1,476,038.704
DELTA - 103° 58' 36.63" (RT)
DEGREE - 238° 43' 56.69"
TANGENT - 30.706
LENGTH - 43.554
RADIUS - 24.000
EXTERNAL - 14.972
LONG CHORD - 37.819
MID. ORD. - 9.220
P.C. STATION 58+75.231 N 724,930.158 E 1,476,008.104
P.T. STATION 59+18.785 N 724,902.386 E 1,476,033.774
C.C. N 724,906.240 E 1,476,010.085
BACK - N 85° 15' 48.29" E
AHEAD - S 9° 14' 24.92" W
CHORD BEAR - S 42° 44' 53.40" E

CURVE DATA

CURVE 86
P.I. STATION 59+83.238 N 724,838.769 E 1,476,023.424
DELTA - 139° 27' 07.38" (LT)
DEGREE - 240° 38' 54.61"
TANGENT - 64.454
LENGTH - 57.948
RADIUS - 23.809
EXTERNAL - 44.902
LONG CHORD - 44.668
MID. ORD. - 15.559
P.C. STATION 59+18.785 N 724,902.386 E 1,476,033.774
P.T. STATION 59+76.733 N 724,880.381 E 1,476,072.645
C.C. N 724,898.563 E 1,476,057.274
BACK - S 9° 14' 24.92" W
AHEAD - N 49° 47' 17.54" E
CHORD BEAR - S 60° 29' 08.77" E

CURVE DATA

CURVE 87
P.I. STATION 60+14.126 N 724,904.919 E 1,476,100.860
DELTA - 114° 25' 51.87" (RT)
DEGREE - 237° 54' 14.07"
TANGENT - 37.393
LENGTH - 48.100
RADIUS - 24.084
EXTERNAL - 20.394
LONG CHORD - 40.495
MID. ORD. - 11.043
P.C. STATION 59+76.733 N 724,880.381 E 1,476,072.645
P.T. STATION 60+24.833 N 724,869.082 E 1,476,111.532
C.C. N 724,862.208 E 1,476,088.450
BACK - N 48° 59' 12.01" E
AHEAD - S 16° 34' 56.12" E
CHORD BEAR - S 73° 47' 52.06" E

CURVE DATA

CURVE 88
P.I. STATION 60+60.257 N 724,835.130 E 1,476,121.642
DELTA - 111° 45' 54.16" (LT)
DEGREE - 238° 43' 56.67"
TANGENT - 35.425
LENGTH - 46.816
RADIUS - 24.000
EXTERNAL - 18.789
LONG CHORD - 39.739
MID. ORD. - 10.539
P.C. STATION 60+24.833 N 724,869.082 E 1,476,111.532
P.T. STATION 60+71.649 N 724,857.109 E 1,476,149.424
C.C. N 724,875.931 E 1,476,134.534
BACK - S 16° 34' 56.12" E
AHEAD - N 51° 39' 09.72" E
CHORD BEAR - S 72° 27' 53.20" E

CURVE DATA

CURVE 89
P.I. STATION 61+06.362 N 724,878.646 E 1,476,176.648
DELTA - 96° 07' 47.96" (RT)
DEGREE - 183° 43' 47.34"
TANGENT - 34.713
LENGTH - 52.321
RADIUS - 31.185
EXTERNAL - 15.479
LONG CHORD - 46.397
MID. ORD. - 10.344
P.C. STATION 60+71.649 N 724,857.109 E 1,476,149.424
P.T. STATION 61+23.970 N 724,849.277 E 1,476,195.155
C.C. N 724,832.652 E 1,476,168.772
BACK - N 51° 39' 09.72" E
AHEAD - S 32° 13' 02.32" E
CHORD BEAR - S 80° 16' 56.30" E

COURSE FROM PT 89 TO PC 90 S 27° 05' 13.11" E DIST 9.714

CURVE DATA

CURVE 90
P.I. STATION 61+57.589 N 724,821.013 E 1,476,213.242
DELTA - 90° 08' 04.58" (LT)
DEGREE - 240° 14' 39.34"
TANGENT - 23.905
LENGTH - 37.518
RADIUS - 23.849
EXTERNAL - 9.918
LONG CHORD - 33.767
MID. ORD. - 7.005
P.C. STATION 61+33.684 N 724,840.628 E 1,476,199.578
P.T. STATION 61+71.202 N 724,834.723 E 1,476,232.825
C.C. N 724,854.260 E 1,476,219.147
BACK - S 34° 51' 39.76" E
AHEAD - N 55° 00' 15.67" E
CHORD BEAR - S 79° 55' 42.04" E

COURSE FROM PT 90 TO PC 91 N 56° 39' 32.59" E DIST 23.127

CURVE DATA

CURVE 91
P.I. STATION 62+12.193 N 724,857.253 E 1,476,267.070
DELTA - 58° 20' 38.79" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 17.864
LENGTH - 32.585
RADIUS - 32.000
EXTERNAL - 4.648
LONG CHORD - 31.196
MID. ORD. - 4.059
P.C. STATION 61+94.330 N 724,847.435 E 1,476,252.146
P.T. STATION 62+26.915 N 724,849.702 E 1,476,283.259
C.C. N 724,820.701 E 1,476,269.734
BACK - N 56° 39' 32.59" E
AHEAD - S 64° 59' 48.63" E
CHORD BEAR - N 85° 49' 51.98" E

COURSE FROM PT 91 TO PC 92 S 64° 59' 48.63" E DIST 43.964

CURVE DATA

CURVE 92
P.I. STATION 62+88.807 N 724,823.721 E 1,476,339.433
DELTA - 72° 03' 01.45" (LT)
DEGREE - 232° 24' 58.81"
TANGENT - 17.927
LENGTH - 31.001
RADIUS - 24.652
EXTERNAL - 5.829
LONG CHORD - 28.998
MID. ORD. - 4.715
P.C. STATION 62+70.879 N 724,831.120 E 1,476,323.103
P.T. STATION 63+01.880 N 724,836.976 E 1,476,351.504
C.C. N 724,853.575 E 1,476,333.277
BACK - S 65° 37' 31.24" E
AHEAD - N 42° 19' 27.31" E
CHORD BEAR - N 78° 20' 58.03" E

COURSE FROM PT 92 TO PC 93 N 40° 18' 42.59" E DIST 10.471

CURVE DATA

CURVE 93
P.I. STATION 63+33.918 N 724,861.821 E 1,476,371.726
DELTA - 67° 57' 29.43" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 21.567
LENGTH - 37.955
RADIUS - 32.000
EXTERNAL - 6.589
LONG CHORD - 35.769
MID. ORD. - 5.464
P.C. STATION 63+12.350 N 724,844.960 E 1,476,358.278
P.T. STATION 63+50.305 N 724,855.684 E 1,476,392.401
C.C. N 724,825.007 E 1,476,383.295
BACK - N 38° 34' 30.94" E
AHEAD - S 73° 27' 59.63" E
CHORD BEAR - N 72° 33' 15.65" E

COURSE FROM PT 93 TO PC 94 S 74° 57' 59.43" E DIST 31.529

CURVE DATA

CURVE 94
P.I. STATION 64+08.473 N 724,839.011 E 1,476,448.099
DELTA - 79° 33' 04.46" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 26.638
LENGTH - 44.430
RADIUS - 32.000
EXTERNAL - 9.637
LONG CHORD - 40.946
MID. ORD. - 7.406
P.C. STATION 63+81.835 N 724,847.506 E 1,476,422.852
P.T. STATION 64+26.264 N 724,862.300 E 1,476,461.031
C.C. N 724,877.835 E 1,476,433.055
BACK - S 71° 24' 19.68" E
AHEAD - N 29° 02' 35.86" E
CHORD BEAR - N 68° 49' 08.09" E

CURVE DATA

CURVE 95
P.I. STATION 64+48.451 N 724,881.697 E 1,476,471.802
DELTA - 72° 58' 12.38" (RT)
DEGREE - 190° 59' 09.36"
TANGENT - 22.187
LENGTH - 38.207
RADIUS - 30.000
EXTERNAL - 7.313
LONG CHORD - 35.677
MID. ORD. - 5.880
P.C. STATION 64+26.264 N 724,862.300 E 1,476,461.031
P.T. STATION 64+64.472 N 724,877.079 E 1,476,493.503
C.C. N 724,847.736 E 1,476,487.259
BACK - N 29° 02' 35.86" E
AHEAD - S 77° 59' 11.77" E
CHORD BEAR - N 65° 31' 42.04" E

STREAM GEOMETRY DATA 08

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RALEIGH, NC 27609-5286
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	30
R/W SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 96
P.I. STATION 65+64.121 N 724.856.338 E 1,476,590.970
DELTA - 144° 27' 37.41" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 79.650
LENGTH - 80.645
RADIUS - 32.000
EXTERNAL - 72.662
LONG CHORD - 60.935
MID. ORD. - 22.216
P.C. STATION 64+64.472 N 724.877.079 E 1,476,493.505
P.T. STATION 65+45.116 N 724.929.948 E 1,476,523.802
C.C. N 724.908.378 E 1,476,500.164
BACK - S 77° 59' 11.77" E
AHEAD - N 42° 22' 49.17" W
CHORD BEAR - N 29° 48' 59.53" E

CURVE DATA

CURVE 97
P.I. STATION 67+88.500 N 725,109.732 E 1,476,359.750
DELTA - 165° 01' 10.03" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 243.383
LENGTH - 92.164
RADIUS - 32.000
EXTERNAL - 213.478
LONG CHORD - 63.454
MID. ORD. - 27.829
P.C. STATION 65+45.116 N 724.929.948 E 1,476,523.802
P.T. STATION 66+37.280 N 724.978.464 E 1,476,564.699
C.C. N 724,951.517 E 1,476,547.440
BACK - N 42° 22' 49.17" W
AHEAD - S 57° 21' 39.15" E
CHORD BEAR - N 40° 07' 45.84" E

COURSE FROM PT 97 TO PC 98 S 57° 21' 39.15" E DIST 25.000

CURVE DATA

CURVE 98
P.I. STATION 66+79.045 N 724.955.938 E 1,476,599.868
DELTA - 69° 52' 15.91" (LT)
DEGREE - 238° 43' 56.69"
TANGENT - 16.765
LENGTH - 29.268
RADIUS - 24.000
EXTERNAL - 5.276
LONG CHORD - 27.487
MID. ORD. - 4.325
P.C. STATION 66+62.280 N 724.964.980 E 1,476,585.75
P.T. STATION 66+91.548 N 724.966.082 E 1,476,613.216
C.C. N 724.985.190 E 1,476,598.695
BACK - S 57° 21' 39.15" E
AHEAD - N 52° 46' 04.94" E
CHORD BEAR - N 87° 42' 12.90" E

CURVE DATA

CURVE 99
P.I. STATION 67+83.066 N 725.021.454 E 1,476,686.082
DELTA - 141° 27' 17.94" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 91.518
LENGTH - 79.003
RADIUS - 32.000
EXTERNAL - 64.952
LONG CHORD - 60.413
MID. ORD. - 21.438
P.C. STATION 66+91.548 N 724.966.082 E 1,476,613.216
P.T. STATION 67+70.551 N 724.932.741 E 1,476,663.597
C.C. N 724.940.604 E 1,476,632.578
BACK - N 52° 46' 04.94" E
AHEAD - S 14° 13' 22.88" W
CHORD BEAR - S 56° 30' 16.09" E

CURVE DATA

CURVE 100
P.I. STATION 68+24.855 N 724.880.102 E 1,476,650.254
DELTA - 118° 58' 49.46" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 54.304
LENGTH - 66.451
RADIUS - 32.000
EXTERNAL - 31.031
LONG CHORD - 55.139
MID. ORD. - 15.754
P.C. STATION 67+70.551 N 724.932.741 E 1,476,663.597
P.T. STATION 68+37.003 N 724.893.935 E 1,476,702.767
C.C. N 724.924.879 E 1,476,694.616
BACK - S 14° 13' 22.88" W
AHEAD - N 75° 14' 33.42" E
CHORD BEAR - S 45° 16' 01.85" E

COURSE FROM PT 100 TO PC 101 N 75° 14' 33.42" E DIST 35.000

CURVE DATA

CURVE 101
P.I. STATION 68+82.535 N 724.905.533 E 1,476.746.798
DELTA - 51° 09' 55.21" (RT)
DEGREE - 260° 26' 07.30"
TANGENT - 10.532
LENGTH - 19.646
RADIUS - 22.000
EXTERNAL - 3.391
LONG CHORD - 19.000
MID. ORD. - 2.157
P.C. STATION 68+72.003 N 724.902.850 E 1,476.736.615
P.T. STATION 68+91.649 N 724.899.281 E 1,476.755.274
C.C. N 724.881.576 E 1,476.742.217
BACK - N 75° 14' 33.42" E
AHEAD - S 53° 35' 31.37" E
CHORD BEAR - S 79° 10' 28.98" E

COURSE FROM PT 101 TO PC 102 S 53° 35' 31.37" E DIST 25.000

CURVE DATA

CURVE 102
P.I. STATION 69+52.798 N 724.862.987 E 1,476,804.488
DELTA - 96° 58' 08.24" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 36.150
LENGTH - 54.158
RADIUS - 32.000
EXTERNAL - 16.278
LONG CHORD - 47.922
MID. ORD. - 10.790
P.C. STATION 69+16.649 N 724.884.443 E 1,476,775.395
P.T. STATION 69+70.806 N 724.894.469 E 1,476,822.256
C.C. N 724.910.197 E 1,476,794.387
BACK - S 53° 35' 31.37" E
AHEAD - N 29° 26' 19.69" E
CHORD BEAR - N 77° 55' 24.16" E

CURVE DATA

CURVE 103
P.I. STATION 69+87.723 N 724.909.202 E 1,476,830.570
DELTA - 62° 16' 41.27" (RT)
DEGREE - 204° 37' 40.02"
TANGENT - 16.917
LENGTH - 30.435
RADIUS - 28.000
EXTERNAL - 4.714
LONG CHORD - 28.959
MID. ORD. - 4.034
P.C. STATION 69+70.806 N 724.894.469 E 1,476,822.256
P.T. STATION 70+01.241 N 724.908.695 E 1,476,847.479
C.C. N 724.880.708 E 1,476,846.640
BACK - N 29° 26' 19.69" E
AHEAD - S 88° 16' 59.05" E
CHORD BEAR - N 60° 34' 40.32" E

COURSE FROM PT 103 TO PC 104 S 88° 16' 59.04" E DIST 20.000

CURVE DATA

CURVE 104
P.I. STATION 70+33.624 N 724.907.725 E 1,476.879.848
DELTA - 47° 42' 51.45" (RT)
DEGREE - 204° 37' 40.02"
TANGENT - 12.383
LENGTH - 23.318
RADIUS - 28.000
EXTERNAL - 2.616
LONG CHORD - 22.650
MID. ORD. - 2.392
P.C. STATION 70+21.241 N 724.908.096 E 1,476.867.470
P.T. STATION 70+44.559 N 724.898.318 E 1,476.887.901
C.C. N 724.880.108 E 1,476.866.631
BACK - S 88° 16' 59.05" E
AHEAD - S 40° 34' 07.60" E
CHORD BEAR - S 64° 25' 33.32" E

CURVE DATA

CURVE 105
P.I. STATION 70+70.384 N 724.878.701 E 1,476.904.697
DELTA - 77° 48' 37.60" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 25.826
LENGTH - 43.458
RADIUS - 32.000
EXTERNAL - 9.121
LONG CHORD - 40.194
MID. ORD. - 7.098
P.C. STATION 70+44.559 N 724.898.318 E 1,476,887.901
P.T. STATION 70+88.016 N 724.890.976 E 1,476,927.419
C.C. N 724.919.130 E 1,476.912.209
BACK - S 40° 34' 07.60" E
AHEAD - N 61° 37' 14.80" E
CHORD BEAR - S 79° 28' 26.40" E

CURVE DATA

CURVE 106
P.I. STATION 71+64.642 N 724.927.396 E 1,476,994.836
DELTA - 134° 40' 04.10" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 76.626
LENGTH - 75.213
RADIUS - 32.000
EXTERNAL - 51.039
LONG CHORD - 59.057
MID. ORD. - 19.668
P.C. STATION 70+88.016 N 724.890.976 E 1,476,927.419
P.T. STATION 71+63.229 N 724.853.846 E 1,476,973.344
C.C. N 724.862.821 E 1,476,942.628
BACK - N 61° 37' 14.80" E
AHEAD - S 16° 17' 18.90" W
CHORD BEAR - S 51° 02' 43.15" E

CURVE DATA

CURVE 107
P.I. STATION 72+67.222 N 724.754.028 E 1,476.944.177
DELTA - 149° 51' 39.53" (LT)
DEGREE - 204° 37' 40.02"
TANGENT - 103.993
LENGTH - 73.236
RADIUS - 28.000
EXTERNAL - 79.696
LONG CHORD - 54.074
MID. ORD. - 20.720
P.C. STATION 71+63.229 N 724.853.846 E 1,476.973.344
P.T. STATION 72+36.465 N 724.825.707 E 1,477.019.520
C.C. N 724.845.993 E 1,477.000.220
BACK - S 16° 17' 18.90" W
AHEAD - N 46° 25' 39.37" E
CHORD BEAR - S 58° 38' 30.86" E

CURVE DATA

CURVE 108
P.I. STATION 72+54.776 N 724.838.328 E 1,477.032.786
DELTA - 70° 18' 37.57" (RT)
DEGREE - 220° 22' 06.18"
TANGENT - 18.311
LENGTH - 31.906
RADIUS - 26.000
EXTERNAL - 5.801
LONG CHORD - 29.941
MID. ORD. - 4.743
P.C. STATION 72+36.465 N 724.825.707 E 1,477,019.520
P.T. STATION 72+68.371 N 724.830.090 E 1,477,049.138
C.C. N 724.806.870 E 1,477,037.441
BACK - N 46° 25' 39.37" E
AHEAD - S 63° 15' 43.06" E
CHORD BEAR - N 81° 34' 58.16" E

COURSE FROM PT 108 TO PC 109 S 63° 15' 43.06" E DIST 30.000

CURVE DATA

CURVE 109
P.I. STATION 73+12.511 N 724.810.231 E 1,477.088.558
DELTA - 47° 40' 39.77" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 14.140
LENGTH - 26.628
RADIUS - 32.000
EXTERNAL - 2.985
LONG CHORD - 25.867
MID. ORD. - 2.730
P.C. STATION 72+98.371 N 724.816.592 E 1,477,075.931
P.T. STATION 73+24.999 N 724.796.611 E 1,477,092.357
C.C. N 724.788.014 E 1,477,061.534
BACK - S 63° 15' 43.06" E
AHEAD - S 15° 35' 03.29" E
CHORD BEAR - S 39° 25' 23.17" E

CURVE DATA

CURVE 110
P.I. STATION 75+50.697 N 724.579.211 E 1,477.152.992
DELTA - 163° 51' 37.71" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 225.698
LENGTH - 91.517
RADIUS - 32.000
EXTERNAL - 195.955
LONG CHORD - 63.366
MID. ORD. - 27.508
P.C. STATION 73+24.999 N 724.796.611 E 1,477,092.357
P.T. STATION 74+16.516 N 724.804.898 E 1,477,155.179
C.C. N 724.805.208 E 1,477,123.181
BACK - S 15° 35' 03.29" E
AHEAD - N 0° 33' 19.00" E
CHORD BEAR - N 82° 29' 07.86" E

CURVE DATA

CURVE 111
P.I. STATION 75+08.943 N 724.897.320 E 1,477,156.075
DELTA - 150° 53' 14.96" (RT)
DEGREE - 238° 43' 56.69"
TANGENT - 92.427
LENGTH - 63.204
RADIUS - 24.000
EXTERNAL - 71.492
LONG CHORD - 46.459
MID. ORD. - 17.968
P.C. STATION 74+16.516 N 724.804.898 E 1,477,155.179
P.T. STATION 74+79.720 N 724.816.138 E 1,477,200.258
C.C. N 724.804.665 E 1,477,179.178
BACK - N 0° 33' 19.00" E
AHEAD - S 28° 33' 26.05" E
CHORD BEAR - N 75° 59' 56.48" E

STREAM GEOMETRY DATA 07

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5780
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	31
R/W SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 112
P.I. STATION 75+41.903 N 724,761.615 E 1,477,221.783
DELTA - 134° 37' 20.95" (LT)
DEGREE - 220° 22' 06.18"
TANGENT - 62.189
LENGTH - 61.090
RADIUS - 26.000
EXTERNAL - 41.406
LONG CHORD - 47.976
MID. ORD. - 15.971
P.C. STATION 74+79.720 N 724,816.138 E 1,477,200.253
P.T. STATION 75+40.809 N 724,821.043 E 1,477,247.363
C.C. N 724,828.567 E 1,477,223.095
BACK - S 28° 33' 26.05" E
AHEAD - N 16° 49' 13.01" E
CHORD BEAR - N 84° 07' 53.48" E

CURVE DATA

CURVE 113
P.I. STATION 76+00.179 N 724,877.872 E 1,477,265.162
DELTA - 123° 21' 02.00" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 59.369
LENGTH - 68.892
RADIUS - 32.000
EXTERNAL - 35.444
LONG CHORD - 56.337
MID. ORD. - 16.817
P.C. STATION 75+40.809 N 724,821.043 E 1,477,247.985
P.T. STATION 76+09.701 N 724,832.279 E 1,477,303.186
C.C. N 724,811.783 E 1,477,278.614
BACK - N 16° 49' 13.01" E
AHEAD - S 39° 49' 44.99" E
CHORD BEAR - N 78° 29' 44.01" E

COURSE FROM PT 113 TO PC 114 S 39° 49' 44.99" E DIST 25.000

CURVE DATA

CURVE 114
P.I. STATION 76+54.238 N 724,798.077 E 1,477,331.714
DELTA - 73° 50' 38.67" (LT)
DEGREE - 220° 22' 06.18"
TANGENT - 19.537
LENGTH - 33.509
RADIUS - 26.000
EXTERNAL - 6.522
LONG CHORD - 31.238
MID. ORD. - 5.214
P.C. STATION 76+34.701 N 724,813.080 E 1,477,319.201
P.T. STATION 76+68.211 N 724,805.921 E 1,477,349.607
C.C. N 724,829.733 E 1,477,339.168
BACK - S 39° 49' 44.99" E
AHEAD - N 66° 19' 36.34" E
CHORD BEAR - S 76° 45' 04.33" E

CURVE DATA

CURVE 115
P.I. STATION 76+95.825 N 724,817.009 E 1,477,374.897
DELTA - 81° 35' 03.39" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 27.614
LENGTH - 45.565
RADIUS - 32.000
EXTERNAL - 10.267
LONG CHORD - 41.812
MID. ORD. - 7.773
P.C. STATION 76+68.211 N 724,805.921 E 1,477,349.607
P.T. STATION 77+13.776 N 724,793.614 E 1,477,389.567
C.C. N 724,776.614 E 1,477,362.456
BACK - N 66° 19' 36.34" E
AHEAD - S 32° 05' 20.28" E
CHORD BEAR - S 72° 52' 51.97" E

COURSE FROM PT 115 TO PC 116 S 32° 05' 20.28" E DIST 30.000

CURVE DATA

CURVE 116
P.I. STATION 77+67.443 N 724,748.146 E 1,477,418.071
DELTA - 89° 11' 57.26" (LT)
DEGREE - 238° 43' 56.69"
TANGENT - 23.667
LENGTH - 37.364
RADIUS - 24.000
EXTERNAL - 9.706
LONG CHORD - 33.703
MID. ORD. - 6.911
P.C. STATION 77+43.776 N 724,768.197 E 1,477,405.504
P.T. STATION 77+81.140 N 724,760.437 E 1,477,438.302
C.C. N 724,780.947 E 1,477,425.837
BACK - S 32° 05' 20.28" E
AHEAD - N 58° 42' 42.46" E
CHORD BEAR - S 76° 41' 18.91" E

CURVE DATA

CURVE 117
P.I. STATION 78+50.125 N 724,796.264 E 1,477,497.254
DELTA - 130° 13' 47.68" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 68.985
LENGTH - 72.734
RADIUS - 32.000
EXTERNAL - 44.046
LONG CHORD - 58.058
MID. ORD. - 18.534
P.C. STATION 77+81.140 N 724,760.437 E 1,477,438.302
P.T. STATION 78+53.874 N 724,728.117 E 1,477,486.533
C.C. N 724,733.091 E 1,477,454.921
BACK - N 58° 42' 42.46" E
AHEAD - S 71° 56' 30.14" W
CHORD BEAR - S 56° 10' 23.70" E

CURVE DATA

CURVE 118
P.I. STATION 78+78.026 N 724,704.258 E 1,477,482.774
DELTA - 74° 05' 17.32" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 24.152
LENGTH - 41.379
RADIUS - 32.000
EXTERNAL - 8.092
LONG CHORD - 38.555
MID. ORD. - 6.458
P.C. STATION 78+53.874 N 724,728.117 E 1,477,486.532
P.T. STATION 78+95.252 N 724,694.107 E 1,477,504.693
C.C. N 724,723.143 E 1,477,518.143
BACK - S 8° 56' 30.14" W
AHEAD - S 65° 08' 47.18" E
CHORD BEAR - S 28° 06' 08.52" E

CURVE DATA

CURVE 119
P.I. STATION 79+19.271 N 724,684.012 E 1,477,526.487
DELTA - 73° 46' 54.03" (RT)
DEGREE - 179° 02' 57.50"
TANGENT - 24.018
LENGTH - 41.207
RADIUS - 32.000
EXTERNAL - 8.011
LONG CHORD - 38.419
MID. ORD. - 6.407
P.C. STATION 78+95.252 N 724,694.107 E 1,477,504.693
P.T. STATION 79+36.460 N 724,660.266 E 1,477,522.881
C.C. N 724,665.071 E 1,477,491.244
BACK - S 65° 08' 47.18" E
AHEAD - S 8° 38' 06.85" W
CHORD BEAR - S 28° 15' 20.17" E

CURVE DATA

CURVE 120
P.I. STATION 79+60.370 N 724,636.628 E 1,477,519.291
DELTA - 80° 59' 21.09" (LT)
DEGREE - 204° 37' 40.04"
TANGENT - 23.910
LENGTH - 39.579
RADIUS - 28.000
EXTERNAL - 8.819
LONG CHORD - 36.365
MID. ORD. - 6.707
P.C. STATION 79+36.460 N 724,660.266 E 1,477,522.881
P.T. STATION 79+76.039 N 724,629.380 E 1,477,542.076
C.C. N 724,656.062 E 1,477,550.564
BACK - S 8° 38' 06.85" W
AHEAD - S 72° 21' 14.25" E
CHORD BEAR - S 31° 51' 33.70" E

CURVE DATA

CURVE 121
P.I. STATION 80+07.333 N 724,619.893 E 1,477,571.898
DELTA - 105° 01' 49.22" (RT)
DEGREE - 238° 43' 56.66"
TANGENT - 31.295
LENGTH - 43.995
RADIUS - 24.000
EXTERNAL - 15.438
LONG CHORD - 38.089
MID. ORD. - 9.395
P.C. STATION 79+76.039 N 724,629.380 E 1,477,542.076
P.T. STATION 80+20.034 N 724,593.552 E 1,477,555.002
C.C. N 724,606.509 E 1,477,534.800
BACK - S 72° 21' 14.25" E
AHEAD - S 32° 40' 34.97" W
CHORD BEAR - S 19° 50' 19.64" E

COURSE FROM PT 121 TO PC 122 S 31° 53' 51.27" W DIST 11.540

CURVE DATA

CURVE 122
P.I. STATION 80+82.926 N 724,540.156 E 1,477,521.769
DELTA - 116° 08' 34.00" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 51.353
LENGTH - 64.866
RADIUS - 32.000
EXTERNAL - 28.507
LONG CHORD - 54.317
MID. ORD. - 15.076
P.C. STATION 80+31.573 N 724,583.754 E 1,477,548.905
P.T. STATION 80+96.440 N 724,535.007 E 1,477,572.864
C.C. N 724,566.846 E 1,477,576.072
BACK - S 31° 53' 51.27" W
AHEAD - S 84° 14' 42.73" E
CHORD BEAR - S 26° 10' 25.73" E

COURSE FROM PT 122 TO PC 123 S 84° 14' 42.73" E DIST 70.295

CURVE DATA

CURVE 123
P.I. STATION 81+87.643 N 724,525.862 E 1,477,663.607
DELTA - 66° 19' 16.88" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 20.909
LENGTH - 37.041
RADIUS - 32.000
EXTERNAL - 6.225
LONG CHORD - 35.007
MID. ORD. - 5.212
P.C. STATION 81+66.734 N 724,527.958 E 1,477,642.804
P.T. STATION 82+03.775 N 724,505.968 E 1,477,670.042
C.C. N 724,496.120 E 1,477,639.595
BACK - S 84° 14' 42.73" E
AHEAD - S 17° 55' 25.85" E
CHORD BEAR - S 51° 05' 04.29" E

CURVE DATA

CURVE 124
P.I. STATION 82+39.642 N 724,471.842 E 1,477,681.080
DELTA - 96° 31' 17.99" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 35.867
LENGTH - 53.908
RADIUS - 32.000
EXTERNAL - 16.067
LONG CHORD - 47.756
MID. ORD. - 10.696
P.C. STATION 82+03.775 N 724,505.968 E 1,477,670.042
P.T. STATION 82+57.683 N 724,486.684 E 1,477,713.732
C.C. N 724,515.816 E 1,477,700.489
BACK - S 17° 55' 25.85" E
AHEAD - N 65° 33' 16.16" E
CHORD BEAR - S 66° 11' 04.84" E

CURVE DATA

CURVE 125
P.I. STATION 83+05.329 N 724,506.401 E 1,477,757.106
DELTA - 130° 25' 49.66" (RT)
DEGREE - 260° 26' 07.30"
TANGENT - 47.646
LENGTH - 50.082
RADIUS - 22.000
EXTERNAL - 30.480
LONG CHORD - 39.947
MID. ORD. - 12.777
P.C. STATION 82+57.683 N 724,486.684 E 1,477,713.732
P.T. STATION 83+07.765 N 724,460.598 E 1,477,743.985
C.C. N 724,466.657 E 1,477,722.836
BACK - N 65° 33' 16.16" E
AHEAD - S 15° 59' 05.83" W
CHORD BEAR - S 49° 13' 49.00" E

CURVE DATA

CURVE 126
P.I. STATION 84+10.064 N 724,362.255 E 1,477,715.814
DELTA - 155° 43' 33.89" (LT)
DEGREE - 260° 26' 07.30"
TANGENT - 102.299
LENGTH - 59.795
RADIUS - 22.000
EXTERNAL - 82.638
LONG CHORD - 43.017
MID. ORD. - 17.375
P.C. STATION 83+07.765 N 724,460.598 E 1,477,743.985
P.T. STATION 83+67.559 N 724,440.322 E 1,477,781.923
C.C. N 724,454.540 E 1,477,765.135
BACK - S 15° 59' 05.83" W
AHEAD - N 40° 15' 31.94" E
CHORD BEAR - S 61° 52' 41.11" E

CURVE DATA

CURVE 127
P.I. STATION 83+99.622 N 724,464.790 E 1,477,802.644
DELTA - 90° 06' 42.13" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 32.063
LENGTH - 50.328
RADIUS - 32.000
EXTERNAL - 13.299
LONG CHORD - 45.299
MID. ORD. - 9.395
P.C. STATION 83+67.559 N 724,440.322 E 1,477,781.923
P.T. STATION 84+17.887 N 724,444.022 E 1,477,827.071
C.C. N 724,419.643 E 1,477,806.344
BACK - N 40° 15' 31.94" E
AHEAD - S 49° 37' 45.92" E
CHORD BEAR - N 85° 18' 53.01" E

STREAM GEOMETRY DATA 08

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5291
•ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	32
R/W SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 128
P.I. STATION 84+38.792 N 724,401.537 E 1,477,874.691
DELTA - 125° 46' 42.22" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 62.504
LENGTH - 70.248
RADIUS - 32.000
EXTERNAL - 38.220
LONG CHORD - 56.968
MID. ORD. - 17.417
P.C. STATION 84+17.887 N 724,444.022 E 1,477,827.071
P.T. STATION 84+88.135 N 724,465.840 E 1,477,879.698
C.C. N 724,468.402 E 1,477,847.798
BACK - S 49° 37' 45.92" E
AHEAD - N 4° 35' 31.86" E
CHORD BEAR - N 67° 28' 52.97" E

CURVE DATA

CURVE 129
P.I. STATION 85+93.740 N 724,571.105 E 1,477,888.157
DELTA - 152° 20' 15.58" (RT)
DEGREE - 220° 22' 06.17"
TANGENT - 105.605
LENGTH - 69.129
RADIUS - 26.000
EXTERNAL - 82.759
LONG CHORD - 50.492
MID. ORD. - 19.784
P.C. STATION 84+88.135 N 724,465.840 E 1,477,879.698
P.T. STATION 85+57.264 N 724,473.947 E 1,477,929.533
C.C. N 724,463.759 E 1,477,905.612
BACK - N 4° 35' 31.86" E
AHEAD - S 23° 04' 12.57" E
CHORD BEAR - N 80° 45' 39.65" E

CURVE DATA

CURVE 130
P.I. STATION 86+50.529 N 724,385.478 E 1,477,959.057
DELTA - 142° 07' 34.33" (LT)
DEGREE - 179° 03' 19.69"
TANGENT - 93.265
LENGTH - 79.376
RADIUS - 31.999
EXTERNAL - 66.603
LONG CHORD - 60.534
MID. ORD. - 21.614
P.C. STATION 85+57.264 N 724,473.947 E 1,477,929.533
P.T. STATION 86+36.639 N 724,473.438 E 1,477,990.065
C.C. N 724,484.077 E 1,477,959.886
BACK - S 18° 27' 18.36" E
AHEAD - N 19° 25' 07.30" E
CHORD BEAR - S 89° 31' 05.53" E

CURVE DATA

CURVE 131
P.I. STATION 86+89.419 N 724,523.132 E 1,478,007.848
DELTA - 117° 31' 00.97" (RT)
DEGREE - 178° 57' 16.55"
TANGENT - 52.780
LENGTH - 65.669
RADIUS - 32.017
EXTERNAL - 29.715
LONG CHORD - 54.748
MID. ORD. - 15.411
P.C. STATION 86+36.639 N 724,473.438 E 1,477,990.065
P.T. STATION 87+02.308 N 724,484.401 E 1,478,043.704
C.C. N 724,462.650 E 1,478,020.210
BACK - N 19° 41' 25.75" E
AHEAD - S 42° 47' 33.29" E
CHORD BEAR - N 78° 26' 56.23" E

CURVE DATA

CURVE 132
P.I. STATION 87+40.960 N 724,457.786 E 1,478,071.733
DELTA - 101° 30' 47.70" (LT)
DEGREE - 181° 28' 23.67"
TANGENT - 38.652
LENGTH - 55.938
RADIUS - 31.573
EXTERNAL - 18.335
LONG CHORD - 48.904
MID. ORD. - 11.599
P.C. STATION 87+02.308 N 724,484.401 E 1,478,043.704
P.T. STATION 87+58.246 N 724,490.563 E 1,478,092.218
C.C. N 724,507.296 E 1,478,065.444
BACK - S 46° 28' 56.01" E
AHEAD - N 32° 00' 16.29" E
CHORD BEAR - N 82° 45' 40.14" E

COURSE FROM PT 132 TO PC 133 N 22° 49' 26.17" E DIST 17.282

CURVE DATA

CURVE 133
P.I. STATION 87+94.557 N 724,523.654 E 1,478,107.141
DELTA - 61° 28' 25.81" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 19.028
LENGTH - 34.333
RADIUS - 32.000
EXTERNAL - 5.230
LONG CHORD - 32.710
MID. ORD. - 4.495
P.C. STATION 87+75.529 N 724,506.492 E 1,478,098.923
P.T. STATION 88+09.862 N 724,524.629 E 1,478,126.144
C.C. N 724,492.671 E 1,478,127.789
BACK - N 25° 35' 23.32" E
AHEAD - N 87° 03' 49.13" E
CHORD BEAR - N 56° 19' 36.22" E

COURSE FROM PT 133 TO PC 134 N 85° 24' 13.64" E DIST 60.869

CURVE DATA

CURVE 134
P.I. STATION 88+91.144 N 724,532.020 E 1,478,207.124
DELTA - 65° 11' 35.56" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 20.462
LENGTH - 36.411
RADIUS - 32.000
EXTERNAL - 5.983
LONG CHORD - 34.478
MID. ORD. - 5.041
P.C. STATION 88+70.732 N 724,529.506 E 1,478,186.817
P.T. STATION 89+07.142 N 724,551.508 E 1,478,213.363
C.C. N 724,561.264 E 1,478,182.886
BACK - N 82° 56' 34.69" E
AHEAD - N 17° 44' 59.13" E
CHORD BEAR - N 50° 20' 46.91" E

CURVE DATA

CURVE 135
P.I. STATION 89+80.745 N 724,618.950 E 1,478,242.841
DELTA - 125° 59' 39.51" (RT)
DEGREE - 152° 45' 36.21"
TANGENT - 73.603
LENGTH - 82.479
RADIUS - 37.507
EXTERNAL - 45.101
LONG CHORD - 66.836
MID. ORD. - 20.478
P.C. STATION 89+07.142 N 724,551.508 E 1,478,213.363
P.T. STATION 89+89.621 N 724,555.464 E 1,478,280.082
C.C. N 724,536.487 E 1,478,247.730
BACK - N 23° 36' 35.24" E
AHEAD - S 30° 23' 45.25" E
CHORD BEAR - N 86° 36' 25.00" E

CURVE DATA

CURVE 136
P.I. STATION 90+76.156 N 724,479.120 E 1,478,320.824
DELTA - 133° 08' 28.01" (LT)
DEGREE - 152° 47' 19.27"
TANGENT - 86.535
LENGTH - 87.141
RADIUS - 37.500
EXTERNAL - 56.811
LONG CHORD - 69.816
MID. ORD. - 22.589
P.C. STATION 89+89.621 N 724,555.464 E 1,478,280.082
P.T. STATION 90+76.762 N 724,561.052 E 1,478,348.671
C.C. N 724,573.120 E 1,478,313.166
BACK - S 28° 05' 14.71" E
AHEAD - N 18° 46' 17.29" E
CHORD BEAR - N 85° 20' 31.29" E

COURSE FROM PT 136 TO PC 137 N 13° 44' 24.62" E DIST 59.154

CURVE DATA

CURVE 137
P.I. STATION 92+30.071 N 724,707.154 E 1,478,394.473
DELTA - 130° 06' 20.42" (RT)
DEGREE - 130° 48' 44.22"
TANGENT - 94.156
LENGTH - 99.460
RADIUS - 43.800
EXTERNAL - 60.045
LONG CHORD - 79.427
MID. ORD. - 25.326
P.C. STATION 91+35.915 N 724,618.513 E 1,478,362.721
P.T. STATION 92+35.375 N 724,625.766 E 1,478,441.816
C.C. N 724,603.743 E 1,478,403.955
BACK - N 19° 42' 29.49" E
AHEAD - S 30° 11' 10.10" E
CHORD BEAR - N 84° 45' 39.70" E

CURVE DATA

CURVE 138
P.I. STATION 92+84.239 N 724,583.528 E 1,478,466.385
DELTA - 108° 46' 27.23" (LT)
DEGREE - 163° 42' 09.02"
TANGENT - 48.864
LENGTH - 66.446
RADIUS - 35.000
EXTERNAL - 25.106
LONG CHORD - 56.908
MID. ORD. - 14.619
P.C. STATION 92+35.375 N 724,625.766 E 1,478,441.816
P.T. STATION 93+01.821 N 724,620.384 E 1,478,498.469
C.C. N 724,643.364 E 1,478,472.070
BACK - S 30° 11' 10.10" E
AHEAD - N 41° 02' 22.67" E
CHORD BEAR - S 84° 34' 23.71" E

COURSE FROM PT 138 TO PC 139 N 41° 02' 22.67" E DIST 11.404

CURVE DATA

CURVE 139
P.I. STATION 93+71.099 N 724,674.246 E 1,478,542.023
DELTA - 114° 07' 00.38" (RT)
DEGREE - 152° 47' 19.48"
TANGENT - 57.874
LENGTH - 74.689
RADIUS - 37.500
EXTERNAL - 31.461
LONG CHORD - 62.943
MID. ORD. - 17.108
P.C. STATION 93+13.225 N 724,628.985 E 1,478,505.956
P.T. STATION 93+87.914 N 724,622.834 E 1,478,568.597
C.C. N 724,605.615 E 1,478,535.284
BACK - N 38° 32' 58.62" E
AHEAD - S 27° 20' 00.99" E
CHORD BEAR - S 84° 23' 31.19" E

CURVE DATA

CURVE 140
P.I. STATION 94+15.725 N 724,597.477 E 1,478,580.017
DELTA - 96° 05' 13.39" (LT)
DEGREE - 229° 09' 39.13"
TANGENT - 27.810
LENGTH - 41.930
RADIUS - 25.002
EXTERNAL - 12.395
LONG CHORD - 37.186
MID. ORD. - 8.287
P.C. STATION 93+87.914 N 724,622.834 E 1,478,568.597
P.T. STATION 94+29.844 N 724,611.521 E 1,478,604.020
C.C. N 724,633.101 E 1,478,591.394
BACK - S 24° 14' 41.41" E
AHEAD - N 59° 40' 05.21" E
CHORD BEAR - S 72° 17' 18.10" E

COURSE FROM PT 140 TO PC 141 N 66° 20' 43.81" E DIST 59.857

CURVE DATA

CURVE 141
P.I. STATION 95+13.589 N 724,645.121 E 1,478,680.729
DELTA - 80° 56' 11.63" (RT)
DEGREE - 204° 37' 40.02"
TANGENT - 23.887
LENGTH - 39.553
RADIUS - 28.000
EXTERNAL - 8.805
LONG CHORD - 36.346
MID. ORD. - 6.699
P.C. STATION 94+89.701 N 724,635.537 E 1,478,658.848
P.T. STATION 95+29.254 N 724,625.024 E 1,478,693.640
C.C. N 724,609.890 E 1,478,670.083
BACK - N 66° 20' 41.13" E
AHEAD - S 32° 43' 07.24" E
CHORD BEAR - S 73° 11' 13.05" E

CURVE DATA

CURVE 142
P.I. STATION 96+03.376 N 724,562.663 E 1,478,733.704
DELTA - 130° 04' 00.00" (LT)
DEGREE - 166° 01' 20.23"
TANGENT - 74.121
LENGTH - 78.913
RADIUS - 34.511
EXTERNAL - 47.251
LONG CHORD - 62.572
MID. ORD. - 19.944
P.C. STATION 95+29.254 N 724,625.024 E 1,478,693.640
P.T. STATION 96+07.597 N 724,633.464 E 1,478,755.640
C.C. N 724,643.678 E 1,478,722.675
BACK - S 32° 43' 07.24" E
AHEAD - N 17° 12' 52.76" E
CHORD BEAR - N 82° 14' 52.76" E

CURVE DATA

CURVE 143
P.I. STATION 96+75.793 N 724,699.574 E 1,478,772.382
DELTA - 129° 43' 29.83" (RT)
DEGREE - 179° 02' 57.52"
TANGENT - 68.196
LENGTH - 72.452
RADIUS - 32.000
EXTERNAL - 43.331
LONG CHORD - 57.939
MID. ORD. - 18.407
P.C. STATION 96+07.597 N 724,633.464 E 1,478,755.640
P.T. STATION 96+80.049 N 724,644.447 E 1,478,812.528
C.C. N 724,625.608 E 1,478,786.661
BACK - N 14° 12' 38.80" E
AHEAD - S 36° 03' 51.36" E
CHORD BEAR - N 79° 04' 23.72" E

STREAM GEOMETRY DATA 09

KCI Associates of North Carolina, P.A.
SUITE 300, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5291
• ENGINEERS • PLANNERS • ECOLOGISTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239NM	33
R/W SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 144
P.I. STATION 97+31.349 N 724,599.767 E 1,478,838.935
DELTA - 119° 05' 50.32" (LT)
DEGREE - 137° 46' 51.47"
TANGENT - 51.900
LENGTH - 63.424
RADIUS - 30.512
EXTERNAL - 23.692
LONG CHORD - 52.606
MID. ORD. - 15.048
P.C. STATION 96+80.049 N 724,644.447 E 1,478,812.528
P.T. STATION 97+43.473 N 724,644.568 E 1,478,865.135
C.C. N 724,659.971 E 1,478,838.796
BACK - S 30° 35' 02.38" E
AHEAD - N 30° 19' 07.29" E
CHORD BEAR - N 89° 52' 02.46" E

CURVE DATA

CURVE 145
P.I. STATION 97+61.697 N 724,662.634 E 1,478,867.531
DELTA - 59° 19' 23.44" (RT)
DEGREE - 179° 02' 57.49"
TANGENT - 18.224
LENGTH - 33.132
RADIUS - 32.000
EXTERNAL - 4.825
LONG CHORD - 31.672
MID. ORD. - 4.193
P.C. STATION 97+43.473 N 724,644.568 E 1,478,865.135
P.T. STATION 97+76.605 N 724,669.790 E 1,478,884.291
C.C. N 724,640.361 E 1,478,896.857
BACK - N 7° 33' 19.45" E
AHEAD - N 66° 52' 42.89" E
CHORD BEAR - N 37° 13' 01.17" E

COURSE FROM PT 145 TO PC 146 N 66° 52' 42.89" E DIST 35.000

CURVE DATA

CURVE 146
P.I. STATION 98+23.473 N 724,688.195 E 1,478,927.395
DELTA - 61° 22' 17.40" (RT)
DEGREE - 286° 28' 44.03"
TANGENT - 11.868
LENGTH - 21.423
RADIUS - 20.000
EXTERNAL - 3.256
LONG CHORD - 20.413
MID. ORD. - 2.800
P.C. STATION 98+11.605 N 724,683.534 E 1,478,916.480
P.T. STATION 98+33.028 N 724,680.847 E 1,478,936.715
C.C. N 724,665.141 E 1,478,924.333
BACK - N 66° 52' 42.89" E
AHEAD - S 51° 44' 59.71" E
CHORD BEAR - S 82° 26' 08.41" E

CURVE DATA

CURVE 147
P.I. STATION 99+00.483 N 724,639.086 E 1,478,989.689
DELTA - 129° 14' 29.82" (LT)
DEGREE - 179° 02' 57.52"
TANGENT - 67.455
LENGTH - 72.182
RADIUS - 32.000
EXTERNAL - 42.660
LONG CHORD - 57.823
MID. ORD. - 18.285
P.C. STATION 98+33.028 N 724,680.847 E 1,478,936.715
P.T. STATION 99+05.210 N 724,706.531 E 1,478,988.521
C.C. N 724,705.977 E 1,478,956.526
BACK - S 51° 44' 59.71" E
AHEAD - N 0° 59' 29.53" W
CHORD BEAR - N 63° 37' 45.38" E

CURVE DATA

CURVE 148
P.I. STATION 99+50.273 N 724,751.588 E 1,478,987.742
DELTA - 109° 14' 31.85" (RT)
DEGREE - 179° 02' 57.50"
TANGENT - 45.063
LENGTH - 61.012
RADIUS - 32.000
EXTERNAL - 23.270
LONG CHORD - 52.182
MID. ORD. - 13.473
P.C. STATION 99+05.210 N 724,706.531 E 1,478,988.521
P.T. STATION 99+66.222 N 724,737.475 E 1,479,030.538
C.C. N 724,707.085 E 1,479,020.517
BACK - N 0° 59' 29.53" W
AHEAD - S 71° 44' 57.68" E
CHORD BEAR - N 53° 37' 46.40" E

CURVE DATA

CURVE 149
P.I. STATION 99+97.715 N 724,727.612 E 1,479,060.447
DELTA - 105° 22' 48.03" (LT)
DEGREE - 238° 43' 56.73"
TANGENT - 31.493
LENGTH - 44.141
RADIUS - 24.000
EXTERNAL - 15.596
LONG CHORD - 38.178
MID. ORD. - 9.453
P.C. STATION 99+66.222 N 724,737.475 E 1,479,030.538
P.T. STATION 100+10.364 N 724,759.066 E 1,479,062.024
C.C. N 724,760.268 E 1,479,038.054
BACK - S 71° 44' 57.68" E
AHEAD - N 2° 53' 14.29" E
CHORD BEAR - N 55° 33' 38.31" E

CURVE DATA

CURVE 150
P.I. STATION 100+67.989 N 724,816.619 E 1,479,064.910
DELTA - 121° 54' 43.79" (RT)
DEGREE - 179° 02' 57.49"
TANGENT - 57.625
LENGTH - 68.089
RADIUS - 32.000
EXTERNAL - 33.914
LONG CHORD - 55.952
MID. ORD. - 16.465
P.C. STATION 100+10.364 N 724,759.066 E 1,479,062.024
P.T. STATION 100+78.452 N 724,783.745 E 1,479,112.239
C.C. N 724,757.463 E 1,479,093.984
BACK - N 2° 52' 14.29" E
AHEAD - S 55° 13' 01.91" E
CHORD BEAR - N 63° 49' 36.19" E

CURVE DATA

CURVE 151
P.I. STATION 101+07.154 N 724,767.372 E 1,479,135.812
DELTA - 110° 15' 36.24" (LT)
DEGREE - 286° 28' 44.13"
TANGENT - 28.701
LENGTH - 38.498
RADIUS - 20.000
EXTERNAL - 14.982
LONG CHORD - 32.818
MID. ORD. - 8.566
P.C. STATION 100+78.452 N 724,783.745 E 1,479,112.239
P.T. STATION 101+16.940 N 724,795.157 E 1,479,143.009
C.C. N 724,800.172 E 1,479,123.648
BACK - S 55° 13' 01.91" E
AHEAD - N 14° 31' 21.85" E
CHORD BEAR - N 69° 39' 09.97" E

CURVE DATA

CURVE 152
P.I. STATION 101+85.164 N 724,861.201 E 1,479,160.117
DELTA - 129° 44' 33.80" (RT)
DEGREE - 179° 02' 57.49"
TANGENT - 68.224
LENGTH - 72.462
RADIUS - 32.000
EXTERNAL - 43.356
LONG CHORD - 57.343
MID. ORD. - 18.411
P.C. STATION 101+16.940 N 724,795.157 E 1,479,143.009
P.T. STATION 101+89.402 N 724,805.821 E 1,479,199.962
C.C. N 724,787.132 E 1,479,173.987
BACK - N 14° 31' 21.85" E
AHEAD - S 35° 44' 04.35" E
CHORD BEAR - N 79° 23' 38.75" E

CURVE DATA

CURVE 153
P.I. STATION 102+58.489 N 724,749.741 E 1,479,240.311
DELTA - 130° 17' 40.11" (LT)
DEGREE - 179° 02' 57.55"
TANGENT - 69.087
LENGTH - 72.770
RADIUS - 32.000
EXTERNAL - 44.138
LONG CHORD - 58.073
MID. ORD. - 18.551
P.C. STATION 101+89.402 N 724,805.821 E 1,479,199.962
P.T. STATION 102+62.172 N 724,816.784 E 1,479,256.991
C.C. N 724,824.510 E 1,479,225.938
BACK - S 35° 44' 04.35" E
AHEAD - N 13° 58' 15.55" E
CHORD BEAR - N 79° 07' 05.60" E

CURVE DATA

CURVE 154
P.I. STATION 103+18.288 N 724,871.239 E 1,479,270.539
DELTA - 114° 38' 11.94" (RT)
DEGREE - 159° 09' 17.77"
TANGENT - 56.115
LENGTH - 72.028
RADIUS - 36.000
EXTERNAL - 30.670
LONG CHORD - 60.601
MID. ORD. - 16.561
P.C. STATION 102+62.172 N 724,816.784 E 1,479,256.991
P.T. STATION 103+34.201 N 724,836.225 E 1,479,314.390
C.C. N 724,808.093 E 1,479,291.926
BACK - N 13° 58' 15.55" E
AHEAD - S 51° 23' 32.51" E
CHORD BEAR - N 71° 17' 21.52" E

CURVE DATA

CURVE 155
P.I. STATION 103+68.956 N 724,814.538 E 1,479,341.549
DELTA - 88° 08' 36.97" (LT)
DEGREE - 159° 35' 53.82"
TANGENT - 34.755
LENGTH - 55.228
RADIUS - 35.900
EXTERNAL - 14.067
LONG CHORD - 49.941
MID. ORD. - 10.107
P.C. STATION 103+34.201 N 724,836.225 E 1,479,314.390
P.T. STATION 103+89.429 N 724,840.980 E 1,479,364.104
C.C. N 724,864.278 E 1,479,336.791
BACK - S 51° 23' 32.51" E
AHEAD - N 40° 27' 50.52" E
CHORD BEAR - N 84° 32' 09.01" E

COURSE FROM PT 155 TO PC 156 N 41° 29' 40.64" E DIST 11.890

CURVE DATA

CURVE 156
P.I. STATION 104+19.411 N 724,863.437 E 1,479,383.9[illegible]
DELTA - 74° 01' 19.34" (RT)
DEGREE - 238° 43' 56.69"
TANGENT - 18.093
LENGTH - 31.006
RADIUS - 24.000
EXTERNAL - 6.056
LONG CHORD - 28.894
MID. ORD. - 4.836
P.C. STATION 104+01.319 N 724,849.886 E 1,479,371.9[illegible]
P.T. STATION 104+32.325 N 724,855.643 E 1,479,400.2[illegible]
C.C. N 724,833.984 E 1,479,389.9[illegible]
BACK - N 41° 29' 40.64" E
AHEAD - S 64° 29' 00.02" E
CHORD BEAR - N 78° 30' 20.31" E

COURSE FROM PT 156 TO PC 157 S 64° 29' 00.02" E DIST 16.390

CURVE DATA

CURVE 157
P.I. STATION 104+59.404 N 724,844.883 E 1,479,425.1[illegible]
DELTA - 46° 17' 54.38" (RT)
DEGREE - 229° 10' 59.22"
TANGENT - 10.689
LENGTH - 20.202
RADIUS - 25.000
EXTERNAL - 2.189
LONG CHORD - 19.656
MID. ORD. - 2.013
P.C. STATION 104+48.715 N 724,848.583 E 1,479,415.0[illegible]
P.T. STATION 104+68.916 N 724,835.077 E 1,479,429.3[illegible]
C.C. N 724,825.129 E 1,479,406.4[illegible]
BACK - S 69° 44' 49.11" E
AHEAD - S 23° 26' 54.73" E
CHORD BEAR - S 46° 35' 51.92" E

CURVE DATA

CURVE 158
P.I. STATION 105+21.407 N 724,785.914 E 1,479,447.7[illegible]
DELTA - 129° 03' 55.11" (LT)
DEGREE - 229° 10' 59.23"
TANGENT - 52.491
LENGTH - 56.315
RADIUS - 25.000
EXTERNAL - 33.140
LONG CHORD - 45.142
MID. ORD. - 14.250
P.C. STATION 104+68.916 N 724,835.077 E 1,479,429.3[illegible]
P.T. STATION 105+25.232 N 724,831.177 E 1,479,474.3[illegible]
C.C. N 724,843.837 E 1,479,452.7[illegible]
BACK - S 20° 30' 40.23" E
AHEAD - N 30° 25' 24.66" E
CHORD BEAR - S 85° 02' 37.78" E

CURVE DATA

CURVE 159
P.I. STATION 105+82.955 N 724,879.284 E 1,479,506.2[illegible]
DELTA - 118° 24' 51.03" (RT)
DEGREE - 166° 33' 26.99"
TANGENT - 57.723
LENGTH - 71.095
RADIUS - 34.400
EXTERNAL - 32.796
LONG CHORD - 59.101
MID. ORD. - 16.789
P.C. STATION 105+25.232 N 724,831.177 E 1,479,474.3[illegible]
P.T. STATION 105+96.327 N 724,828.335 E 1,479,533.3[illegible]
C.C. N 724,812.166 E 1,479,503.0[illegible]
BACK - N 33° 32' 55.73" E
AHEAD - S 28° 02' 13.24" E
CHORD BEAR - S 87° 14' 38.75" E

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5286
• ENGINEERS • PLANNERS • LANDSCAPE ARCHITECTS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239HM	34
RW SHEET NO.	
ENGINEER	SCIENTIST

CURVE DATA

CURVE 160
P.I. STATION 106+50.821 N 724,781.450 E 1,479,561.148
DELTA - 115° 28' 28.41" (LT)
DEGREE - 166° 33' 27.00"
TANGENT - 54.494
LENGTH - 69.330
RADIUS - 34.400
EXTERNAL - 30.043
LONG CHORD - 58.178
MID. ORD. - 16.037
P.C. STATION 105+96.327 N 724,828.335 E 1,479,533.374
P.T. STATION 106+65.657 N 724,826.690 E 1,479,591.529
C.C. N 724,845.868 E 1,479,562.971
BACK - S 30° 38' 29.99" E
AHEAD - N 33° 53' 01.10" E
CHORD BEAR - S 88° 22' 44.44" E

CURVE DATA

CURVE 161
P.I. STATION 107+32.133 N 724,881.876 E 1,479,628.589
DELTA - 121° 08' 37.47" (RT)
DEGREE - 152° 47' 19.48"
TANGENT - 66.475
LENGTH - 79.288
RADIUS - 37.500
EXTERNAL - 38.823
LONG CHORD - 65.323
MID. ORD. - 19.075
P.C. STATION 106+65.657 N 724,826.690 E 1,479,591.529
P.T. STATION 107+44.945 N 724,821.615 E 1,479,656.654
C.C. N 724,805.783 E 1,479,622.660
BACK - N 33° 53' 01.10" E
AHEAD - S 24° 58' 21.43" E
CHORD BEAR - S 85° 32' 40.16" E

CURVE DATA

CURVE 162
P.I. STATION 107+83.296 N 724,786.850 E 1,479,672.845
DELTA - 107° 32' 16.12" (LT)
DEGREE - 203° 53' 58.46"
TANGENT - 38.350
LENGTH - 52.741
RADIUS - 28.100
EXTERNAL - 19.443
LONG CHORD - 45.333
MID. ORD. - 11.492
P.C. STATION 107+44.945 N 724,821.615 E 1,479,656.654
P.T. STATION 107+97.686 N 724,812.764 E 1,479,701.115
C.C. N 724,833.478 E 1,479,682.127
BACK - S 24° 58' 21.43" E
AHEAD - N 47° 29' 22.45" E
CHORD BEAR - S 78° 44' 29.49" E

CURVE DATA

CURVE 163
P.I. STATION 108+30.593 N 724,834.098 E 1,479,726.170
DELTA - 82° 32' 05.00" (RT)
DEGREE - 152° 47' 19.48"
TANGENT - 32.907
LENGTH - 54.019
RADIUS - 37.500
EXTERNAL - 12.391
LONG CHORD - 49.468
MID. ORD. - 9.314
P.C. STATION 107+97.686 N 724,812.764 E 1,479,701.115
P.T. STATION 108+51.705 N 724,812.027 E 1,479,750.577
C.C. N 724,784.212 E 1,479,725.426
BACK - N 49° 35' 13.20" E
AHEAD - S 47° 52' 41.80" E
CHORD BEAR - S 89° 08' 44.30" E

COURSE FROM PT 163 TO 8001 S 50° 52' 35.81" E DIST 52.049

POINT 8001 N 724,779.184 E 1,479,790.956 STA 109+03.753

TRIBUTARY GEOMETRY DATA

CURVE 1
P.I. STATION 10+35.273 N 725,090.562 E 1,477,789.633
DELTA - 58° 52' 39.31" (RT)
DEGREE - 91° 40' 23.69"
TANGENT - 35.273
LENGTH - 64.225
RADIUS - 62.500
EXTERNAL - 9.266
LONG CHORD - 61.437
MID. ORD. - 8.070
P.C. STATION 10+00.000 N 725,119.980 E 1,477,770.173
P.T. STATION 10+64.225 N 725,058.697 E 1,477,774.507
C.C. N 725,085.498 E 1,477,718.046
BACK - S 33° 29' 04.31" E
AHEAD - S 25° 23' 35.00" W
CHORD BEAR - S 4° 02' 44.65" E

CURVE DATA

CURVE 2
P.I. STATION 11+17.612 N 725,010.463 E 1,477,751.614
DELTA - 81° 00' 24.28" (LT)
DEGREE - 91° 40' 23.69"
TANGENT - 53.386
LENGTH - 88.365
RADIUS - 62.500
EXTERNAL - 19.697
LONG CHORD - 81.187
MID. ORD. - 14.977
P.C. STATION 10+64.225 N 725,058.697 E 1,477,774.507
P.T. STATION 11+52.590 N 724,980.317 E 1,477,795.671
C.C. N 725,031.895 E 1,477,830.969
BACK - S 25° 23' 35.00" W
AHEAD - S 55° 36' 49.28" E
CHORD BEAR - S 15° 06' 37.14" E

CURVE DATA

CURVE 3
P.I. STATION 11+96.423 N 724,955.562 E 1,477,831.844
DELTA - 70° 05' 10.34" (RT)
DEGREE - 91° 40' 23.69"
TANGENT - 43.833
LENGTH - 76.452
RADIUS - 62.500
EXTERNAL - 13.839
LONG CHORD - 71.774
MID. ORD. - 11.330
P.C. STATION 11+52.590 N 724,980.317 E 1,477,795.671
P.T. STATION 12+29.042 N 724,913.119 E 1,477,820.889
C.C. N 724,928.739 E 1,477,760.373
BACK - S 55° 36' 49.28" E
AHEAD - S 14° 28' 21.06" W
CHORD BEAR - S 20° 34' 14.11" E

CURVE DATA

CURVE 4
P.I. STATION 12+90.201 N 724,853.901 E 1,477,805.605
DELTA - 88° 45' 26.43" (LT)
DEGREE - 91° 40' 23.69"
TANGENT - 61.159
LENGTH - 96.819
RADIUS - 62.500
EXTERNAL - 24.945
LONG CHORD - 87.425
MID. ORD. - 17.829
P.C. STATION 12+29.042 N 724,913.119 E 1,477,820.889
P.T. STATION 13+25.862 N 724,837.336 E 1,477,864.478
C.C. N 724,897.500 E 1,477,881.406
BACK - S 14° 28' 21.06" W
AHEAD - S 74° 17' 05.37" E
CHORD BEAR - S 29° 54' 22.15" E

CURVE DATA

CURVE 5
P.I. STATION 13+68.558 N 724,825.771 E 1,477,905.578
DELTA - 68° 40' 37.52" (RT)
DEGREE - 91° 40' 23.69"
TANGENT - 42.696
LENGTH - 74.915
RADIUS - 62.500
EXTERNAL - 13.192
LONG CHORD - 70.510
MID. ORD. - 10.893
P.C. STATION 13+25.862 N 724,837.336 E 1,477,864.478
P.T. STATION 14+00.777 N 724,783.280 E 1,477,909.750
C.C. N 724,777.172 E 1,477,847.549
BACK - S 74° 17' 05.37" E
AHEAD - S 5° 36' 27.84" E
CHORD BEAR - S 39° 56' 46.60" E

COURSE FROM PT 5 TO PC 6 S 6° 36' 05.26" E DIST 43.208

CURVE DATA

CURVE 6
P.I. STATION 14+92.834 N 724,692.152 E 1,477,922.620
DELTA - 76° 01' 19.51" (LT)
DEGREE - 91° 40' 23.69"
TANGENT - 48.850
LENGTH - 82.927
RADIUS - 62.500
EXTERNAL - 16.826
LONG CHORD - 76.977
MID. ORD. - 13.257
P.C. STATION 14+43.985 N 724,740.358 E 1,477,914.717
P.T. STATION 15+26.912 N 724,688.176 E 1,477,971.308
C.C. N 724,750.469 E 1,477,976.394
BACK - S 9° 18' 36.72" E
AHEAD - S 85° 19' 56.23" E
CHORD BEAR - S 47° 19' 16.48" E

CURVE DATA

CURVE 7
P.I. STATION 16+03.533 N 724,681.941 E 1,478,047.675
DELTA - 95° 10' 16.40" (RT)
DEGREE - 81° 51' 04.01"
TANGENT - 76.621
LENGTH - 116.274
RADIUS - 70.000
EXTERNAL - 33.782
LONG CHORD - 103.360
MID. ORD. - 22.786
P.C. STATION 15+26.912 N 724,688.176 E 1,477,971.308
P.T. STATION 16+43.186 N 724,606.447 E 1,478,034.582
C.C. N 724,618.409 E 1,477,965.612

CURVE DATA

CURVE 8
P.I. STATION 17+29.233 N 724,521.665 E 1,478,019.872
DELTA - 101° 44' 35.56" (LT)
DEGREE - 81° 51' 04.01"
TANGENT - 86.048
LENGTH - 124.303
RADIUS - 70.000
EXTERNAL - 40.924
LONG CHORD - 108.603
MID. ORD. - 25.826
P.C. STATION 16+43.186 N 724,606.447 E 1,478,034.582
P.T. STATION 17+67.488 N 724,524.524 E 1,478,105.873
C.C. N 724,594.486 E 1,478,103.553
BACK - S 9° 50' 20.17" W
AHEAD - N 88° 05' 44.61" E
CHORD BEAR - S 41° 01' 57.61" E

COURSE FROM PT 8 TO 9001 N 88° 05' 44.61" E DIST 32.361

POINT 9001 N 724,525.600 E 1,478,138.222 STA 17+99.856

STREAM GEOMETRY DATA 11

KCI Associates of North Carolina, P.A.
SUITE 1550, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5780
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PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	35

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

735
730
725
720
715
710

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

F - 2239(1)M	30

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

735
730
725
720
715
710

38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00 49+00 50+00 51+00 52+00

H - 2239WM | 37

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

735
730
725
720
715
710

66-00 67-00 68-00 69-00 70-00 71-00 72-00 73-00 74-00 75-00 76-00 77-00 78-00 79-00 80-00

R - 2239NM	38

ROADWAY DESIGN ENGINEER

HYDRAULIC ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

735
730
725
720
715
710

94+00 95+00 96+00 97+00 98+00 99+00 100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00

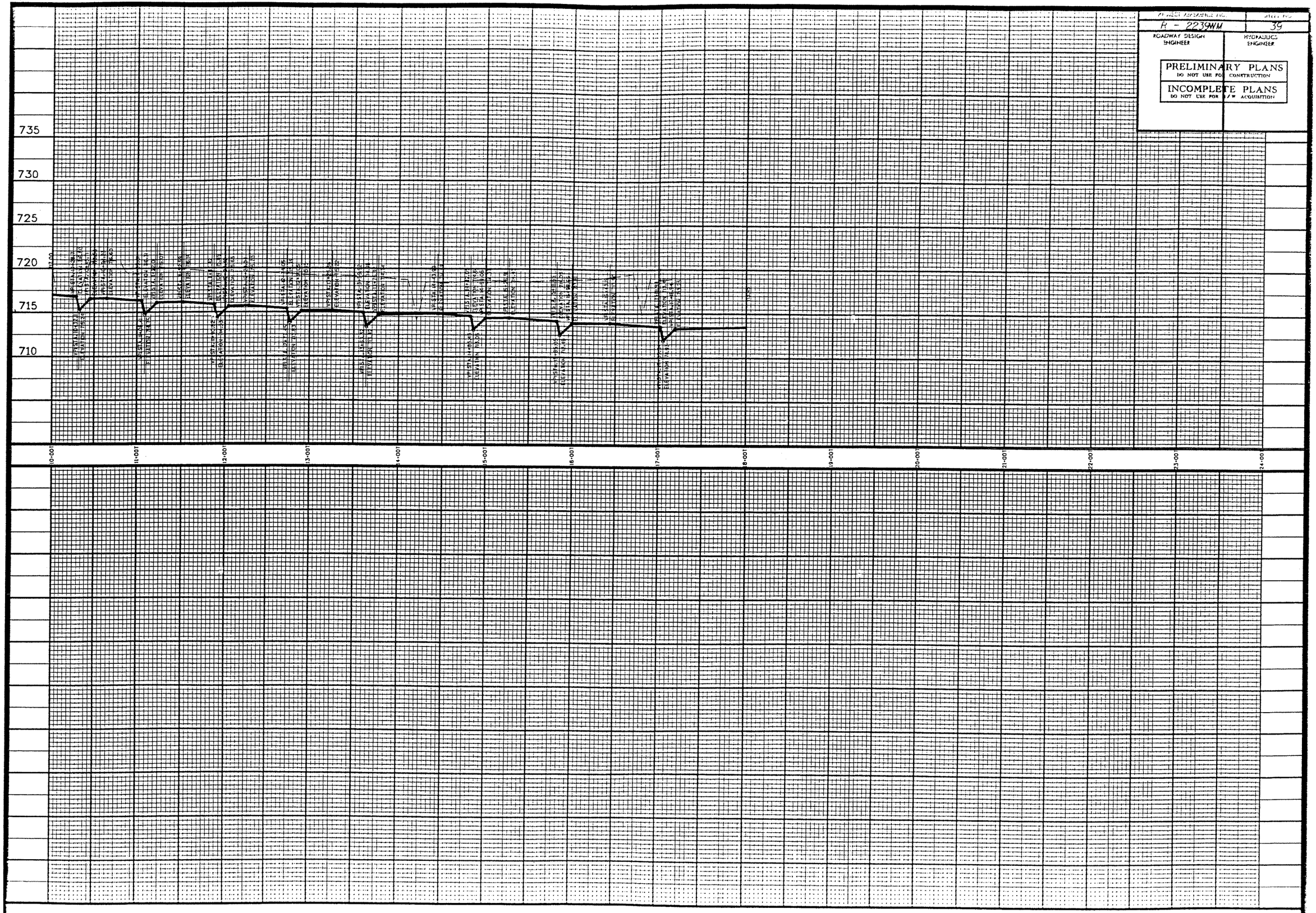
PROJECT REFERENCE NO.	SHEET NO.
R - 2238WM	39

ROADWAY DESIGN ENGINEER

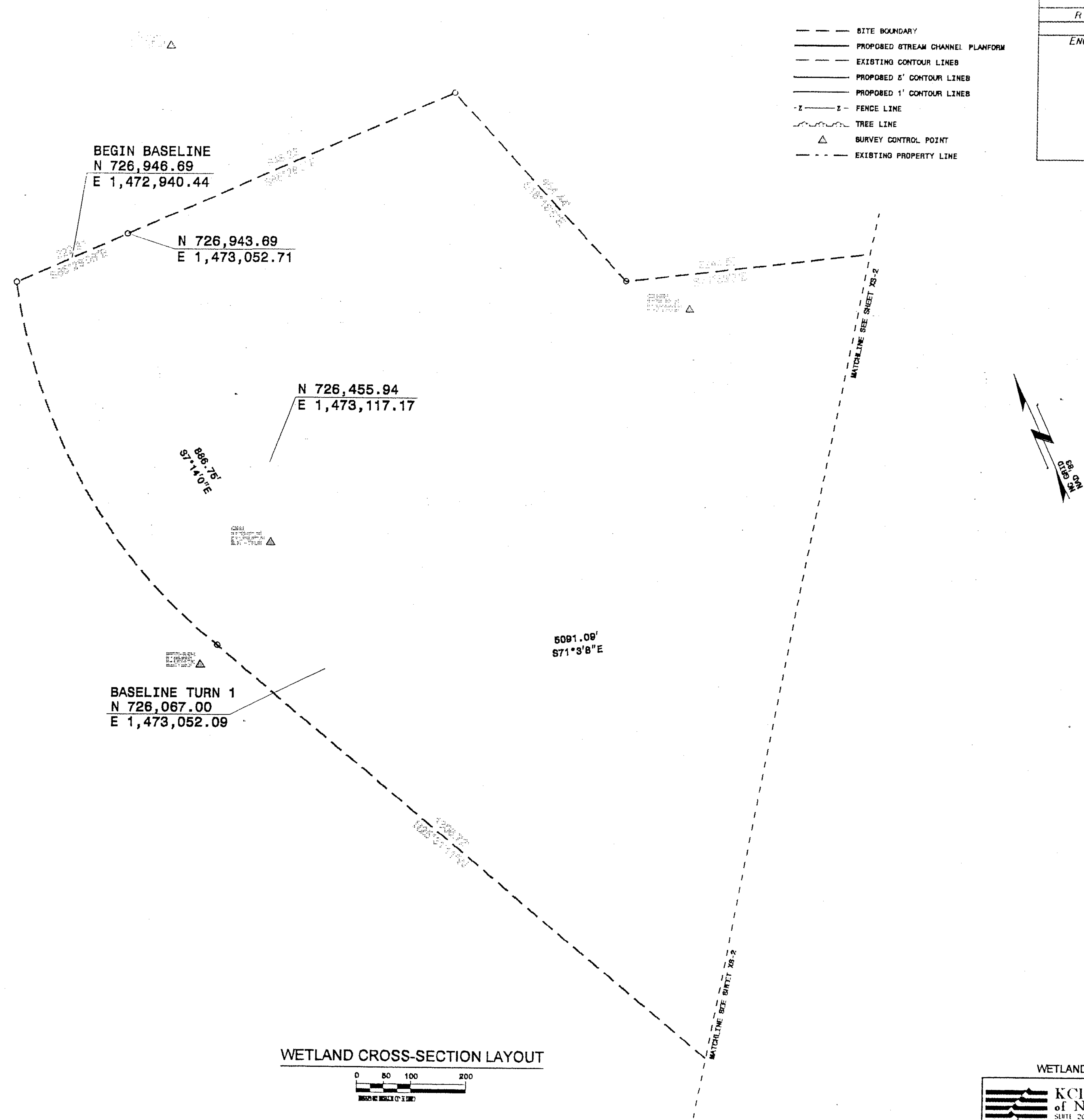
HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



R - 2239WM	40
ENGINEER	SCIENTIST



SITE BOUNDARY
PROPOSED STREAM CHANNEL PLANFORM
EXISTING CONTOUR LINES
PROPOSED 5' CONTOUR LINES
PROPOSED 1' CONTOUR LINES
FENCE LINE
TREE LINE
SURVEY CONTROL POINT
EXISTING PROPERTY LINE
BEGIN BASELINE
N 726,946.69
E 1,472,940.44
N 726,943.69
E 1,473,052.71
N 726,455.94
E 1,473,117.17
886.75'
S7°14'0"E
BASELINE TURN 1
N 726,067.00
E 1,473,052.09
5091.09'
S71°3'8"E
MATCHLINE SEE SHEET XS-2
NC GRID NAD 83
0 50 100 200

WETLAND CROSS-SECTION LAYOUT

WETLAND CROSS SECTION LAYOUT 01

KCI Associates
of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

11 - 2239WM	41
ENGINEER	SCIENTIST

- SITE BOUNDARY
- PROPOSED STREAM CHANNEL PLANFORM
- EXISTING CONTOUR LINES
- PROPOSED 5' CONTOUR LINES
- PROPOSED 1' CONTOUR LINES
- FENCE LINE
- TREE LINE
- SURVEY CONTROL POINT
- EXISTING PROPERTY LINE

NC GRID NAD '83

MATCHLINE SEE SHEET XS-1

MATCHLINE SEE SHEET XS-3

MATCHLINE SEE SHEET XS-1

MATCHLINE SEE SHEET XS-3

5091.09'
S71°3'8"E

WETLAND CROSS SECTION LAYOUT

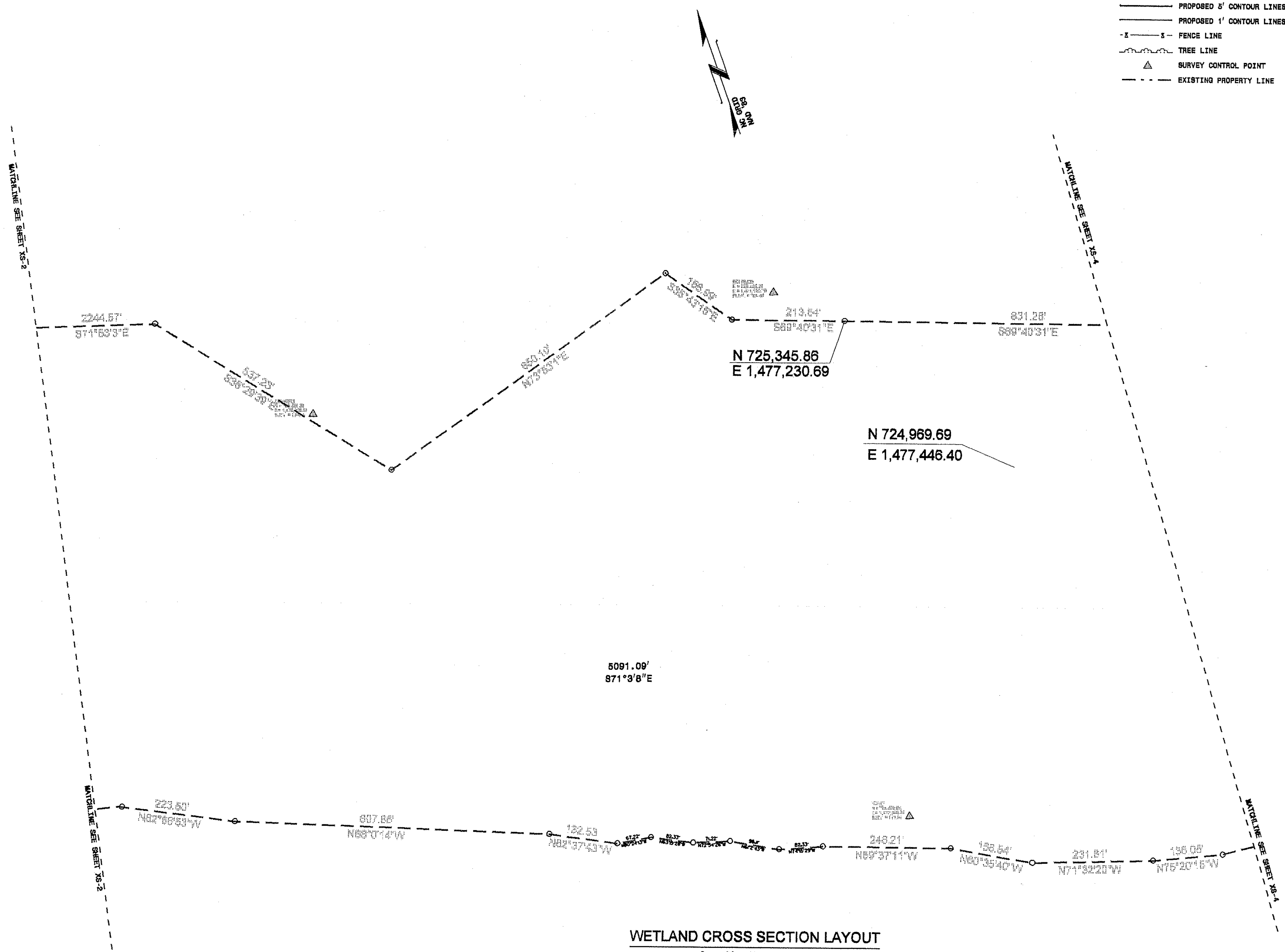
0 50 100 200

WETLAND CROSS SECTION LAYOUT 02

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER II, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5310
• ENGINEERS • PLANNERS • ECOLOGISTS

R - 2239WM	42
ENGINEER	SCIENTIST

- SITE BOUNDARY
- PROPOSED STREAM CHANNEL PLANFORM
- EXISTING CONTOUR LINES
- PROPOSED 5' CONTOUR LINES
- PROPOSED 1' CONTOUR LINES
- FENCE LINE
- TREE LINE
- SURVEY CONTROL POINT
- EXISTING PROPERTY LINE



WETLAND CROSS SECTION LAYOUT

0 50 100 200

WETLAND CROSS SECTION LAYOUT 03

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

R - 2239WM	43
ENGINEER	SCIENTIST

- SITE BOUNDARY
- PROPOSED STREAM CHANNEL PLANFORM
- EXISTING CONTOUR LINES
- PROPOSED 5' CONTOUR LINES
- PROPOSED 1' CONTOUR LINES
- FENCE LINE
- TREE LINE
- SURVEY CONTROL POINT
- EXISTING PROPERTY LINE

NC GRID NAD 83

MATCHLINE SEE SHEET XS-3

1044.80'
S68°40'31"E

5091.09'
S71°3'8"E

MATCHLINE SEE SHEET XS-3

287.54'
S70°1'55"W

208.19'
S73°40'57"W

772.85'
S76°10'38"W

992.99'
S76°5'12"W

BASELINE TURN 2
N 724,413.90
E 1,477,867.31

1920.35'
N72°39'29"E

END BASELINE
N 724,986.30
E 1,479,700.37

WETLAND CROSS SECTION LAYOUT

0 50 100 200

WETLAND CROSS SECTION LAYOUT 04

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

R-2210HA

PROJECT: 6.769001T

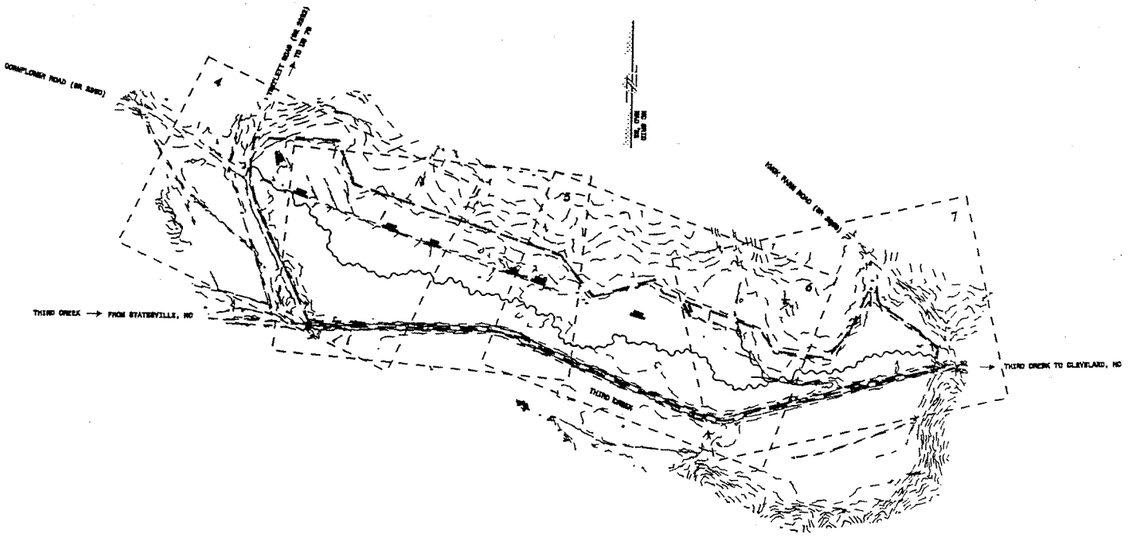
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

IREDELL COUNTY

LOCATION: SHEPHERDS TREE MITIGATION SITE LOCATED BETWEEN TRIPLETT ROAD (SR 2162) AND KNOX FARM ROAD (SR 2163) ADJACENT TO THIRD CREEK, SOUTHEAST OF STATESVILLE

TYPE OF WORK: GRADING, CLEARING AND GRUBBING, MOWING, RIPPING,



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	[illegible]	EC-1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
[illegible]		

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
	Reforestation	
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.01	Riser Basin	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Temporary Rock Silt Check Type-B	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1636.01	Rock Silt Screen	
1630.04	Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	-OR-
1632.02	Type B	-OR-
1632.03	Type C	-OR-

GRAPHIC SCALE

0

0

0

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

Prepared in the Office of:
ROADSIDE ENVIRONMENTAL UNIT
1 South Wilmington St.
Raleigh, NC 27611

2002 STANDARD SPECIFICATIONS

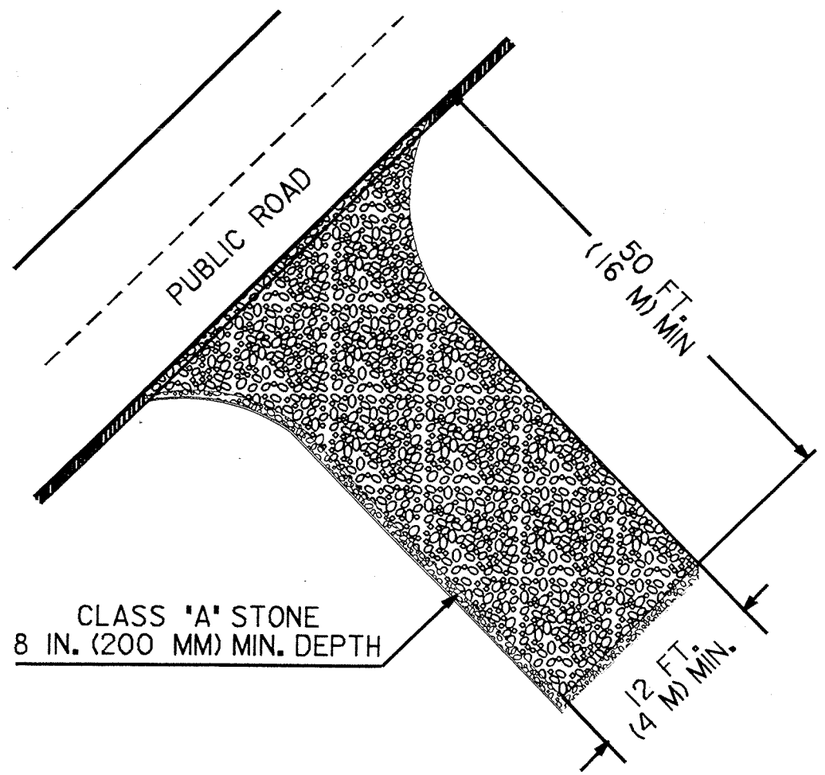
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 20, 2002 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1605.01 Temporary Silt Fence
1633.01 Temporary Rock Silt Check Type A
1636.01 Rock Silt Screen

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEET
R-2239WM	EC-2	
STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE



NOTES:

1. TURNING RADIUS SUFFICIENT TO ACCOMODATE LARGE TRUCKS SHALL BE PROVIDED.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. NUMBER AND LOCATION OF CONSTRUCTION ENTRANCES TO BE DETERMINED BY THE ENGINEER

NOTE: FILTER FABRIC TO BE PLACED BENEATH STONE

R - 2239NM	EC-3/CONST.12
ENGINEER	SCIENTIST

INSTALL CATTLE GATE
PER STD. DRAWING 866.04

PHASE I LIMITS
DO NOT DISTURB

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

MATCHLINE SEE SHEET 13

NOTE: STABILIZED CONSTRUCTION ENTRANCES (SCE) HAVE BEEN INSTALLED AS PART OF PHASE I OPERATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN THE EXISTING SCE(S) THROUGH THE CONSTRUCTION PERIOD.

DITCH PLUG
SEE DETAIL SHEET 2

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02

RELOCATE EXISTING
UTILITY POLE
(LOCATION TBD)

MATCHLINE SEE SHEET 13

INSTALL CATTLE GATE
PER STD. DRAWING 866.04

GRADING LEGEND

- EXISTING MINOR CONTOURS
- 785 EXISTING MAJOR CONTOURS
- PROPOSED CONTOURS
- MITIGATION BOUNDARY
- (SCE) STABILIZED CONSTRUCTION ENTRANCE
- TREES
- TREELINE AND HEDGES
- UTILITY POLE
- DUKE POWER TOWER
- PROPOSED STREAM ALIGNMENT
- PHASE I LIMITS DO NOT DISTURB

GRADING PLAN

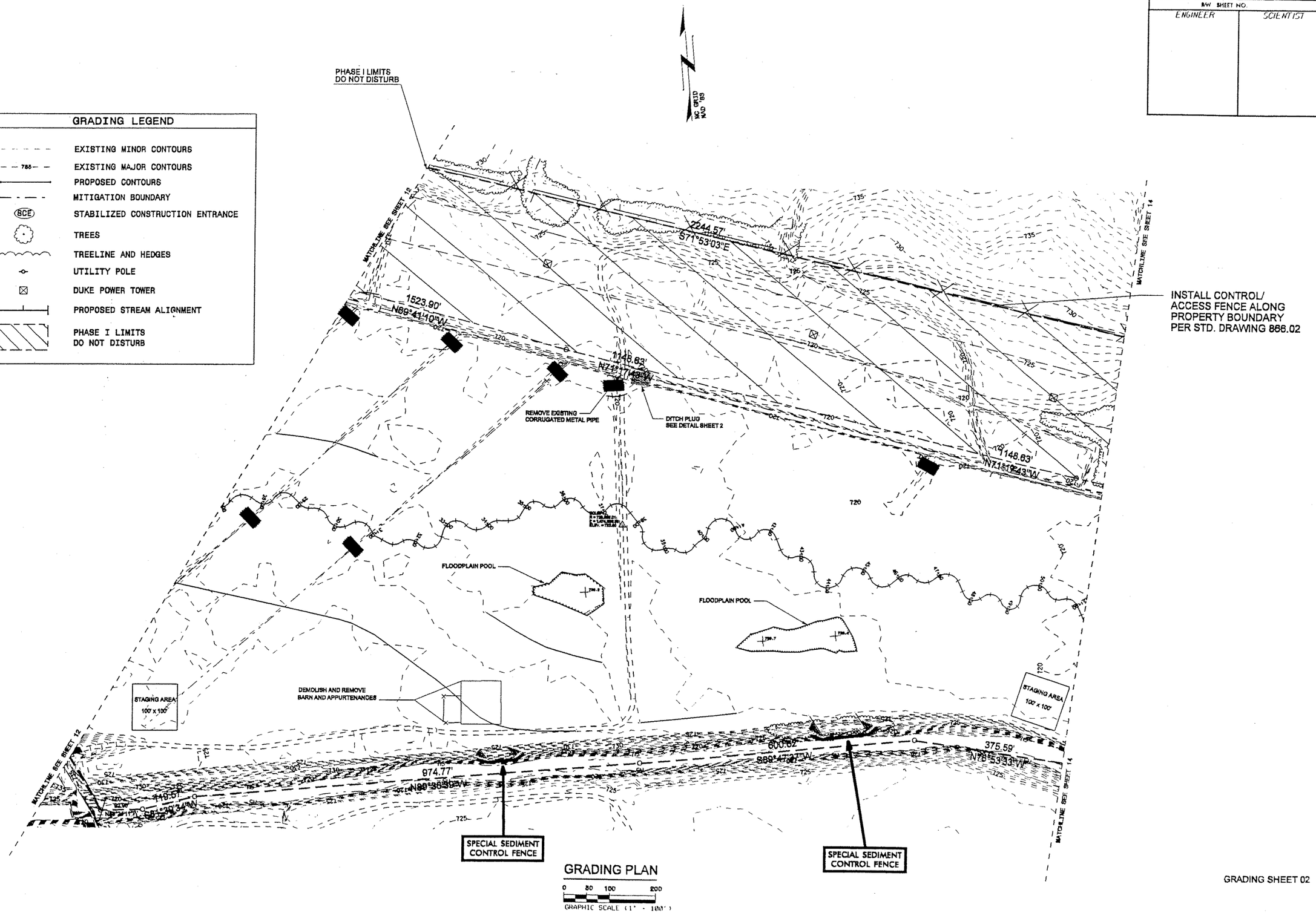
0 50 100 200

GRAPHIC SCALE (1" = 100')

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	EC-4/CONST.13
R/W SHEET NO.	
ENGINEER	SCIENTIST

GRADING LEGEND

- EXISTING MINOR CONTOURS
- 788 EXISTING MAJOR CONTOURS
- PROPOSED CONTOURS
- MITIGATION BOUNDARY
- SCE STABILIZED CONSTRUCTION ENTRANCE
- TREES
- TREELINE AND HEDGES
- UTILITY POLE
- DUKE POWER TOWER
- PROPOSED STREAM ALIGNMENT
- PHASE I LIMITS DO NOT DISTURB

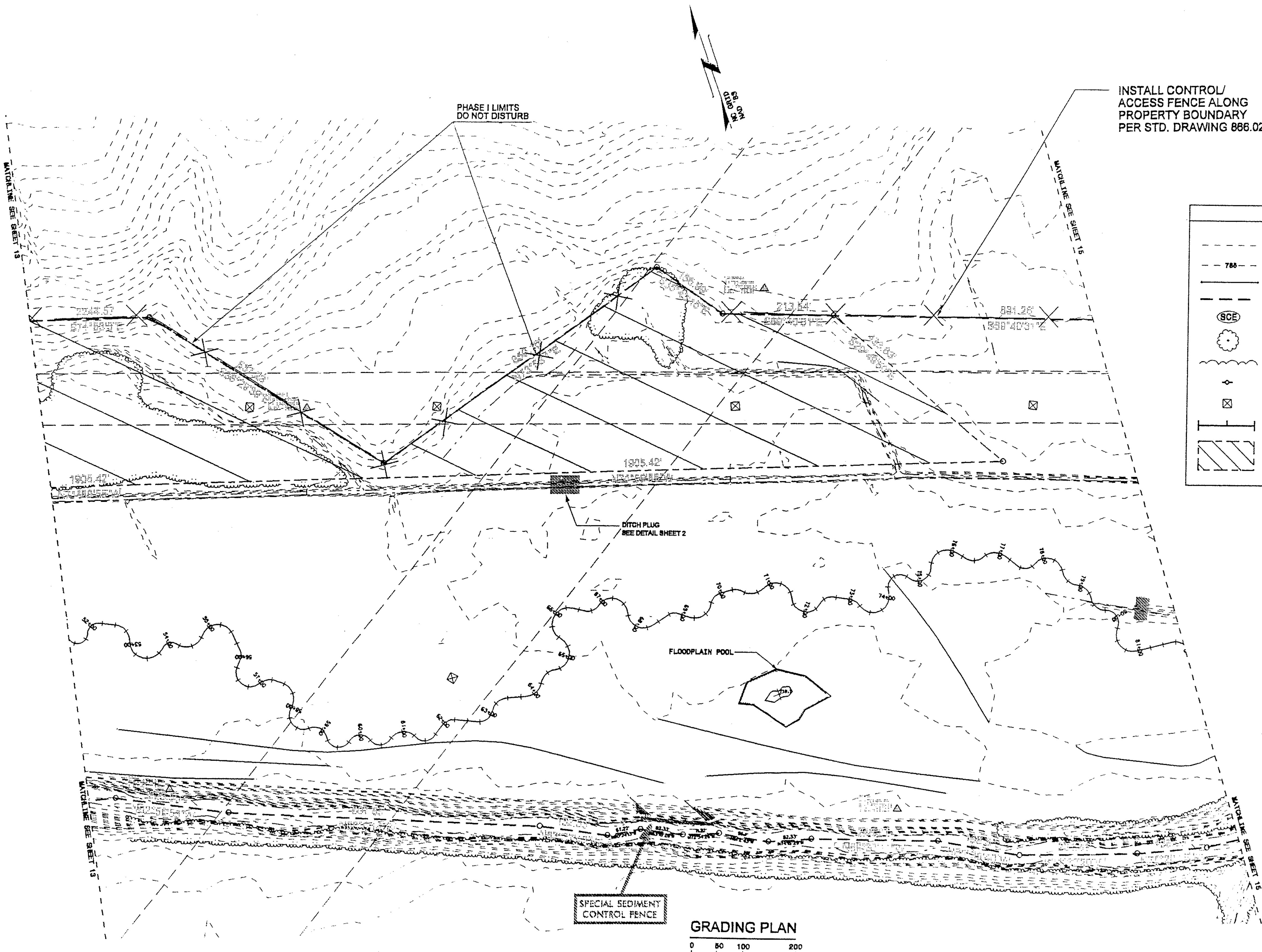


GRADING PLAN

0 80 100 200

GRAPHIC SCALE (1" = 100')

R - 2239WM	EC-5/CONST.14
ENGINEER	SCIENTIST



GRADING LEGEND

- EXISTING MINOR CONTOURS
- EXISTING MAJOR CONTOURS
- PROPOSED CONTOURS
- LIMITS OF DISTURBANCE
- STABILIZED CONSTRUCTION ENTRANCE
- TREES
- TREELINE AND HEDGES
- UTILITY POLE
- DUKE POWER TOWER
- PROPOSED STREAM ALIGNMENT
- PHASE I LIMITS DO NOT DISTURB

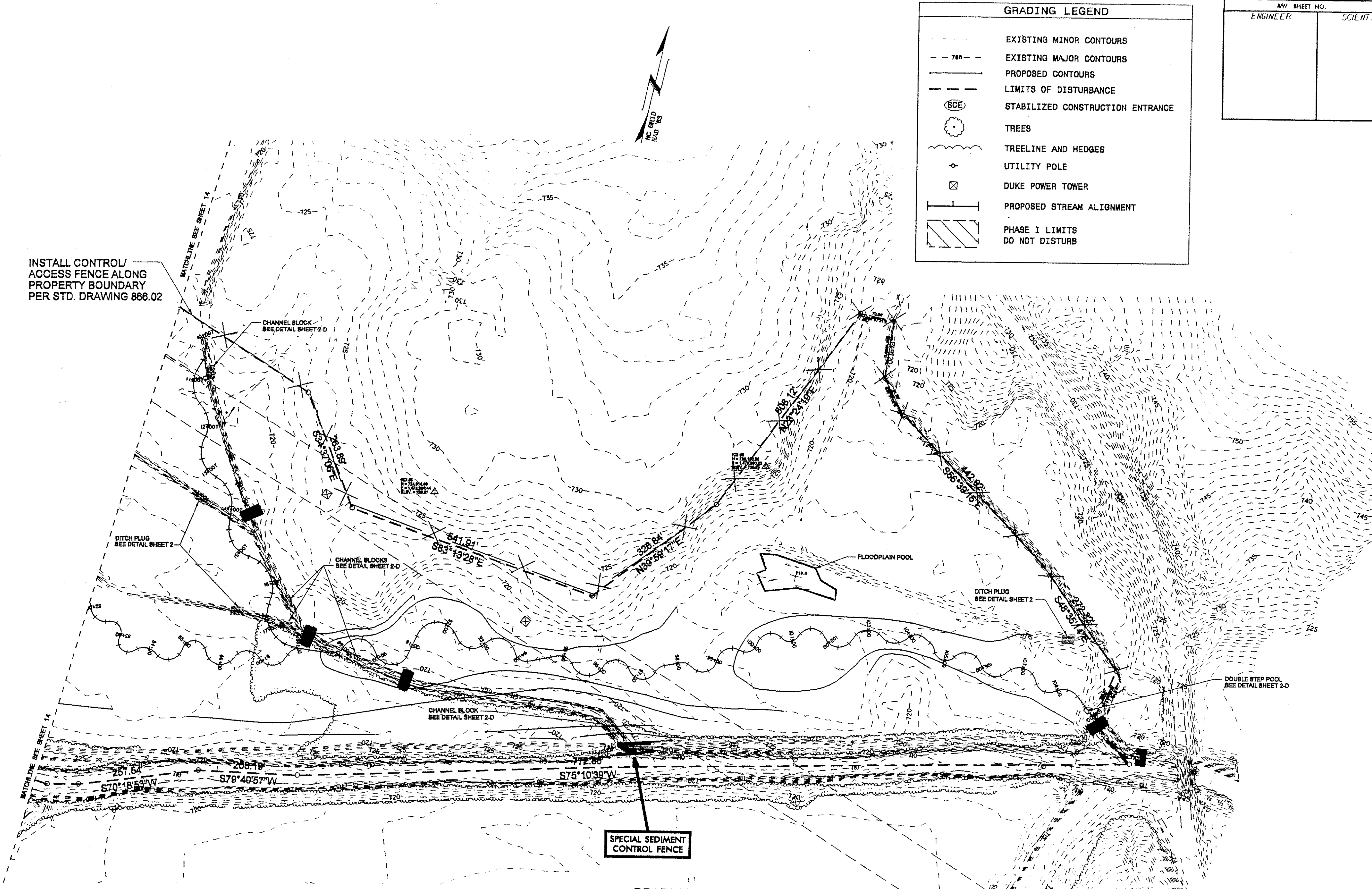
GRADING PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

GRADING 03

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	EC-6/CONST.15
RW SHEET NO.	
ENGINEER	SCIENTIST


GRADING LEGEND
EXISTING MINOR CONTOURS
EXISTING MAJOR CONTOURS
PROPOSED CONTOURS
LIMITS OF DISTURBANCE
SCE
STABILIZED CONSTRUCTION ENTRANCE
TREES
TREELINE AND HEDGES
UTILITY POLE
DUKE POWER TOWER
PROPOSED STREAM ALIGNMENT
PHASE I LIMITS
DO NOT DISTURB
NC GRID NAD '83
INSTALL CONTROL/
ACCESS FENCE ALONG
PROPERTY BOUNDARY
PER STD. DRAWING 866.02
MATCHLINE SEE SHEET 14
CHANNEL BLOCK
SEE DETAIL SHEET 2-D
CHANNEL BLOCKS
SEE DETAIL SHEET 2-D
DITCH PLUG
SEE DETAIL SHEET 2
FLOODPLAIN POOL
DOUBLE STEP POOL
SEE DETAIL SHEET 2-D
263.89'
S34°27'05"E
541.91'
S83°13'28"E
328.84'
N39°59'17"E
806.12'
N35°24'18"E
442.92'
S56°39'16"E
S48°35'14"E
257.54'
S70°18'59"W
206.16'
S79°40'57"W
772.86'
S75°10'39"W
SPECIAL SEDIMENT
CONTROL FENCE

GRADING PLAN

0 50 100 200

GRAPHIC SCALE (1" = 100')

GRADING 04

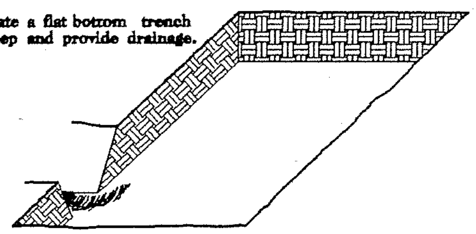
PLANTING DETAILS

SEEDLING / LINER BAREROOT PLANTING DETAIL

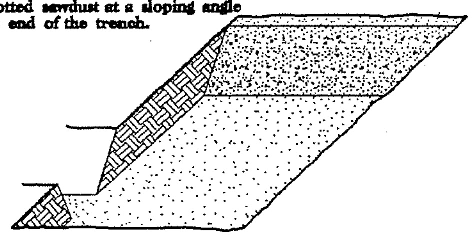
HEALING IN

1. Locate a healing-in site in a shady, well protected area.

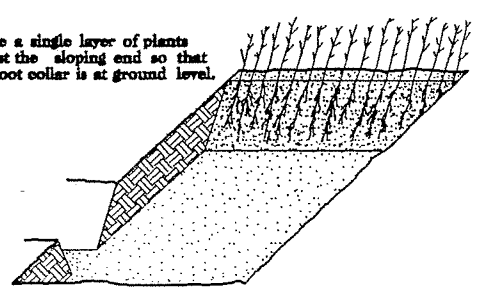
2. Excavate a flat bottom trench 12" deep and provide drainage.



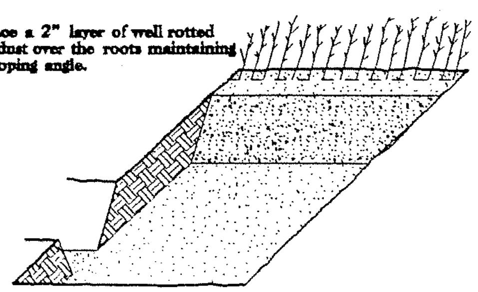
3. Backfill the trench with 2" well rotted sawdust. Place a 2" layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

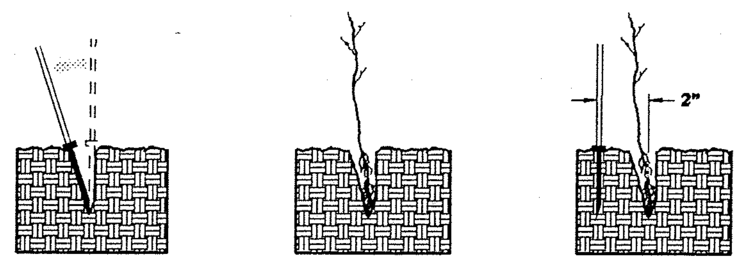


5. Place a 2" layer of well rotted sawdust over the roots maintaining a sloping angle.

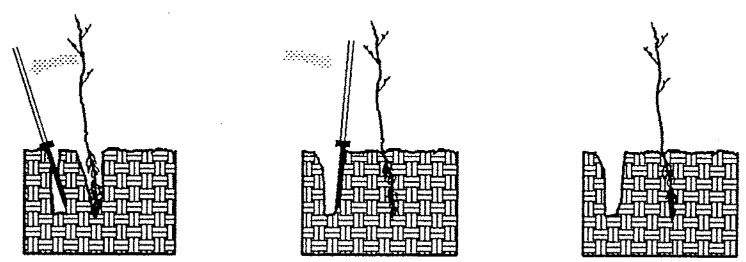


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



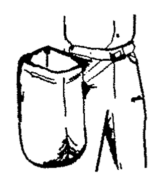
1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2" toward planter from seedling.



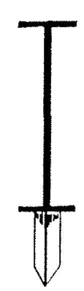
4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12" long, 4" wide and 1" thick at center.



ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches (10") below the root collar.

SHEPHERD'S TREE WETLAND PLANTING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2239WM	RF-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION

WETLAND TREE REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	BAREROOT SEEDLING
FRAXINUS PENNSYLVANICA	GREEN ASH	BAREROOT SEEDLING
QUERCUS LYRATA	OVERCUP OAK	BAREROOT SEEDLING
QUERCUS NIGRA	WATER OAK	BAREROOT SEEDLING
QUERCUS MICHAUXII	SWAMP CHESTNUT OAK	BAREROOT SEEDLING
LIRIODENDRON TULIPIFERA	TULIP POPLAR	BAREROOT SEEDLING
NYSSA AQUATICA	WATER TUPELO	BAREROOT SEEDLING
QUERCUS FALCATA VAR. PAGODAEFOLIA	CHERRYBARK OAK	BAREROOT SEEDLING
QUERCUS PHELLOS	WILLOW OAK	BAREROOT SEEDLING

TREE REFORESTATION SHALL BE PLANTED 6' TO 10' ON CENTER, RANDOM SPACING, AVERAGING 8' ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

SALIX NIGRA	BLACK WILLOW	LIVE STAKE
CORNUS AMOMUM	SILKY DOGWOOD	LIVE STAKE

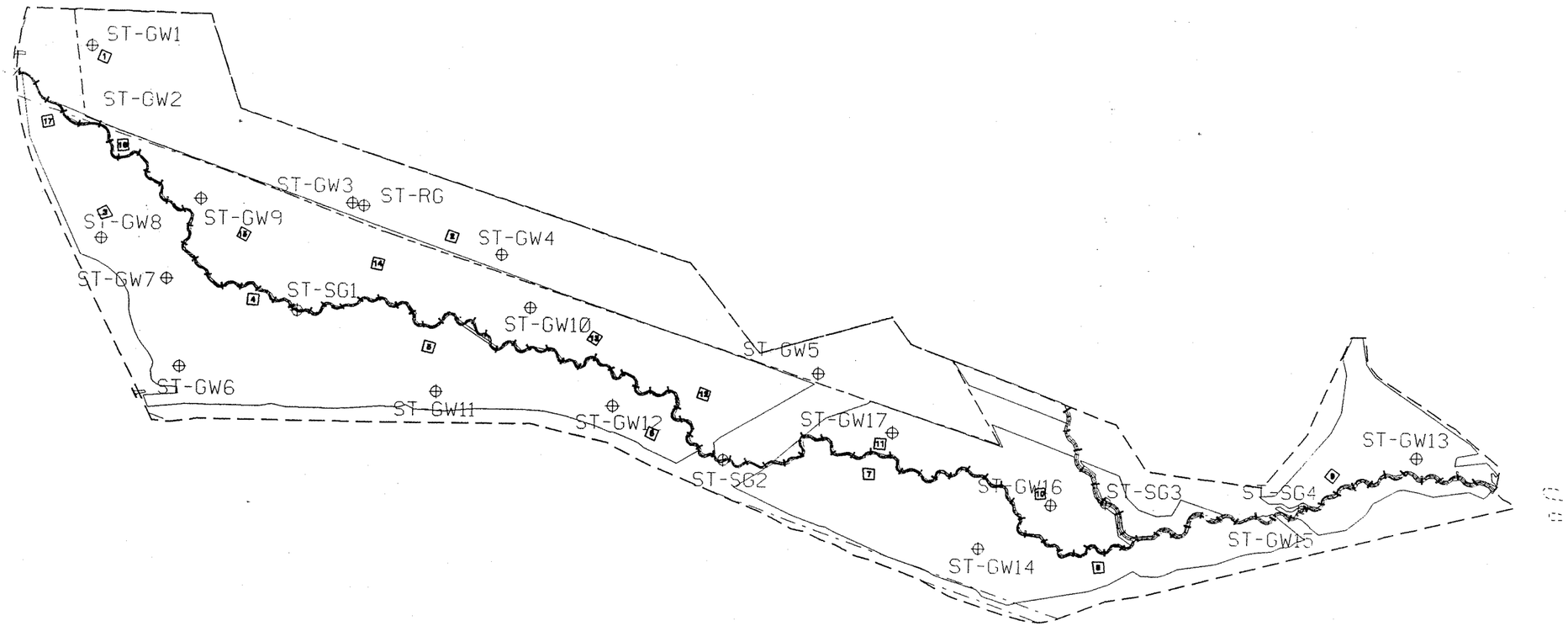
TREE REFORESTATION SHALL BE PLANTED 2' TO 6' ON CENTER, RANDOM SPACING, AVERAGING 4' ON CENTER.

SEE PLAN SHEETS FOR AREAS TO BE PLANTED

WETLAND AND STREAM REFORESTATION DETAIL SHEET

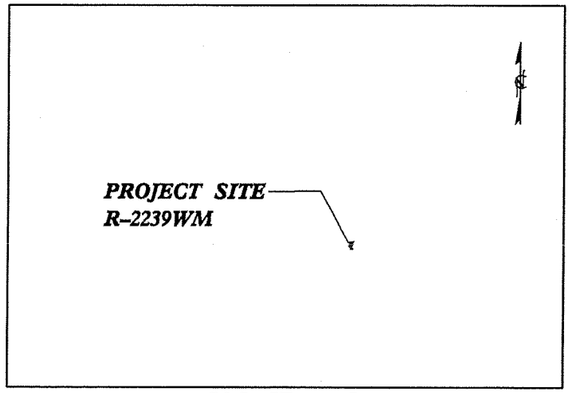
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

SHEPHERD'S TREE MITIGATION SITE
MONITORING GAUGE AND PLOT LOCATIONS



WBS ELEMENT: 34404.4.1 R-2239WM

See Sheet 1-A For Index of Sheets



VICINITY MAP
NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

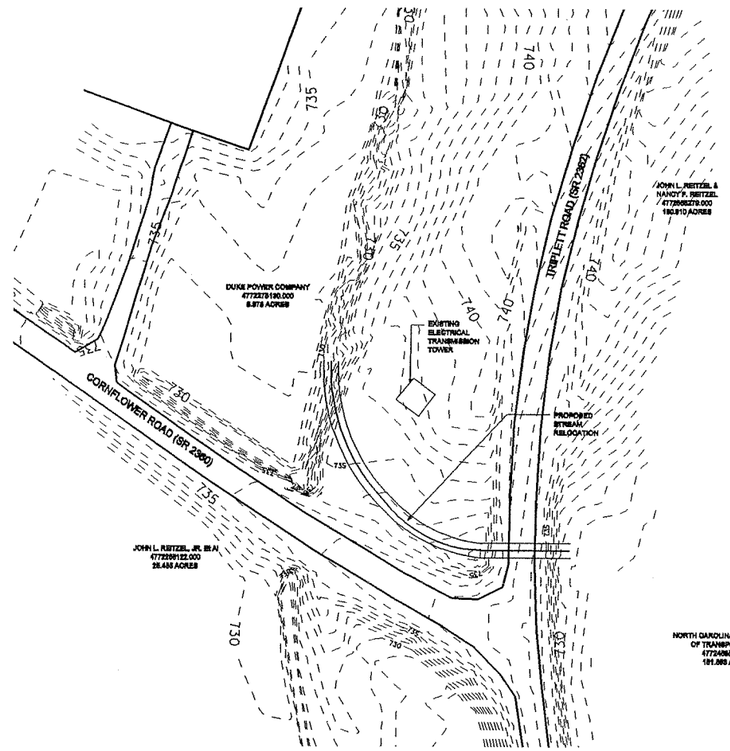
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2239WM	1	18

WBS ELEMENT	F.A. PROJ. NO.	DESCRIPTION
34404.1.1		P.E.
34404.2.1		R /W
34404.4.1		CONST.

As-Built Plans

LOCATION: DUKE POWER PROPERTY ADJACENT TO SHEPHERDS TREE MITIGATION SITE BETWEEN TRIPLETT ROAD (SR 2362) AND CORNFLOWER (SR 2360), SOUTHEAST OF STATESVILLE

TYPE OF WORK: DRAINAGE



PHASE III

GRAPHIC SCALES

PLANS: –30 –15 0 30 60

PROFILE (HORIZONTAL): –20 –10 0 20 40

PROFILE (VERTICAL): –4 –2 0 4 8

PROJECT LENGTH

CHANNEL RELOCATION = 284 FEET

Prepared in the Office of:

KCI Associates of North Carolina, P.A.
SUITE 220 LANDMARK CENTER II, 4601 SIX FORKS RD., RALEIGH NC
ENGINEERS • PLANNERS • ECOLOGISTS

for the:

DIVISION OF HIGHWAYS

2002 STANDARD SPECIFICATIONS

LETTING DATE:

JAMES W. BLAKE, PE
PROJECT ENGINEER

GARY M. MRYNCZA, PH
DESIGN ENGINEER

DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	1A
R/W SHEET NO.	
ENGINEER	

INDEX OF SHEETS

ROADWAY STANDARD DRAWINGS:

(REV. JAN. 2002)

STD NO.	TITLE
310.10	DRIVEWAY PIPE CONSTRUCTION
840.71	CONCRETE AND BRICK PIPE PLUG

GENERAL NOTES:

BEARING AND DISTANCES:
ALL BEARINGS ARE NAD '83 GRID BEARINGS.
ALL DISTANCES AND COORDINATES SHOWN ARE HORIZONTAL (GROUND) VALUES.
ALL INFORMATION IS BASED ON THE FOLLOWING NCGS CONTROL MONUMENTS.

"KIMMER"	N = 705,616.53	E = 1,497,413.15	ELEV.= 782.13'
"BEACON AZ"	N = 684,999.89	E = 1,463,959.23	ELEV.= 926.73'
"319 JAS"	N = 733,066.25	E = 1,477,188.81	ELEV.= 837.95'

ALL PROPERTY BOUNDARY DATA IS BASED ON DATA SUPPLIED BY NCDOT.

GRADING:
-THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED OR FUTURE SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING, ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

SUBSURFACE PLANS:
-NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:
-UTILITY LOCATIONS NOTED ON PLANS ARE FOR INFORMATIONAL PURPOSES ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ANY EXISTING UTILITIES. CONTACT 'NC ONE CALL', 1-800-632-4949, A MINIMUM OF 48 HOURS IN ADVANCE OF CONSTRUCTION, AS WELL AS NCDOT, FOR INFORMATION.

KCI Associates
of North Carolina, P.A.
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RALEIGH, NC 27609-5210
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	1B
R/W SHEET NO.	

NORTH CAROLINA PROFESSIONAL SEAL 14331 ENGINEER JAMES WALDO BLAKE 5-20-04

ROADS & RELATED ITEMS

- Edge of Pavement
- Curb
- Prop. Slope Stakes Cut — C
- Prop. Slope Stakes Fill — F
- Prop. Woven Wire Fence
- Prop. Chain Link Fence
- Prop. Barbed Wire Fence
- Prop. Wheelchair Ramp — WCR
- Exist. Guardrail
- Prop. Guardrail
- Equality Symbol
- Pavement Removal

RIGHT OF WAY

- Baseline Control Point
- Existing Right of Way Marker
- Exist. Right of Way Line w/Marker
- Prop. Right of Way Line with Proposed R/W Marker (Iron Pin & Cap)
- Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
- Exist. Control of Access Line — CA
- Prop. Control of Access Line
- Exist. Easement Line — E
- Prop. Temp. Construction Easement Line — E
- Prop. Temp. Drainage Easement Line — TDE
- Prop. Perm. Drainage Easement Line — PDE

HYDROLOGY

- Stream or Body of Water
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Shoreline
- Falls, Rapids
- Prop Lateral, Tail, Head Ditches — FLOW

STRUCTURES

MAJOR

- Bridge, Tunnel, or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR

- Head & End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Boxes — CB
- Paved Ditch Gutter

UTILITIES

- Exist. Pole
- Exist. Power Pole
- Prop. Power Pole
- Exist. Telephone Pole
- Prop. Telephone Pole
- Exist. Joint Use Pole
- Prop. Joint Use Pole
- Telephone Pedestal — T
- Cable TV Pedestal — C
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole — P
- Telephone Booth
- Water Manhole — W
- Light Pole
- H-Frame Pole
- Power Line Tower
- Pole with Base
- Gas Valve
- Gas Meter
- Telephone Manhole — T
- Power Transformer
- Sanitary Sewer Manhole
- Storm Sewer Manhole — S
- Tank; Water, Gas, Oil
- Water Tank With Legs
- Traffic Signal Junction Box — S
- Fiber Optic Splice Box — F
- Television or Radio Tower
- Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS — TS

- Water Line — W — W
- Sanitary Sewer — SS — SS
- Sanitary Sewer Force Main — FSS — FSS
- Gas Line — G — G
- Storm Sewer — S — S
- Power Line — P — P
- Telephone Cable — T — T
- U/G Telephone Conduit — TC — TC
- Unknown Utility — ?UTL — ?UTL
- Television Cable — TV — TV
- Fiber Optics Cable — FO — FO
- Exist. Water Meter — 0
- Drawn According to U/G Records — DATUR
- Abandoned According to U/G Records — AATUR
- End Of Information — E.O.I.

BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol — PL
- Exist. Iron Pin — EIP
- Property Corner
- Property Monument — EPM
- Property Number — 123
- Parcel Number — 6
- Fence Line — WW & ISBW
- Existing Wetland Boundaries — WLB
- Proposed Wetland Boundaries — WLB
- Existing Endangered Animal Boundaries — EAB
- Existing Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

- Buildings
- Foundations
- Area Outline
- Gate

- Gas Pump Vent or U/G Tank Cap
- Church
- School
- Park
- Cemetery
- Dam
- Sign
- Well — OW
- Small Mine
- Swimming Pool

TOPOGRAPHY

- Loose Surface
- Hard Surface
- Change in Road Surface
- Curb
- Right of Way Symbol — R/W
- Guard Post — GP
- Paved Walk
- Bridge
- Box Culvert or Tunnel
- Ferry
- Culvert
- Footbridge
- Trail, Footpath
- Light House

VEGETATION

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — VINEYARD

RAILROADS

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch

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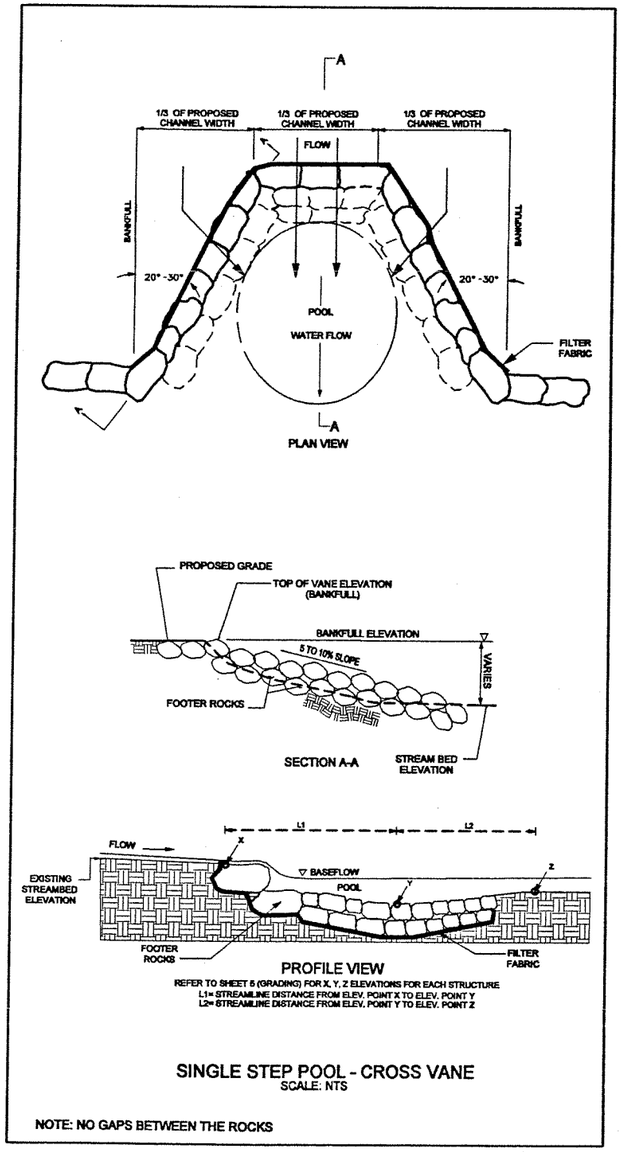
REVISIONS

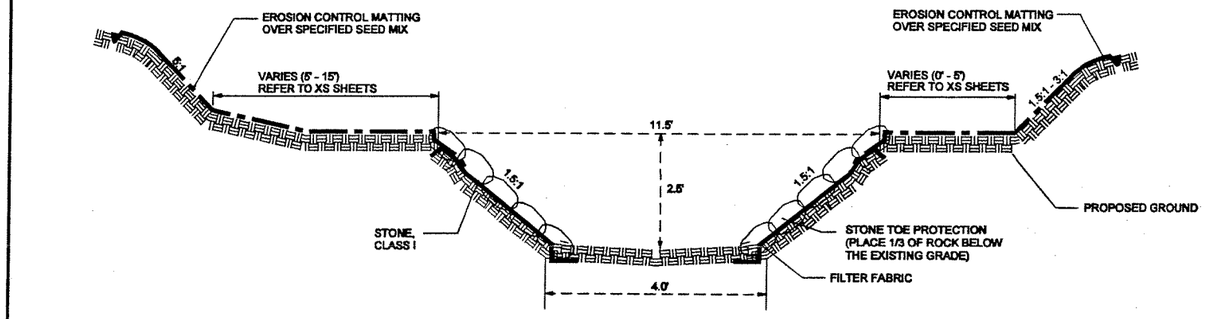
PROJECT REFERENCE NO.	SHEET NO.
12239WM	2
TOTAL SHEETS	SHEET NO.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14351 JAMES WALDO BLAKE 5-20-04



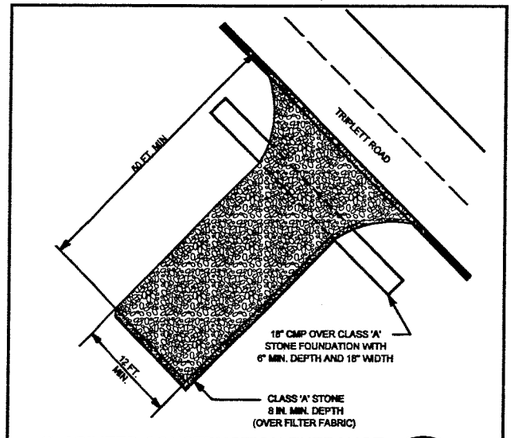
SINGLE STEP POOL - CROSS VANE
SCALE: NTS

NOTE: NO GAPS BETWEEN THE ROCKS



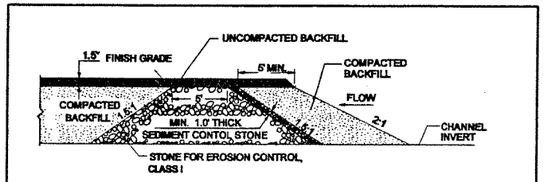
TYPICAL SECTION - RELOCATED CHANNEL STONE TOE/EROSION CONTROL MATTING STABILIZATION
SCALE: NTS

NOTE: PERM. SHEAR STRESS FOR CLASS I EQUALS 2.00 LBS/SQ. FT
(T= 62.4 * 2.5' * 0.0067 = 1.05)



STABILIZED CONSTRUCTION ENTRANCE (SCE)
SCALE: NTS

NOTES:
1. TURNING RADIUS SUFFICIENT TO ACCOMODATE LARGE TRUCKS SHALL BE PROVIDED.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. FOUNDATION CONDITIONING MATERIAL SHALL BE PLACED, AS REQUIRED, BENEATH THE 18" CMP.



CHANNEL BLOCK
SCALE: NTS

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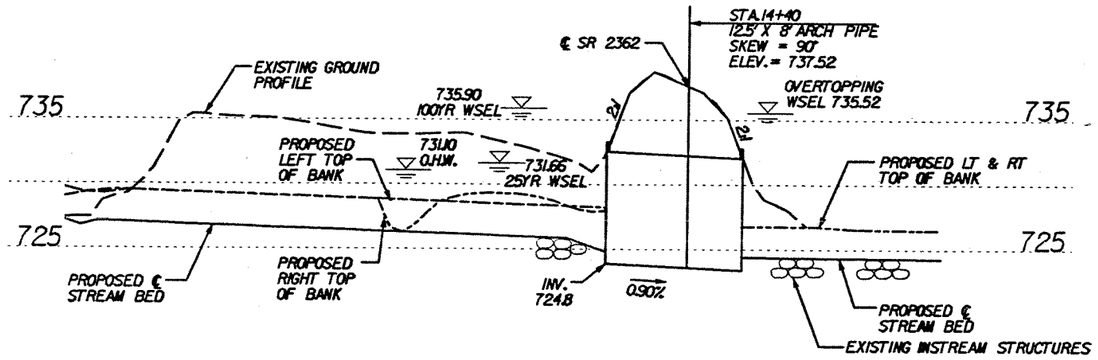
REVISIONS

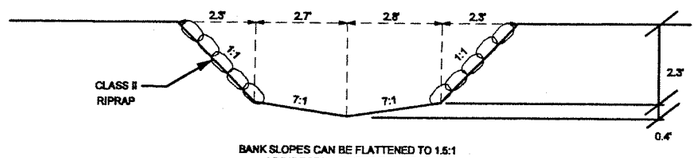
PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	2A
F.A. PROJ. NO.	

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14351 5-20-04 JAMES WALDO BLAKE



PROFILE VIEW OF RELOCATED
STREAM AND CULVERT
REFER TO CULVERT SURVEY REPORT

SCALE: 1" = 30' (5H : 1V)



BANK SLOPES CAN BE FLATTENED TO 1.5:1
AS DIRECTED BY THE ENGINEER.
(FOR TOTAL MAX. WIDTH - 12.4')

TYPICAL SECTION - DOWNSTREAM OF CULVERT
TIE-IN WITH EXISTING RESTORED CHANNEL
REFER TO CULVERT SURVEY REPORT

SCALE: NTS

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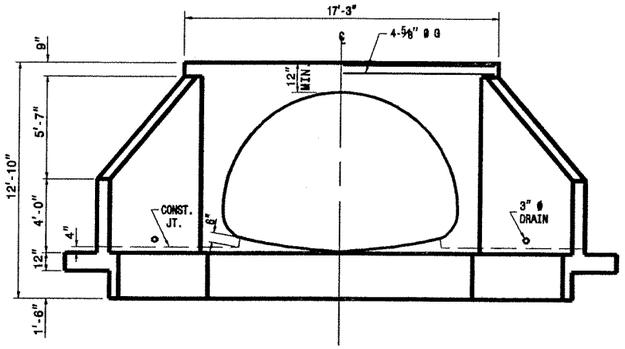
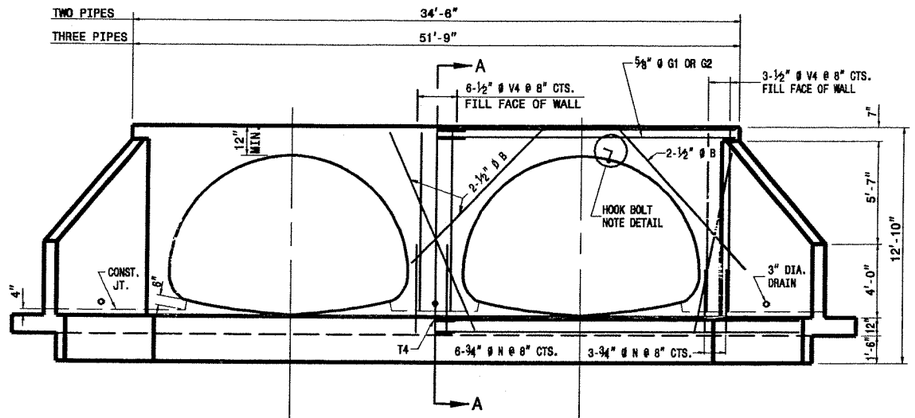
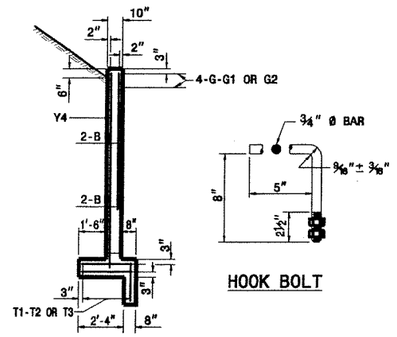
PROJECT REFERENCE NO.	SHEET NO.
	2B



END ELEVATION

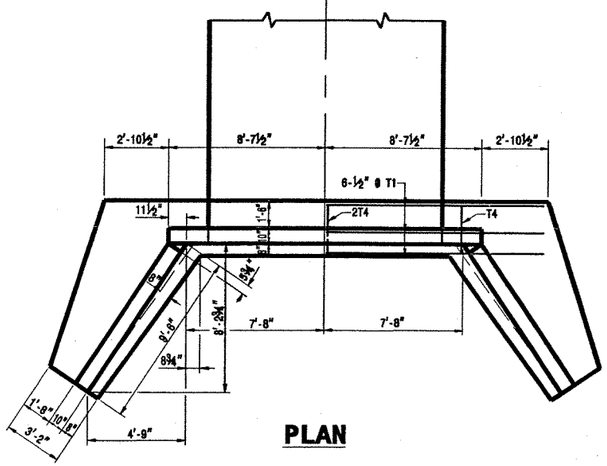


END ELEVATION

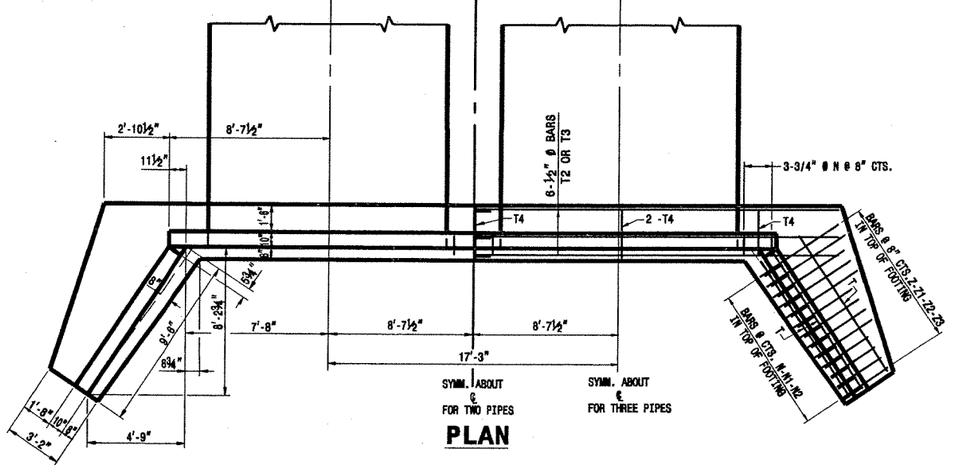


HOOK BOLT

SECTION A-A
FOR ALL ENDWALLS



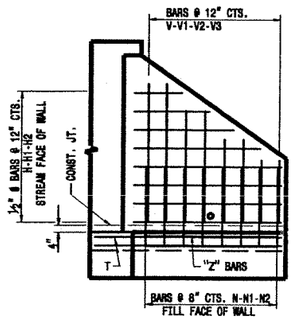
PLAN



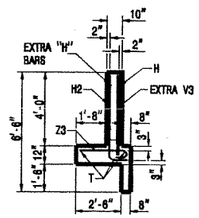
PLAN

BILL OF MATERIAL FOR ONE ENDWALL

			1 PIPE		2 PIPES		3 PIPES	
BAR	SIZE	LENGTH	NO.	WEIGHT	NO.	WEIGHT	NO.	WEIGHT
B	#4	10'-0"	8	53	16	107	24	160
G	#5	17'-0"	4	71	-	-	-	-
G1	#5	18'-3"	-	-	8	152	-	-
G2	#5	18'-9"	-	-	-	-	12	235
H	#4	11'-6"	12	92	12	92	12	92
H1	#4	9'-0"	4	24	4	24	4	24
H2	#4	5'-9"	6	23	6	23	6	23
N	#6	5'-0"	12	90	18	135	24	180
N1	#5	4'-6"	6	28	6	28	6	28
N2	#4	4'-1"	16	44	16	44	16	44
T	#4	9'-6"	6	38	6	38	6	38
T1	#4	23'-0"	6	92	-	-	-	-
T2	#4	20'-11"	-	-	12	167	-	-
T3	#4	20'-5"	-	-	-	-	18	245
T4	#4	2'-9"	4	7	7	13	10	19
V	#5	8'-0"	8	67	8	67	8	67
V1	#4	6'-0"	10	40	10	40	10	40
V2	#4	4'-9"	6	19	6	19	6	19
V3	#4	3'-9"	6	15	6	15	6	15
V4	#4	9'-10"	6	39	12	79	18	118
Z	#6	5'-8"	6	51	6	51	6	51
Z1	#5	5'-2"	6	32	6	32	6	32
Z2	#4	4'-7"	8	24	8	24	8	24
Z3	#4	3'-11"	8	21	8	21	8	21
TOTAL REINF. STEEL (lbs.)			870		1171		1475	
CLASS "A" CONC. (cu. yds.)			13.2		18.8		24.4	



ELEVATION OF WING



END OF WING

SHOWING REINFORCEMENT

GENERAL NOTES

ALL CONCRETE TO BE CLASS "A".

ALL REINFORCING STEEL SHALL BE ASTMA615-GRADE 60.

ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.

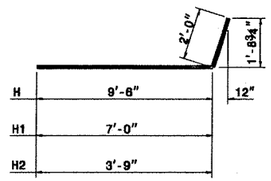
THE FOOTING, CURTAIN WALL AND 4" OF WALL ARE TO BE POURED IN ONE OPERATION ALLOWING NO TIME FOR INITIAL SET TO TAKE PLACE BETWEEN THEM. THE REMAINING WALL SHALL THEN BE POURED IN ONE OPERATION.

ALL EXPOSED CORNERS ARE TO BE CHAMFERED 1".

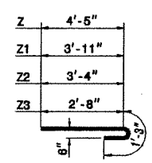
3" DIAMETER DRAINS SHALL BE PLACED IN WALL AS SHOWN AND BE 6" ABOVE NORMAL FLOW LINE.

ALL MATERIAL AND WORKMANSHIP AS PER SPECIFICATIONS OF THE N.C.DEPARTMENT OF TRANSPORTATION.

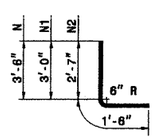
THE FOLLOWING EXTRA BARS ARE PROVIDED FOR HOLDING REINFORCING STEEL IN CORRECT POSITION IN WINGS: 2H-1H2-2H4-1H6-3T-3T1-2V-1V1-2V2.



BARS H1-H2-H3



BARS Z-Z1-Z2-Z3



BARS N-N1-N2

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

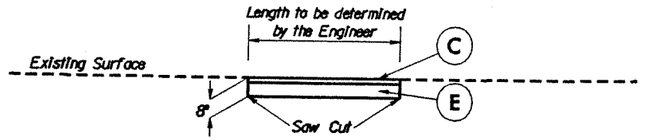
DETAIL OF
REINFORCED CONCRETE ENDWALL
FOR 150" X 96"
PIPE ARCH - 90°

ORIGINAL BY: T.Spell DATE: Oct.1998
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC. : da174:usr/details/stand/endwpiearch.dgn

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	2C
RW SHEET NO.	
ENGINEER	

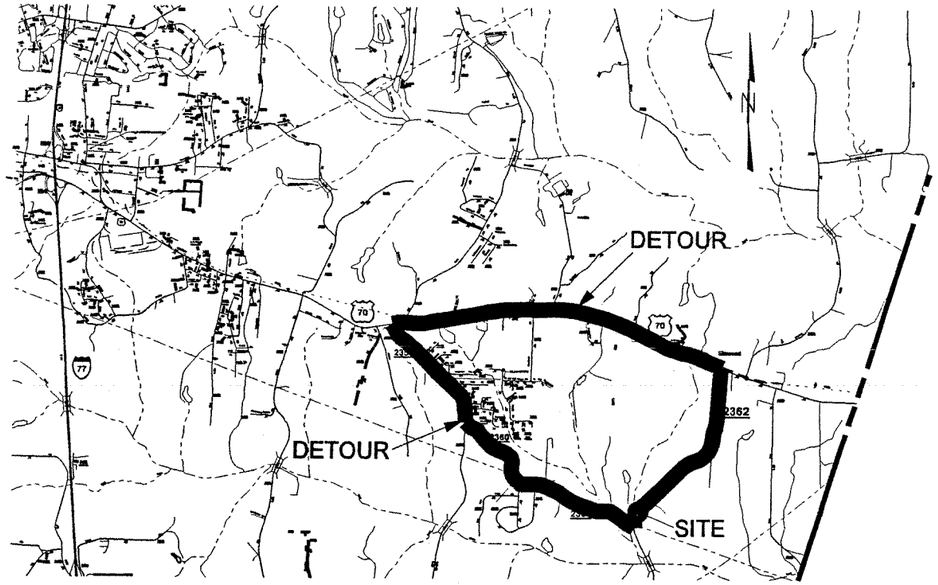
PROJECT REFERENCE NO.
R-2239 WM

PROJECT TYPICAL



PROFILE

PAVEMENT SCHEDULE	
C	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
E	PROP. APPROX. 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.



VICINITY MAP

KCI Associates
of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R - 2239WM	3
R/W SHEET NO.	
ENGINEER	

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SUMMARY OF QUANTITIES

SECT.	QUANTITY	UNIT	ITEM DESCRIPTION
800	1	LS	MOBILIZATION
226	1	AC	SUPPLEMENTAL CLEARING AND GRUBBING
226	1	LS	GRADING
867	100	LF	FENCE RESET
1660	2	AC	SEEDING AND MULCHING
1056	85	SY	FILTER FABRIC FOR DRAINAGE
1610	20	TON	SEDIMENT CONTROL STONE
1610	85	TON	STONE FOR EROSION CONTROL, CLASS A
1610	20	TON	STONE FOR EROSION CONTROL, CLASS B
1610	15	TON	STONE FOR EROSION CONTROL, CLASS 1
SP	160	TON	STONE, CLASS 1
SP	15	TON	STONE, CLASS 2
SP	50	TON	STONE, BOULDER
520	50	TON	ABC - INCIDENTAL STONE
300	50	TON	FOUNDATION CONDITIONING MATERIAL
SP	1600	SY	EROSION CONTROL (COIR) MATTING
1630	5	CY	SILT EXCAVATION
840	1	CY	PIPE PLUGS
310	20	LF	18" CS PIPE CULV, 0.064" THICK
310	55	LF	12.5' X 8' ARCH PIPE
838	25	CY	REINFORCED ENDWALL
SP	150	LF	SAFETY FENCE

SUMMARY OF EARTHWORK

IN CUBIC YARDS

SITE EXCAVATION =	2,400 CY
SITE EMBANKMENT =	160 CY
NET WASTE =	2,240 CY

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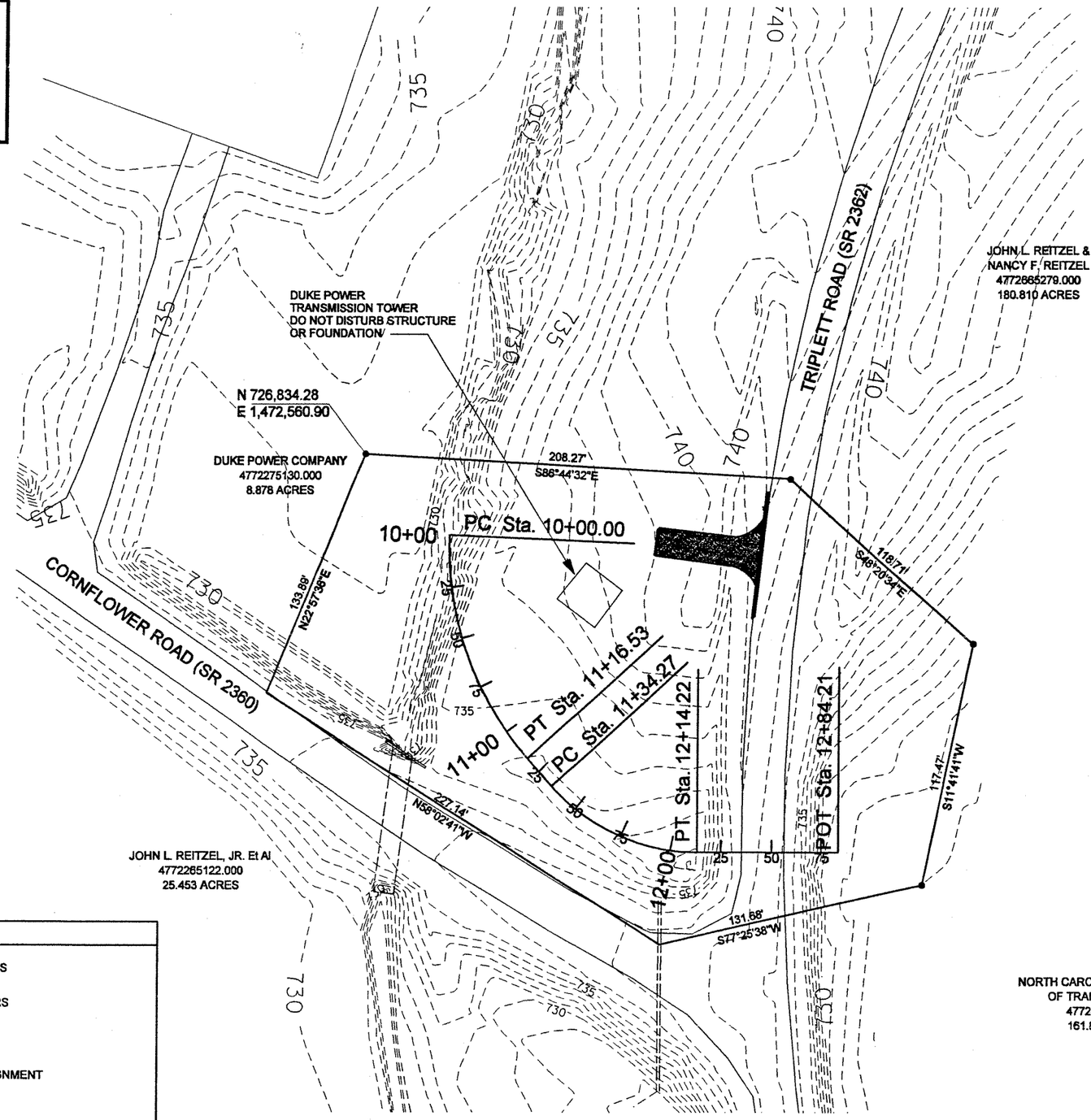
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2239VVM	4
RW SHEET NO.	

NORTH CAROLINA PROFESSIONAL SEAL 14351 ENGINEER 5-25-04 JAMES WALDO BLAKE



LIMITS LEGEND	
- - - - - - -	EXISTING MINOR CONTOURS
- - - 785 - - -	EXISTING MAJOR CONTOURS
40.73' / N90°00'00"E	LIMIT OF DISTURBANCE
	PROPOSED RELOCATE ALIGNMENT
	DUKE POWER TOWER

LIMITS OF OPERATION

0 15 30 60
GRAPHIC SCALE (1" = 30')

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	5
TOTAL SHEET NO.	

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14391 5-20-04 JAMES WALDO BLAKE

DUKE POWER COMPANY
4772275130.000
8.878 ACRES

JOHN L. REITZEL &
NANCY F. REITZEL
4772685279.000
180.810 ACRES

TRIPLETT ROAD (SR 2362)

CORNFLOWER ROAD (SR 2360)

KCI #6258
N= 728,864.02
E= 1,472,674.86
ELEV= 739.01

INSTALL SINGLE STEP POOL
STA. 10+00
REFER TO SHEET 2 (DETAILS)
X= 727.11'
Y= 726.70'
Z= 727.03'
L1= 6.0'
L2= 6.5'

INSTALL CHANNEL BLOCK
REFER TO SHEET 2 (DETAILS)

EXISTING
ELECTRICAL
TRANSMISSION
TOWER

10+00 PC Sta. 10+00.00

INSTALL STABILIZED
CONSTRUCTION ENTRANCE
SEE SHEET 2 (DETAILS)

18" CMP (STD. DRAWING 310.10)

PROPOSED
STREAM
RELOCATION

PROPOSED 12.5' X 8' TYPE B ARCH PIPE

PT Sta. 11+16.53

PG Sta. 11+34.27

PT Sta. 12+14.22

EOT Sta. 12+84.21

TIE-IN WITH
NATURAL CHANNEL
SHEPHERDS TREE
MITIGATION SITE

REMOVE AND RESET C/A FENCE
(AS NECESSARY FOR CULVERT INSTALLATION)

INSTALL SINGLE STEP POOL
STA. 12+05.6
REFER TO SHEET 2 (DETAILS)
X= 725.73'
Y= 724.50'
Z= 724.80
L1= 5.1'
L2= 5.1'

KCI #6004
N= 726,613.37
E= 1,472,725.38
ELEV= 738.02'

APPROXIMATE LOCATION
18" RCP TO BE PLUGGED

JOHN L. REITZEL, JR. Et Al
4772265122.000
25.453 ACRES

EXISTING 7' X 10' ARCH CMP
TO REMAIN

NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
4772456592.000
161.863 ACRES

EXISTING STREAM LENGTH = 106 FEET
PROPOSED STREAM LENGTH = 284 FEET
PROPOSED PIPE LENGTH = 55 FEET

GRADING LEGEND	
- - - - -	EXISTING MINOR CONTOURS
- - 785 - -	EXISTING MAJOR CONTOURS
———	PROPOSED CONTOURS
——|——	PROPOSED RELOCATE ALIGNMENT
▲	SURVEY CONTROL POINT
□	DUKE POWER TOWER

GRADING

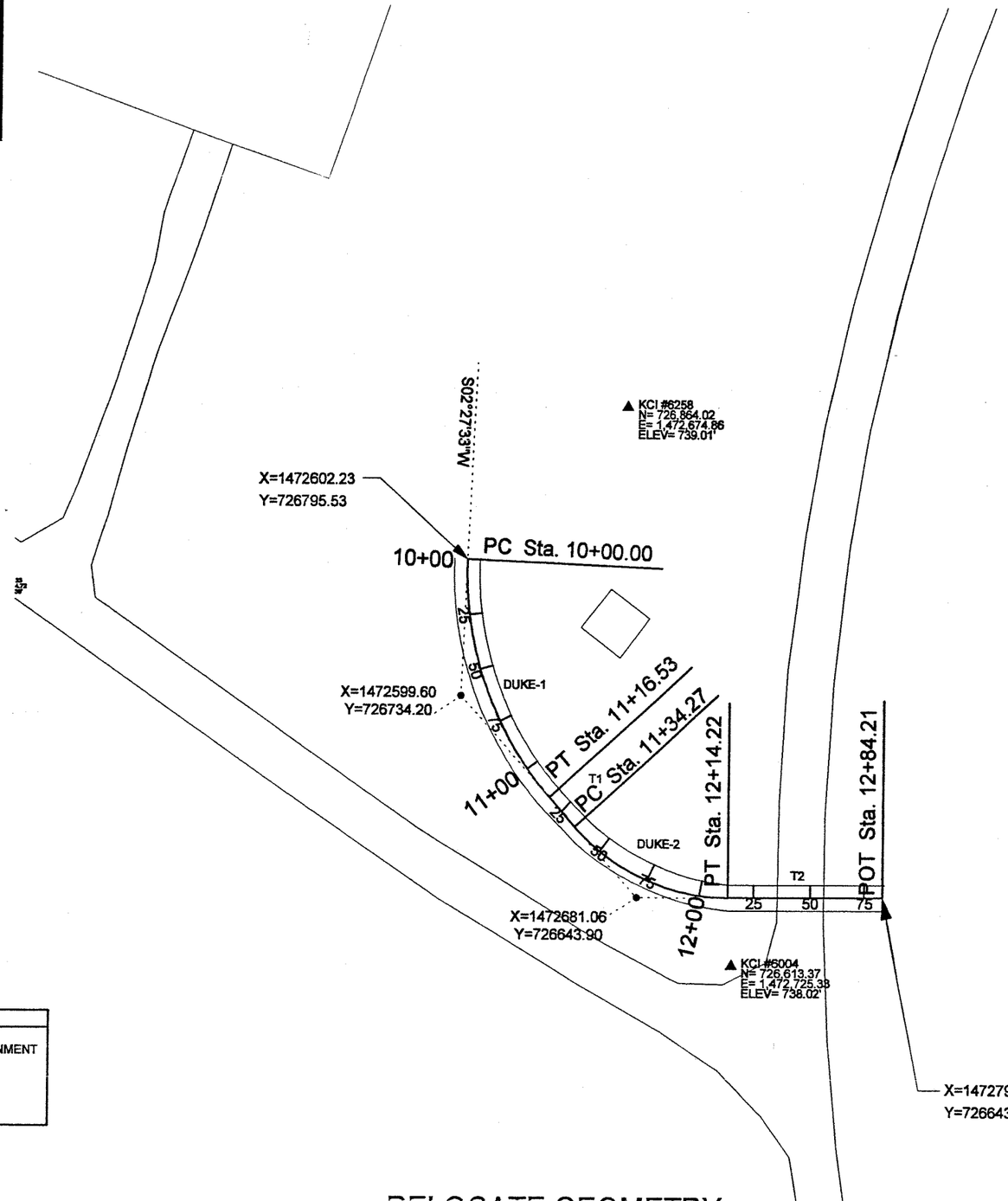
0 15 30 60
GRAPHIC SCALE (1" = 30')

KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14351 5-28-04 JAMES WALDO BLAKE



Curve DUKE-1

P.I. Station	10+61.38 N	726,734.20 E	1,472,599.60
Delta =	44° 30' 39.79" (LT)		
Degree =	38° 11' 49.87"		
Tangent =	61.38		
Length =	116.53		
Radius =	150.00		
External =	12.07		
Long Chord =	113.62		
Mid. Ord. =	11.17		
P.C. Station	10+00.00 N	726,795.53 E	1,472,602.24
P.T. Station	11+16.53 N	726,688.62 E	1,472,640.72
C.C.	N	726,789.09 E	1,472,752.10

Back = S 2° 27' 32.81" W
Ahead = S 42° 03' 06.98" E
Chord Bear = S 19° 47' 47.08" E

Course from PT DUKE-1 to PC DUKE-2 S 42° 03' 06.98" E Dist 17.74

Curve DUKE-2

P.I. Station	11+76.76 N	726,643.90 E	1,472,681.06
Delta =	47° 56' 53.02" (LT)		
Degree =	59° 58' 29.31"		
Tangent =	42.48		
Length =	79.95		
Radius =	95.53		
External =	9.02		
Long Chord =	77.63		
Mid. Ord. =	8.24		
P.C. Station	11+34.27 N	726,675.45 E	1,472,652.60
P.T. Station	12+14.22 N	726,643.90 E	1,472,723.54
C.C.	N	726,739.44 E	1,472,723.54

Back = S 42° 03' 06.98" E
Ahead = Due East
Chord Bear = S 66° 01' 33.49" E

Course from PT DUKE-2 to 101 Due East Dist 69.98

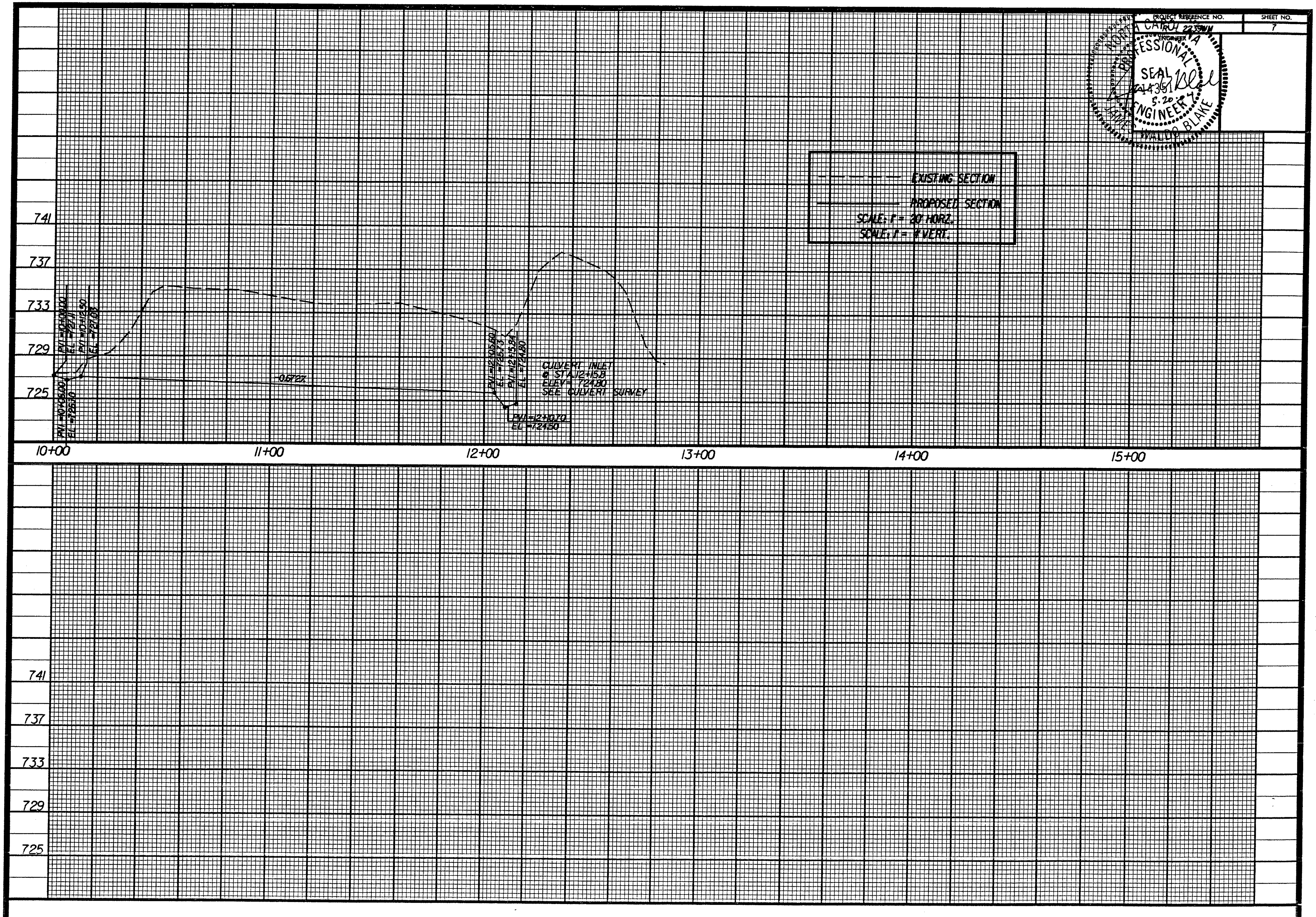
Point 101 N 726,643.90 E 1,472,793.65 Sta 12+84.21

GEOMETRY LEGEND
PROPOSED RELOCATE ALIGNMENT
SURVEY CONTROL POINT
DUKE POWER TOWER

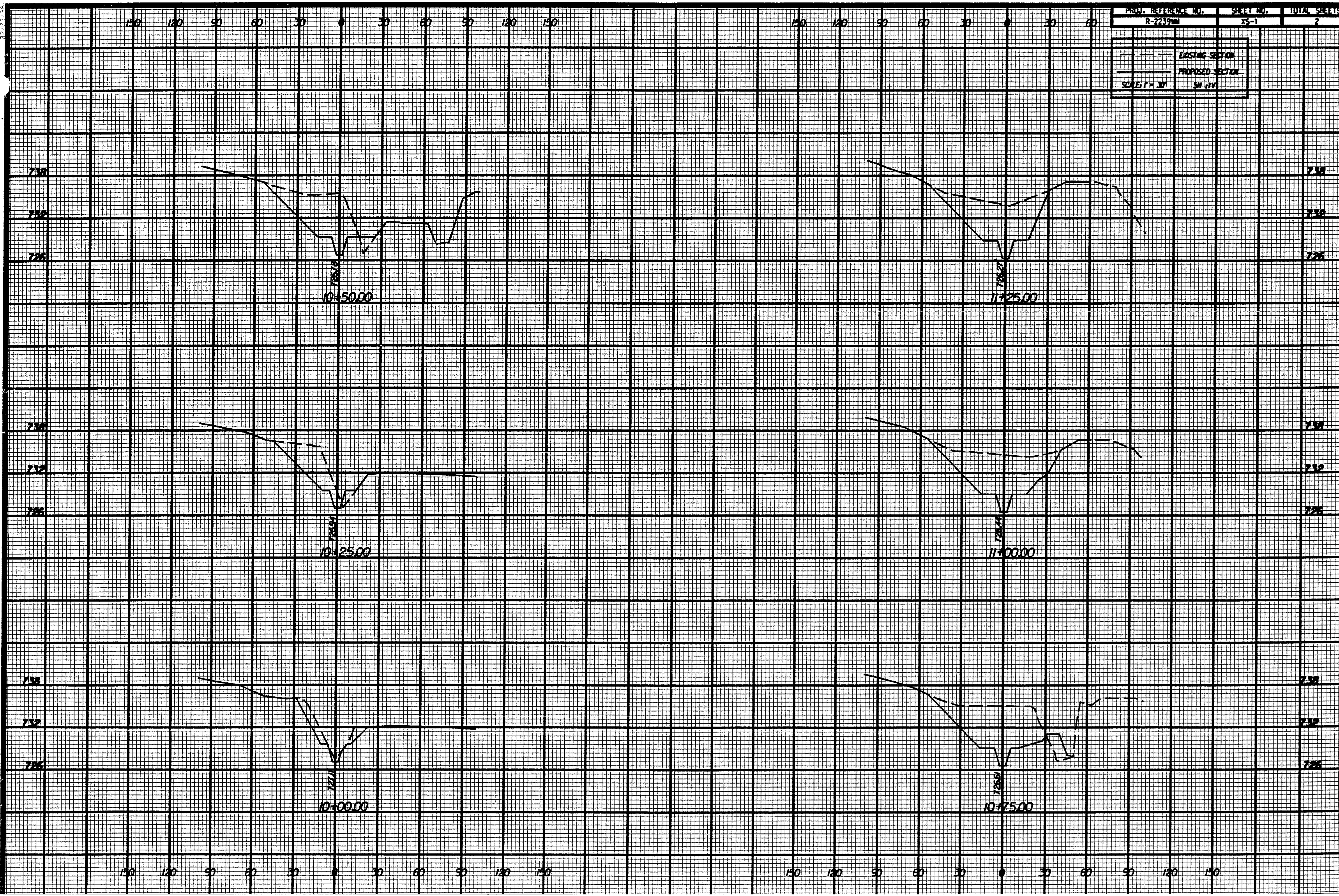
RELOCATE GEOMETRY

0 15 30 60
GRAPHIC SCALE (1" = 30')

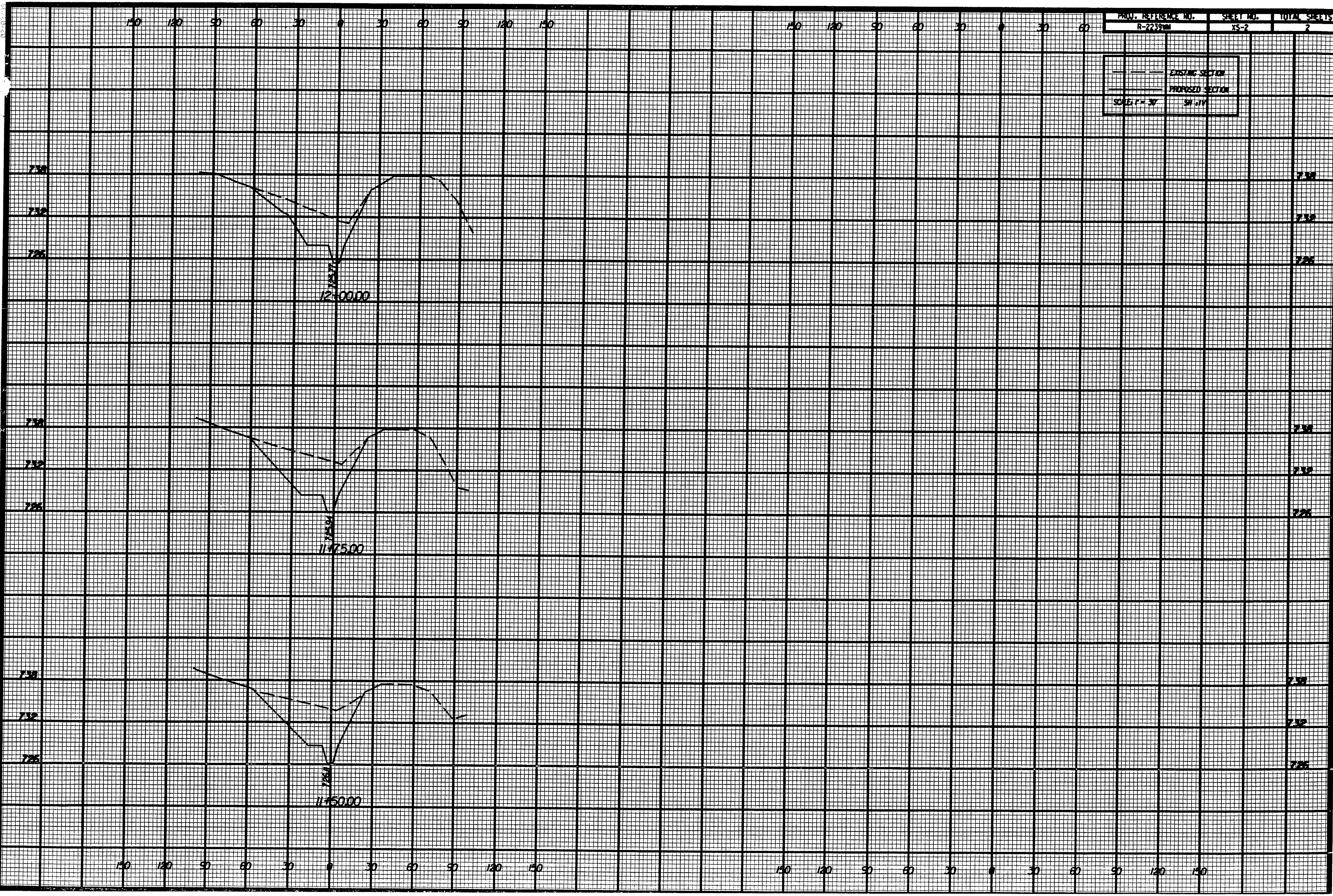
KCI Associates of North Carolina, P.A.
SUITE 200, LANDMARK CENTER I, 4601 SIX FORKS RD.
RALEIGH, NC 27609-5210
•ENGINEERS • PLANNERS • ECOLOGISTS


PROJECT REFERENCE NO.
RU 2239WM
SHEET NO.
7
ENGINEER
NORTH CAROLINA
PROFESSIONAL
SEAL
14351
5.20
ENGINEER
JAMES WALDO BLAKE
EXISTING SECTION
PROPOSED SECTION
SCALE: 1" = 20' HORZ.
SCALE: 1" = 4' VERT.
741
737
733
729
725
PVI =10+08.00
EL =727.11
PVI =10+12.50
EL =727.05
PVI =10+05.00
EL =725.10
0.572%
PVI =12+05.60
EL =725.73
PVI =12+15.84
EL =724.80
PVI =12+10.70
EL =724.50
CULVERT INLET
@ STA.12+15.8
ELEV= 724.80
SEE CULVERT SURVEY
10+00
11+00
12+00
13+00
14+00
15+00
741
737
733
729
725

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
R-2239WM	XS-1	2



PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
R-2239	XS-2	2



WBS ELEMENT: 34404.4.1 R-2239WM

STATE OF NORTH CAROLINA

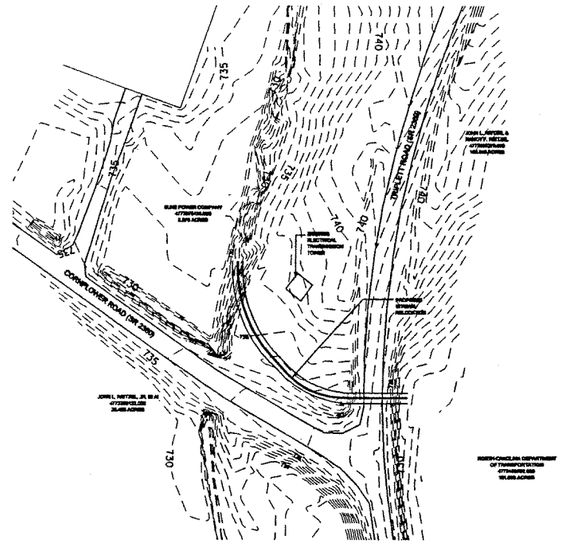
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED HIGHWAY EROSION CONTROL

IREDELL COUNTY

LOCATION: DUKE POWER PROPERTY ADJACENT TO SHEPHERDS TREE MITIGATION SITE BETWEEN TRIPLETT ROAD (SR 2362) AND CORNFLOWER (SR 2360), SOUTHEAST OF STATESVILLE

TYPE OF WORK: DRAINAGE



METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2239WM	EC-1	

WBS ELEMENT	F.A. PROJ. NO.	DESCRIPTION
34404.1.1		P.E.
34404.2.1		R /W
34404.4.1		CONST.

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
	Reforestation	
1630.05	Temporary Silt Ditch	TSD
1630.06	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.01	Riser Basin	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Temporary Rock Silt Check Type-B	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1636.01	Rock Silt Screen	
1630.04	Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A OR A)
1632.02	Type B	B OR B)
1632.03	Type C	C OR C)

GRAPHIC SCALE

0
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

PROJECT LENGTH

CHANNEL RELOCATION = 284 FEET

Prepared in the Office of:

ROADSIDE ENVIRONMENTAL UNIT

1 South Wilmington St.
Raleigh, NC 27611

2002 STANDARD SPECIFICATIONS

Roadway Standard Drawings

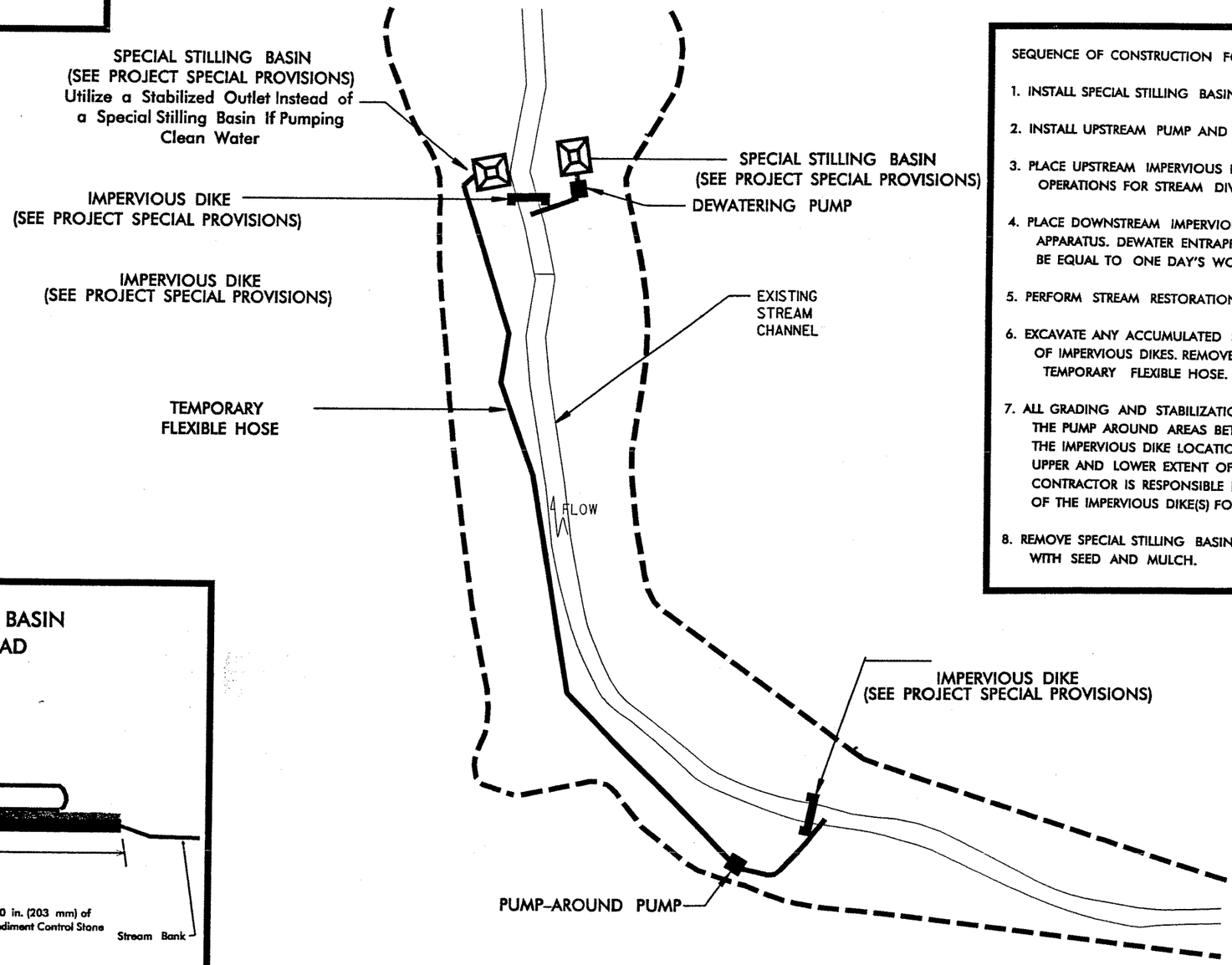
The following roadway metric standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January, 2002 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1636.01 Rock Silt Screen

PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NOTES:
1) All excavation shall be performed in only dry or isolated sections of channel.
2) Impervious dikes are to be used to isolate work from stream flow when necessary.
3) All graded areas shall be stabilized within 24 hours.
4) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
5) Pumps and hoses shall be of sufficicient size to dewater the work area.

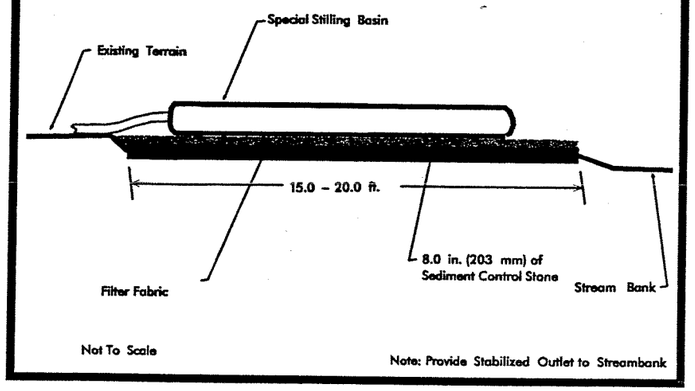
EXAMPLE OF PUMP-AROUND OPERATION



SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

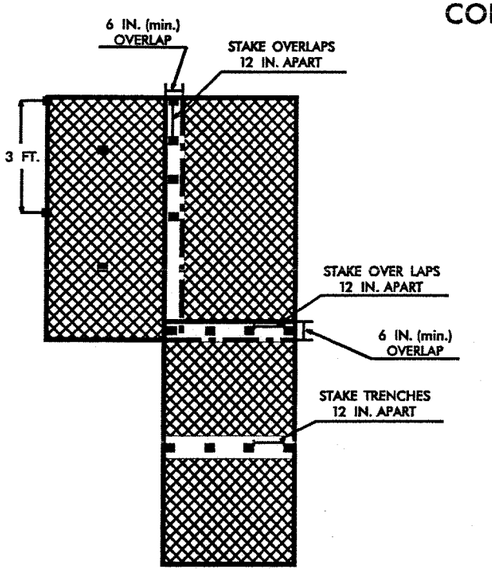
1. INSTALL SPECIAL STILLING BASIN(S)..
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED IN ONE DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKE(S) FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

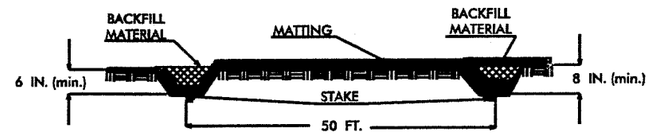
SPECIAL STILLING BASIN WITH ROCK PAD



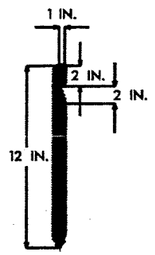
METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2239WM	EC-2A
	R /W SHEET NO.	
NOT TO SCALE		
CONST.REV.		
R /W REV.		

COIR FIBER MAT DETAIL





2 IN. x 2 IN. (nominal)
WOODEN STAKE



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2239WM	EC-3/CONST-5
R/W SHEET NO.	
ENGINEER	EC-3 ONLY

Safety Fence

DUKE POWER COMPANY
4772275130.000
8.878 ACRES

KCI #6258
N= 726,864.02
E= 1,472,674.86
ELEV= 739.01'

JOHN L. REITZEL &
NANCY F. REITZEL
4772665279.000
180.810 ACRES

TRIPLETT ROAD (SR 2362)

INSTALL SINGLE STEP POOL
STA. 10+00
REFER TO SHEET 2 (DETAILS)
X= 727.11'
Y= 726.70'
Z= 727.03'
L1= 6.0'
L2= 6.5'

EXISTING
ELECTRICAL
TRANSMISSION
TOWER

INSTALL STABILIZED
CONSTRUCTION ENTRANCE
SEE SHEET 2 (DETAILS)

10+00 PC Sta. 10+00.00

18" CMP (STD. DRAWING 310.10)

INSTALL CHANNEL BLOCK
REFER TO SHEET 2 (DETAILS)

CORNFLOWER ROAD (SR 2360)

PROPOSED
STREAM
RELOCATION

PT Sta. 11+16.53

PC Sta. 11+34.27

PROPOSED 12.5' X 8' TYPE B ARCH PIPE

PT Sta. 12+14.22

ROT Sta. 12+04.21

TIE-IN WITH
NATURAL CHANNEL
SHEPHERDS TREE
MITIGATION SITE

JOHN L. REITZEL, JR. Et Al
4772265122.000
25.453 ACRES

REMOVE AND RESET C/A FENCE
(AS NECESSARY FOR CULVERT INSTALLATION)

EXISTING 7' X 10' ARCH CMP
TO REMAIN

KCI #6004
N= 726,613.37
E= 1,472,725.33
ELEV= 738.02'

INSTALL SINGLE STEP POOL
STA. 12+05.6
REFER TO SHEET 2 (DETAILS)
X= 725.73'
Y= 724.50'
Z= 724.80
L1= 5.1'
L2= 5.1'

NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
4772456592.000
161.863 ACRES

APPROXIMATE LOCATION
18" RCP TO BE PLUGGED

0 15 30 60
GRAPHIC SCALE (1" = 30')

KCI Associates
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•ENGINEERS • PLANNERS • ECOLOGISTS