TIP PROJECT: R-2721

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
SHEET 1 OF 69

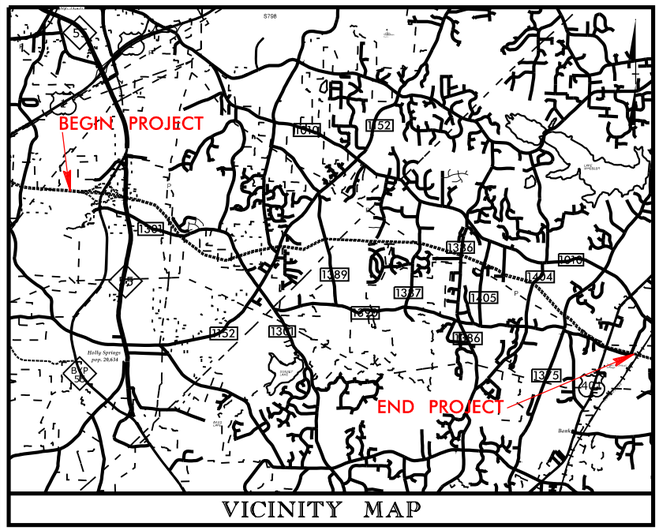
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2721	1	

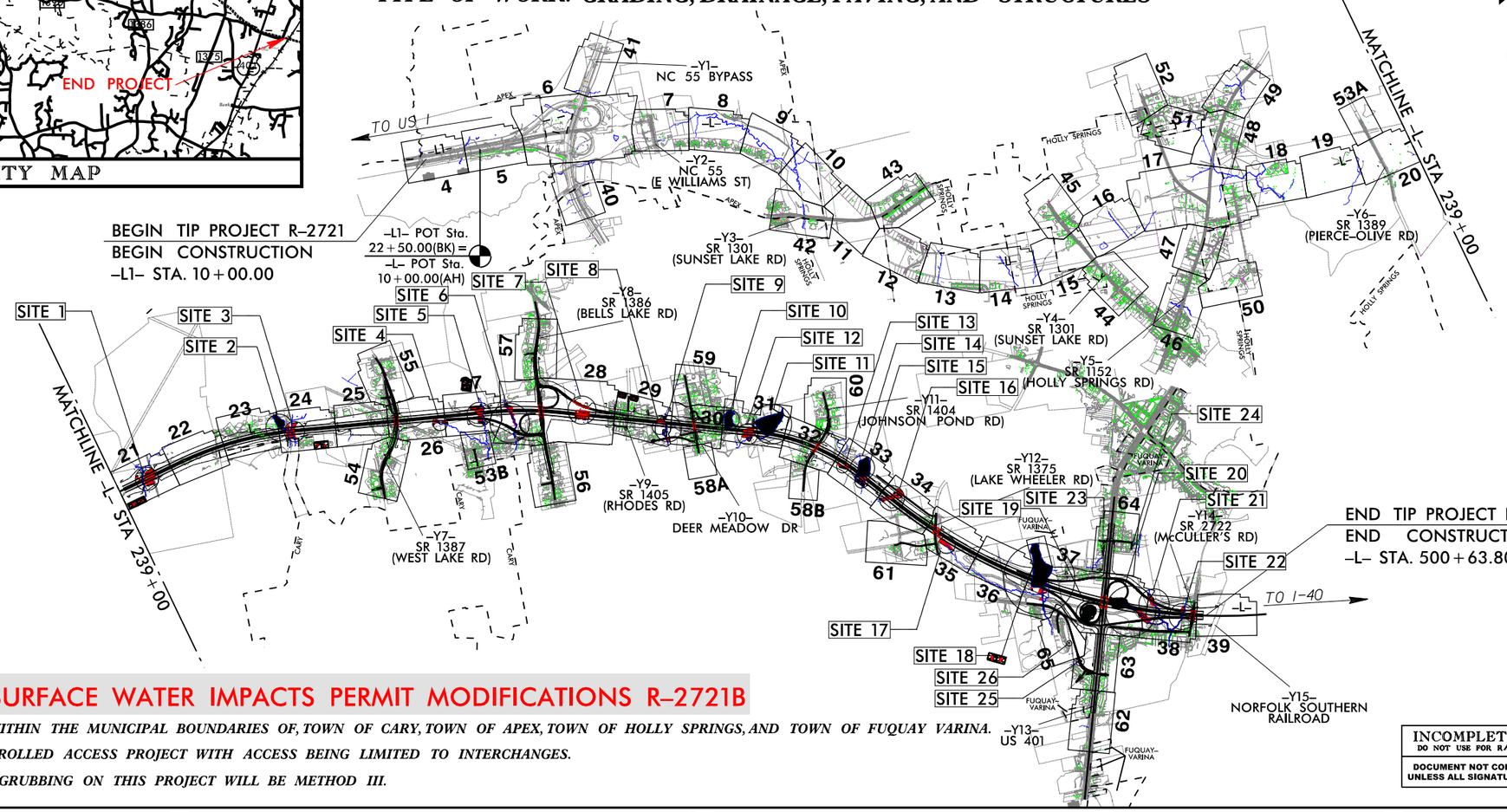
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
6.401078	STP-540(19)	PE

WAKE COUNTY

LOCATION: COMPLETE 540 – FROM WEST OF NC55 TO EAST OF HWY 401

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES



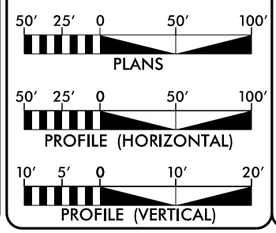


WETLAND AND SURFACE WATER IMPACTS PERMIT MODIFICATIONS R-2721B

THIS PROJECT WITHIN THE MUNICIPAL BOUNDARIES OF, TOWN OF CARY, TOWN OF APEX, TOWN OF HOLLY SPRINGS, AND TOWN OF FUQUAY VARINA.
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
CLEARING AND GRUBBING ON THIS PROJECT WILL BE METHOD III.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2018 = 28,200
ADT 2040 = 66,400
K = 12 %
D = 65 %
T = 11 % *
V = 75 MPH
* TTST = 7% DUAL 4%

FUNC CLASS = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2721	*=9.529 Miles*
LENGTH STRUCTURES	*=0.178 Miles*
TOTAL LENGTH TIP PROJECT R-2721	*=9.351 Miles*

Prepared In the Office of:

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
February 18, 2020

LETTING DATE:
February 18, 2020

Brian K. Eason, PE
PROJECT ENGINEER

Christina L. Yokeley, EI
PROJECT DESIGN ENGINEER

NCDOT CONTACT

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
USER: NWOMACK
FILE: Flatiron_Construction_Corp.\Flatiron_R-2721B_NC-540_DB\6.0_CAD_BIM\6.2_WIP\R-2721B\Hydraulics\PERMITS_Environmental\Drawings\R2721_PSH_01TSH_wet.dgn
PENTABLE: NCDOT_TSH.tbl
DATE: 8/8/2019
TIME: 7:38:29 AM

51499

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	21
R-2721B ROADWAY SHEET NO. 4 & 5	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 2 OF 69

100' 0' 100'
GRAPHIC SCALE

MATCHLINE SHEET 20 -L- STA 239+00.00

MATCHLINE SHEET 22 -L- STA 252+00.00

N 77° 00' 00.0" E

240 245 250

SAK WAT WAR SAJ WAS SAJ

SITE 1 SITE 1

TS TS

CLASS 'II' RIP RAP
EST 160 TONS
245 SY GEOTEXTILE
SEE SHEET 2D-2
DETAIL AB

CLASS 'II' RIP RAP
EST 195 TONS
215 SY GEOTEXTILE
SEE SHEET 2D-2
DETAIL BA

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND

14'x10' RCBC (FUTURE GREENWAY)

18" CSP W/ELBOWS

30" CSP W/ELBOWS

15" RCP-III

18" RCP-III

30" RCP-III

24" RCP-III

FS

ENERGY DISSIPATOR #1

TDE

+26.26 -L-
142.25' RT
END WW FENCE

FILL SLOPE CHANGE

INLET DETAIL BA
NTS
3 @ 8'x10' RCBC
EXCAVATION EST 32 TONS
NG
2H
1V
CLASS II RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 2'
FILL W/ CLASS II RIP RAP

OUTLET DETAIL AA
NTS
3 @ 8'x10' RCBC
EXCAVATION EST 26 TONS
NG
2H
1V
CLASS II RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 2'
FILL W/ CLASS II RIP RAP
CLASS I RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 1.5'
CLASS II RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 2'

8820\10\R-2721_PSH_21_02wet.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2721	21
R-2721B ROADWAY SHEET NO. 4 & 5	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

51499

100' 0' 100'
GRAPHIC SCALE

PERMIT DRAWING
SHEET 2A OF 69

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND

MATCHLINE SHEET 20
-L- STA 239+00.00

MATCHLINE SHEET 22
-L- STA 252+00.00

N 77° 00' 00.0" E

SAK
WAT
WAR
SAJ
WAS
SAJ

SITE 1
SITE 1

TS
TS

CLASS II RIP RAP
EST 160 TONS
245 SY GEOTEXTILE
SEE SHEET 2D-2
DETAIL AB

CLASS II RIP RAP
EST 195 TONS
215 SY GEOTEXTILE
SEE SHEET 2D-2
DETAIL BA

18" CSP W/ELBOWS
30" CSP W/ELBOWS
14'x10' RCBC (FUTURE GREENWAY)
ENERGY DISSIPATOR BASIN #1

18" RCP-III
15" RCP-III
30" RCP-III
24" RCP-III
36" RCP-III

26.26 FT
172.50 FT
END WW FENCE

TDE

FILL SLOPE CHANGE

INLET DETAIL BA
NTS
3 @ 8'x10' RCBC
EXCAVATION EST 32 TONS
NG
CLASS II RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 2'
FILL W/ CLASS II RIP RAP

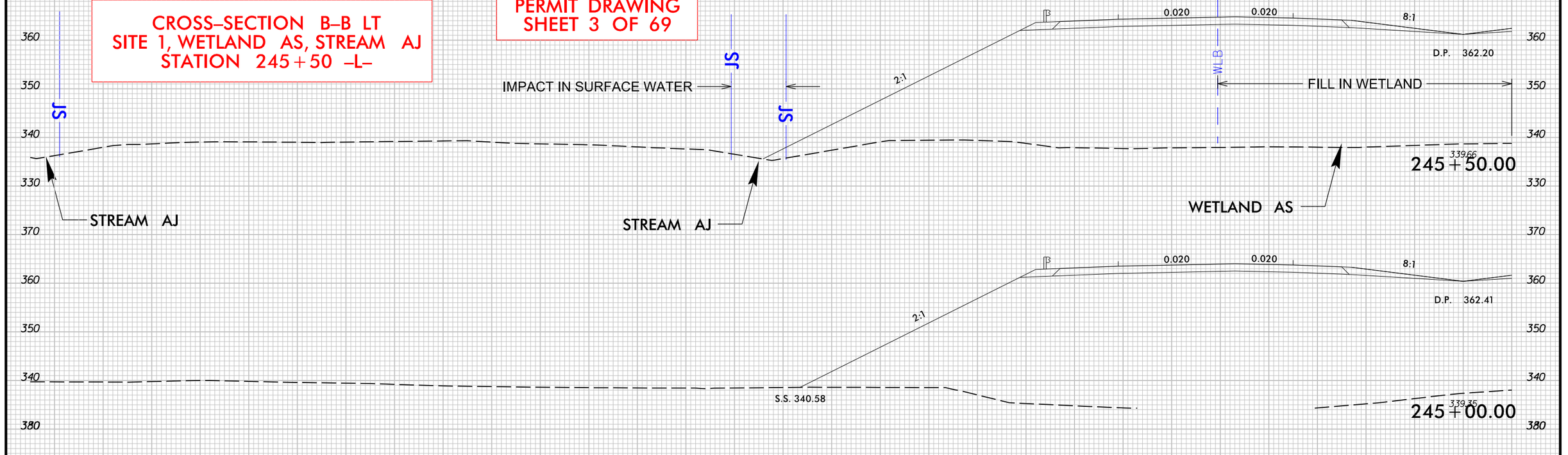
OUTLET DETAIL AA
NTS
3 @ 8'x10' RCBC
EXCAVATION EST 26 TONS
NG
CLASS II RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 2'
FILL W/ CLASS II RIP RAP
CLASS I RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 1.5'
CLASS II RIP RAP W/GEOTEXTILE (TYP) THICKNESS = 2'

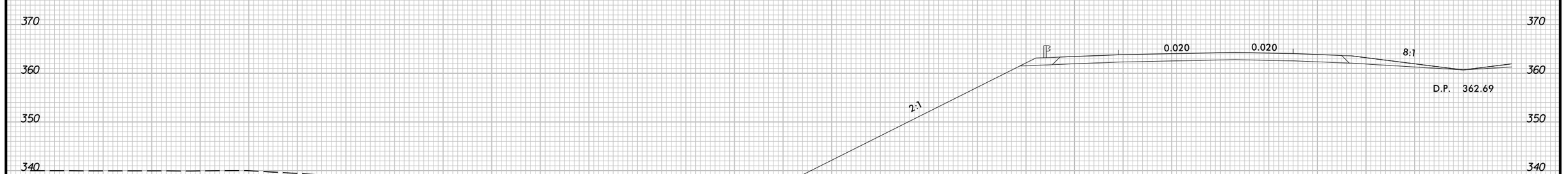
882019
R2721_PSH_21_02Awet.dgn
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
R-2721	X-156

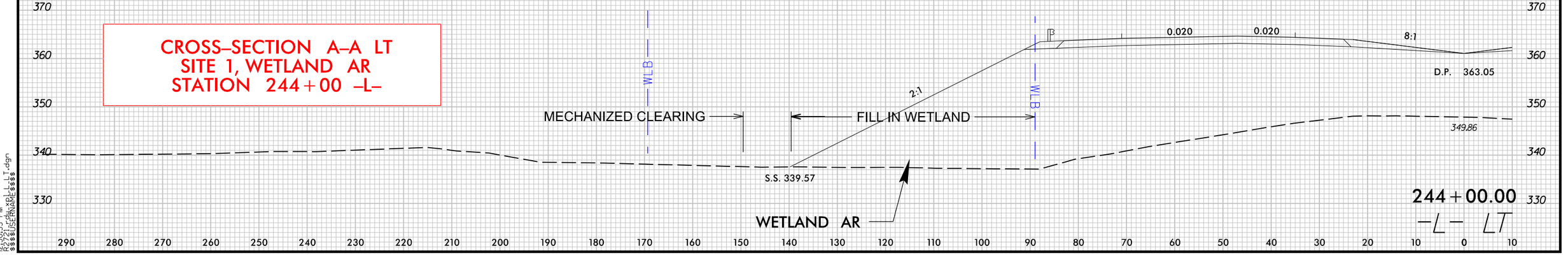
PERMIT DRAWING
SHEET 3 OF 69

CROSS–SECTION B–B LT
SITE 1, WETLAND AS, STREAM AJ
STATION 245 + 50 –L–





CROSS–SECTION A–A LT
SITE 1, WETLAND AR
STATION 244 + 00 –L–



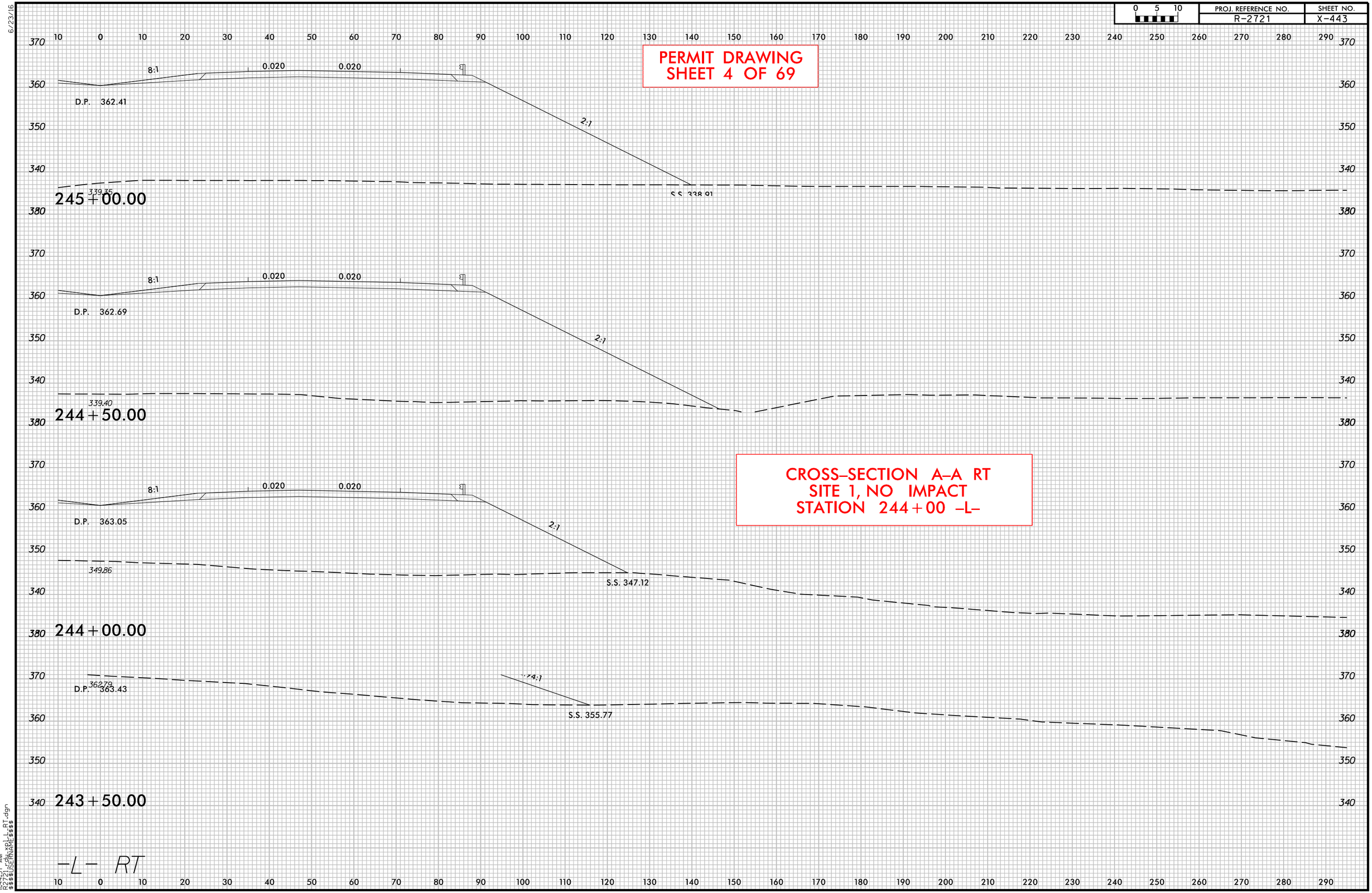
6/23/16
12:30:53 PM
R2721_X-Sections_X-Sections_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-443

PERMIT DRAWING
SHEET 4 OF 69

CROSS–SECTION A–A RT
SITE 1, NO IMPACT
STATION 244+00 –L–



IR4437 AM
R2721SERNAME$$$$$
$$$$$USERNAME$$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-444

PERMIT DRAWING
SHEET 5 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

370 360 350 340 330

8:1 0.020 0.020 ℄ 2:1

D.P. 362.09

247+00.00

8:1 0.020 0.020 ℄ 2:1

D.P. 362.04

340.00

246+50.00

8:1 0.020 0.020 ℄ 2:1

D.P. 362.08

339.86

246+00.00

8:1 0.020 0.020 ℄ 2:1

D.P. 362.20

FILL IN WETLAND

MECHANIZED CLEARING

339.66

245+50.00

-L- RT

WETLAND AS

CROSS-SECTION B-B RT
SITE 1, WETLAND AS
STATION 245+50 -L-

W45202_AM
R2721_XPLL_RT.dgn
$$$$USERNAME$$$$

51499

PERMIT DRAWING
SHEET 6 OF 69

PROJECT REFERENCE NO.	SHEET NO.
R-2721	23
R-2721B ROADWAY SHEET NO. 7	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

100' 0' 100'
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER (POND)

SAL

SITE 2

PD

MATCHLINE SHEET 22
-L- STA 265+00.00

MATCHLINE SHEET 24
-L- STA 278+00.00

270

275

24" RCP-III

FES

40TCB

15" RCP-III

24" CSP

24" RCP-III

18" RCP-III

ENERGY DISSIPATOR BASIN #2

EXISTING R/W

8820119
R-2721_PSH_23_06wet.dgn
$$$$USERNAME$$$$

51499

PERMIT DRAWING
SHEET 6A OF 69

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	23
R-2721B ROADWAY SHEET NO. 7	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

100' 0' 100'
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER (POND)

SAL

SITE 2

PD

MATCHLINE SHEET 22
-L- STA 265+00.00

MATCHLINE SHEET 24
-L- STA 278+00.00

24" RCP-III
4OTCB
15" RCP-III
24" RCP-III
18" RCP-III
ENERGY DISSIPATOR BASIN #2
FS

8820(12)
R2721_PSH_23_06Awet.dgn
$$$$USERNAME$$$$

51499

PROJECT REFERENCE NO.	SHEET NO.
R–2721	24
R–2721B ROADWAY SHEET NO. 7 & 8	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

FLATIRON — BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 7 OF 69

SITE 2

POND SHALL BE DRAINED IN ACCORDANCE WITH THE "POND DRAINAGE PLAN REQUIREMENT" SPECIAL PROVISION. POND MUCK SHALL BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER AND DISPOSED OF IN ACCORDANCE WITH THE "WASTE AND BORROW SOURCES" SPECIAL PROVISION. REMOVED MUCK SHALL BE REPLACED WITH A SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

WAW (2)

SAM

SAO

SAL

WAW (1)

SAN

-L- CS Sta. 280+64.00

-L- STS Sta. 282+64.00

SITE 3

SITE 2

FILL SLOPE CHANGE

FILL SLOPE CHANGE

CLASS 'II' RIP RAP
EST 115 TONS
180 SY GEOTEXTILE
SEE SHEET 2D-2
DETAIL AA

CLASS 'II' RIP RAP
EST 100 TONS
175 SY GEOTEXTILE
SEE SHEET 2D-2
DETAIL BA

GRAPHIC SCALE
100' 0' 100'

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCHLINE SHEET 23
-L- STA 278+00.00

MATCHLINE SHEET 25
-L- STA 291+00.00

S 82° 50' 00.4" E

15" RCP-III
18" RCP-III
24" RCP-III
24" CSP W/ELBOWS
15" CSP W/ELBOWS
FS
TDE
TDS
CHORD
S
TS
RW
CA
C
F
BZ
280
285
290
95
96
101
102
103

INLET DETAIL AA
NTS

2@7'x8' RCBC
EXCAVATION EST 47 CY
NG
CLASS II RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 2'

OUTLET DETAIL BA
NTS

2@7'x8' RCBC
EXCAVATION EST 74 CY
NG
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 2'
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 1.5'

8/8/2019
R2721_PSH_24_07-wet.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	24
R-2721B ROADWAY SHEET NO. 7 & 8	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 7A OF 69

GRAPHIC SCALE 100' 0' 100'

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 2
SITE 3
WAW (2)
SAO
SAM
SAL
WAW (1)
SAN
-L- CS Sta. 280+64.00
-L- STS Sta. 282+64.00
FILL SLOPE CHANGE
FILL SLOPE CHANGE
CLASS "II" RIP RAP EST 115 TONS 180 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA
CLASS "I" RIP RAP EST 100 TONS 175 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA
TDE
TDS
CHORD
15" CSP W/ELBOWS
15" RCP-III
18" RCP-III
24" CSP W/ELBOWS
24" RCP-III
S 82° 50' 00.4" E
MATCHLINE SHEET 23 -L- STA 278+00.00
MATCHLINE SHEET 25 -L- STA 291+00.00

INLET DETAIL AA
NTS
2@7'x8' RCBC
EXCAVATION EST 47 CY
NG
CLASS II RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 2'

OUTLET DETAIL BA
NTS
2@7'x8' RCBC
EXCAVATION EST 74 CY
NG
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 2'
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 1.5'

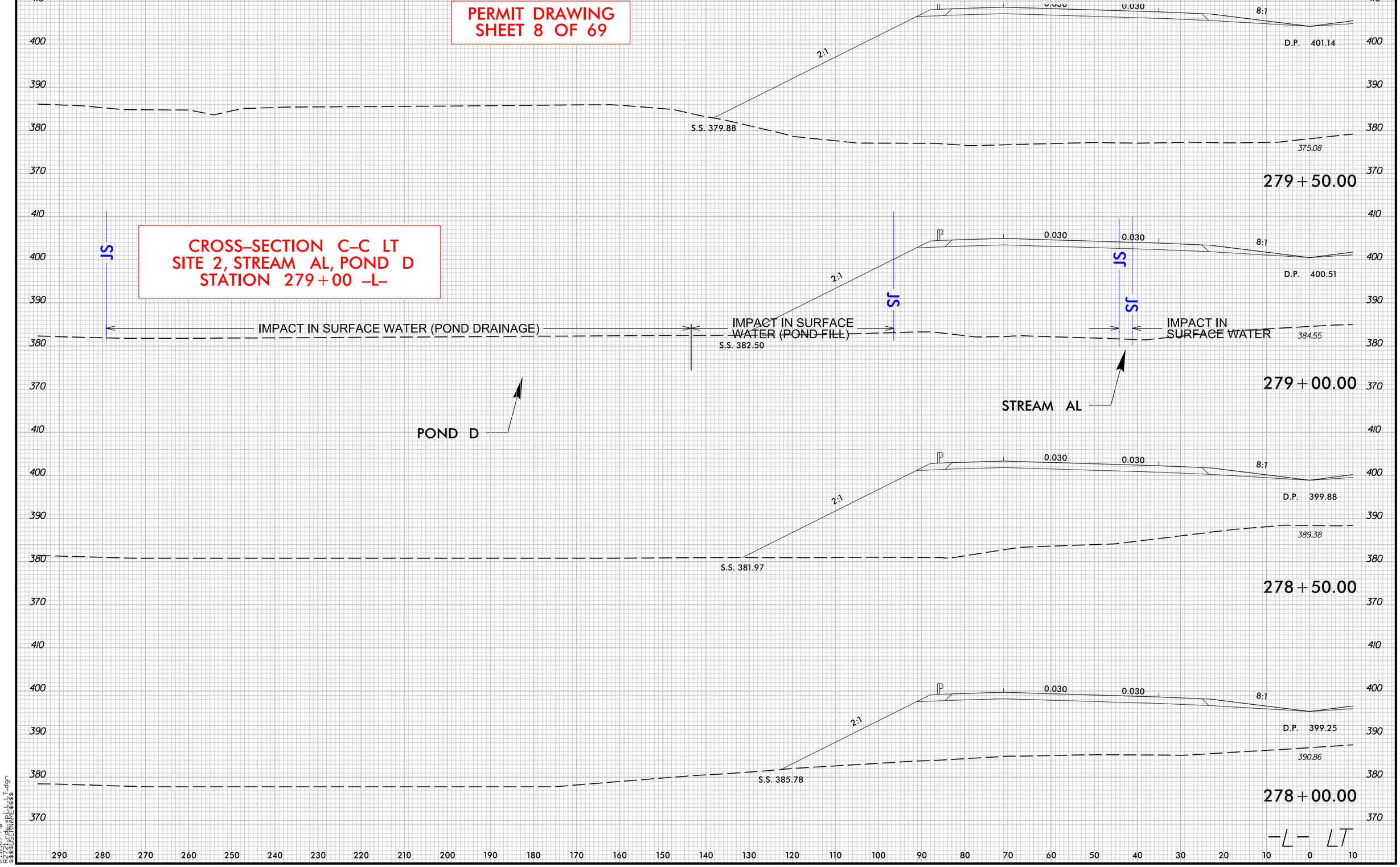
8820102
R2721_PSH_24_07Awet.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-177

PERMIT DRAWING
SHEET 8 OF 69

CROSS-SECTION C-C LT
SITE 2, STREAM AL, POND D
STATION 279+00 -L-



12:32:07 PM
R2721_PLAN_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-465

PERMIT DRAWING
SHEET 9 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

410
400
390
380
370
360

7.731:1 0.030 0.030 2:1

D.P. 401.77

369.05

S.S. 367.35

280+00.00

410
400
390
380
370

7.731:1 0.030 0.030 2:1

D.P. 401.14

375.08

S.S. 376.19

279+50.00

410
400
390
380
370

7.731:1 0.030 0.030 2:1

D.P. 400.51

384.55

S.S. 385.47

279+00.00
–L– RT

CROSS–SECTION C–C RT
SITE 2, NO IMPACT
STATION 279+00 –L–

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

11:51:48 AM
R2721_X01_L_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-178

CROSS–SECTION D–D LT
SITES 2 & 3, WETLAND AW, STREAM AM STATION 281+00 –L–

PERMIT DRAWING
SHEET 10 OF 69

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

420 410 400 390 380 370 360

IMPACT IN SURFACE WATER
8:1
D.P. 403.02
2:1
JS
IMPACT IN SURFACE WATER
JS
WLB
FILL IN WETLAND
JS
FILL IN WETLAND
S.S. 370.88
369.89
281+00.00
STREAM AM
WETLAND AW
STREAM AM

0.030
0.030
8:1
D.P. 402.39
2:1
S.S. 370.86
369.96
280+50.00

0.030
0.030
8:1
D.P. 401.77
2:1
S.S. 372.59
369.05
280+00.00

–L– LT

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

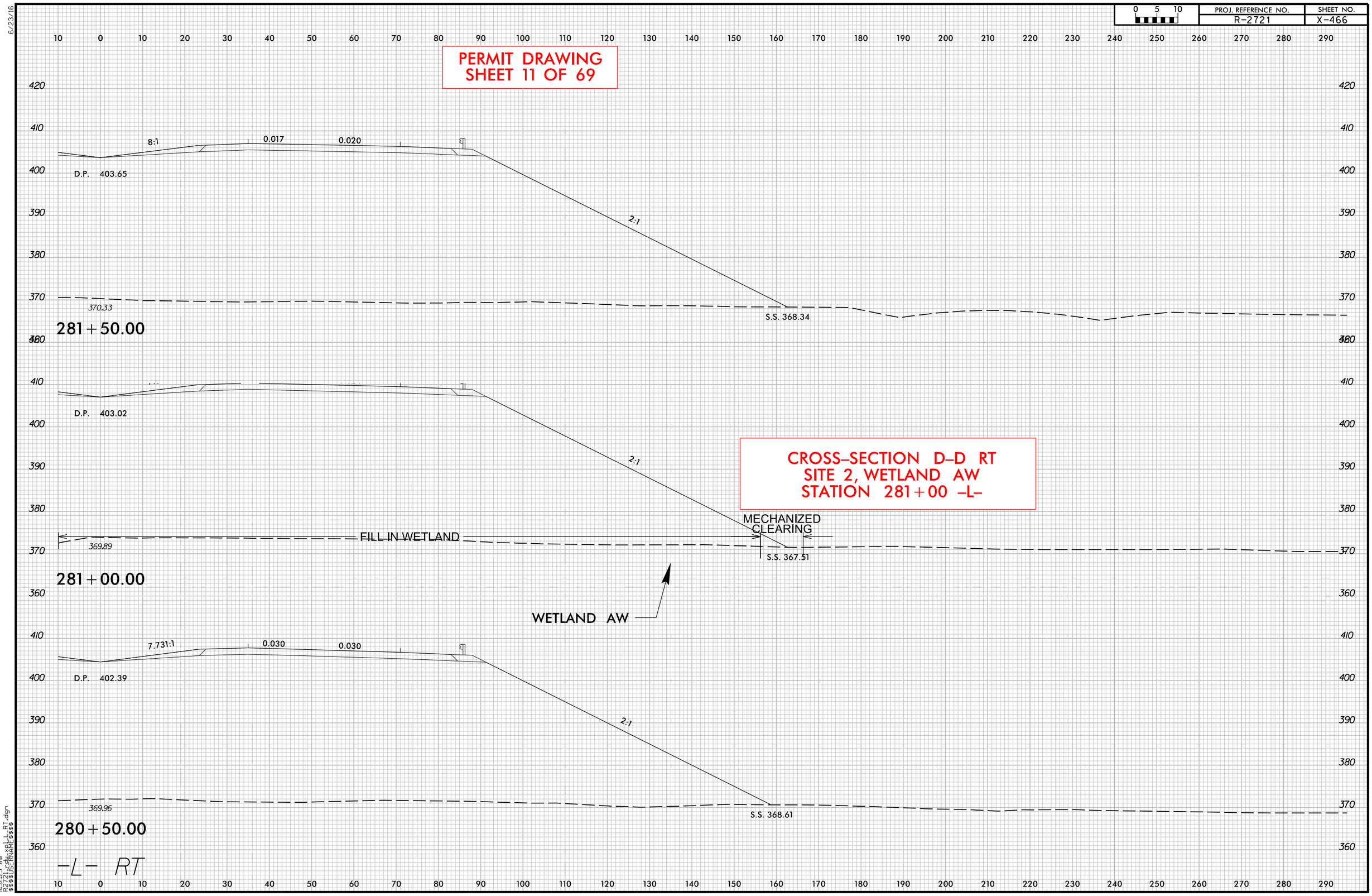
12:32:53 PM
R2721_xsec_sht_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-466

PERMIT DRAWING
SHEET 11 OF 69

CROSS–SECTION D–D RT
SITE 2, WETLAND AW
STATION 281+00 –L–



I:\52-23_AM\Roads\L_RT.dgn
$$$$USERNAME$$$$

51499

100' 0' 100'
GRAPHIC SCALE

PERMIT DRAWING SHEET 12 OF 69

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING

FLATIRON | BRANCH CMIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	26
R-2721B ROADWAY SHEET NO. 9 & 10	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MATCHLINE SHEET 55
-Y7- STA 31+50.00

MATCHLINE SHEET 25
-L- STA 303+00.00

MATCHLINE SHEET 27
-L- STA 316+00.00

MATCHLINE SHEET 54
-Y7- STA 23+50.00

-Y7- POC Sta. 27+46.89 =
-L- POT Sta. 304+98.18

S 82° 50' 00.4" E

SITE 4

WET FILE START PT.

WAX

WAY

FILL SLOPE CHANGE

HEAD DITCH W/CLASS 'I' RIP RAP EST 25 TONS 40 SY GEOTEXTILE

MEDIAN 'V' DITCH SEE SHEET 2D-1 DETAIL 09-03

15" RCP-III
15" RCP-IV
24" RCP-III
30" RCP-III
36" RCP-III
4OTCB
24" CSP W/ELBOWS
15" CSP ELBOWS
PUE
R 1640'
R 1650'
R 1500'

8/2019
R-2721_PSH_26_12wet.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2721	26
R-2721B ROADWAY SHEET NO. 9 & 10	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

FLATIRON | BRANCH CMIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

100' 0' 100'
GRAPHIC SCALE

PERMIT DRAWING SHEET 12A OF 69

S / S DENOTES IMPACTS IN SURFACE WATER
F / F DENOTES FILL IN WETLAND
TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
E / E DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING

MATCHLINE SHEET 55
-Y7- STA 31+50.00

MATCHLINE SHEET 25
-L- STA 303+00.00

MATCHLINE SHEET 54
-Y7- STA 23+50.00

MATCHLINE SHEET 27
-L- STA 316+00.00

-Y7- POC Sta. 27+46.89 =
-L- POT Sta. 304+98.18

S 82° 50' 00.4" E

SITE 4

WET FILE START PT.

WAX

WAY

FILL SLOPE CHANGE

HEAD DITCH W/CLASS I RIP RAP EST 25 TONS 40 SY GEOTEXTILE

MEDIAN 'V' DITCH SEE SHEET 9D-1 DETAIL 09-03

15" RCP-III
24" RCP-III
30" RCP-III
36" RCP-III
15" RCP-IV
24" CSP W/ELBOWS
15" CSP W/ELBOWS
4QTCB
FS
HW
PUE
TDE
TE
TS
R 1640'
R 1650'
R 1900'

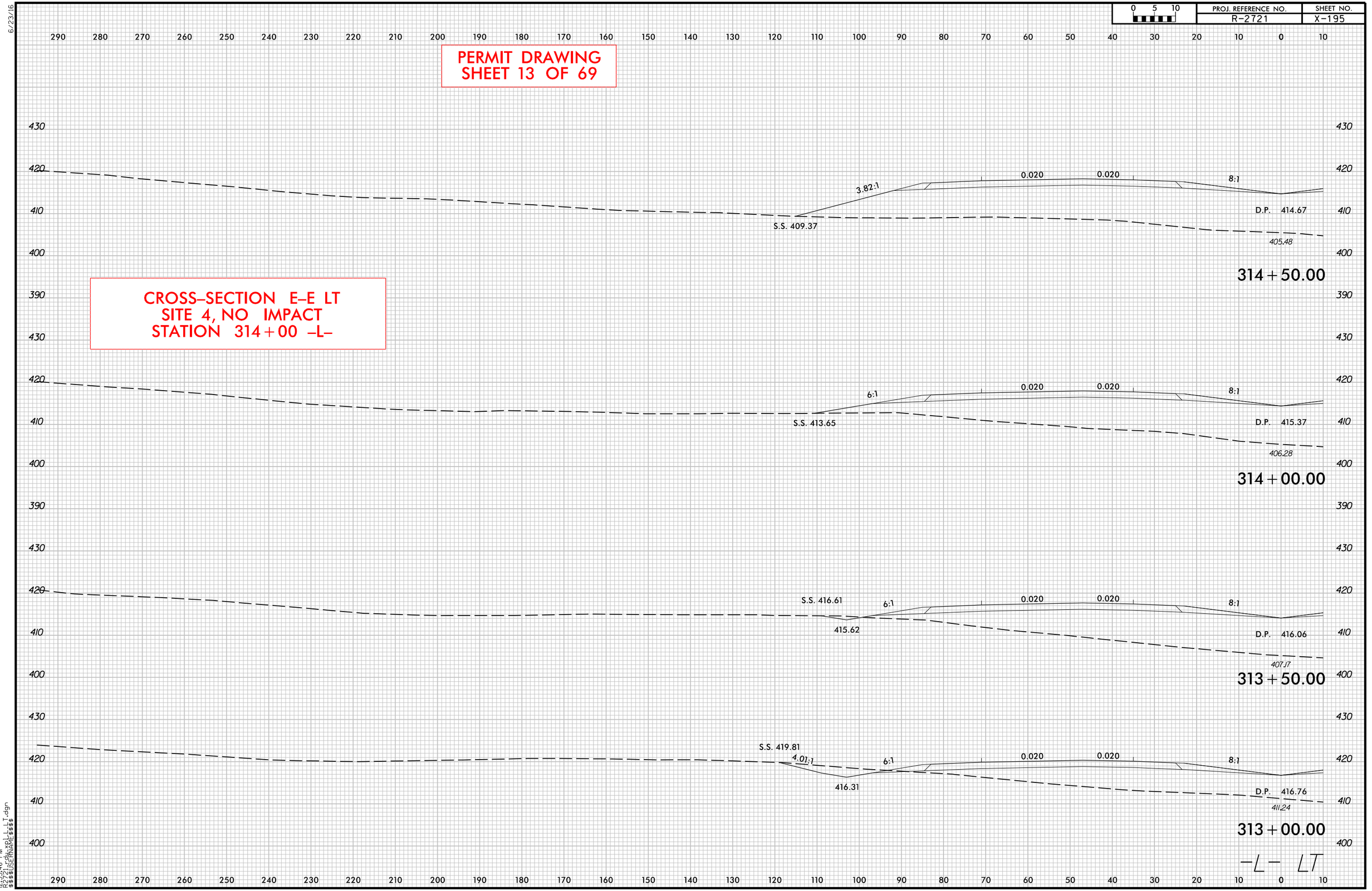
8/20/19
R-2721_PSH_26_12Awet.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-195

PERMIT DRAWING
SHEET 13 OF 69

CROSS-SECTION E-E LT
SITE 4, NO IMPACT
STATION 314+00 -L-



12:33:46 PM
R2721_Xsec_Sta_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-483

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

PERMIT DRAWING
SHEET 14 OF 69

430 420 410 400 390

8:1 0.020 0.020 0.021 2:01:1

D.P. 414.67

405.48

Y8RPC
10+61.61

S.S. 396.84

314+50.00

IMPACT IN SURFACE WATER

W.L.B

JS

SF

E.I.M

8:1 0.020 0.020 0.021 2:01:1

D.P. 415.37

406.28

Y8RPC
10+11.54

FILL IN WETLAND

S.S. 400.54

314+00.00

WETLAND AX

STREAM AR

CROSS-SECTION E-E RT
SITE 4, WETLAND AX, STREAM AR
STATION 314+00 -L-

8:1 0.020 0.020 2:1

D.P. 416.06

407.17

S.S. 402.33

313+50.00

8:1 0.020 0.020 2.25:1

D.P. 416.76

411.24

S.S. 406.00

313+00.00

-L- RT

IR5302.AM
R2721_XS_L_RT.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2721	27
R-2721B ROADWAY SHEET NO. 10 & 11	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

51499

100' 0' 100'
GRAPHIC SCALE

PERMIT DRAWING SHEET 15 OF 69

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WBD
WBI
WBC
SAQ
SAR
WAZ
WBA
WBB

320
325
107
109

CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 18 TONS 25 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 66 TONS 37 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA
CLASS 'II' RIP RAP EST 35 TONS 25 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 36 TONS 41 SY GEOTEXTILE

-L- TS Sta. 325+66.89
-L- SC Sta. 327+66.89
CHORD
TS
S
SITE 4
SITE 5
FILL SLOPE CHANGE
FILL SLOPE CHANGE

S 82° 50' 00.4" E
S 80° 32' 00.4" E
-Y8RPC- TS Sta. 14+78.48
-Y8RPC- SC Sta. 17+02.48
-Y8RPC- POT Sta. 10+00.00 =
-L- POT Sta. 316+31.69, 71.0' RT

FS
24" RCP-III
15" RCP-III
15" RCP-IV
24" CSP
24" CSP W/ELBOWS
6'x3' RCBC
ENERGY DISSIPATOR BASIN #3

MATCHLINE SHEET 26
-L- STA 316+00.00
MATCHLINE SHEET 28
-L- STA 329+00.00
MATCHLINE SHEET 28
-Y8RPC- STA 25+00.00

R 1400'

8820192721_PSH_27_15wet.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2721	27
R-2721B ROADWAY SHEET NO. 10 & 11	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

51499

100' 0' 100'
GRAPHIC SCALE

PERMIT DRAWING SHEET 15A OF 69

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WBD
WBI
WBC
SAQ
SAR
WAZ
WBA
WBB
SAQ
FILL SLOPE CHANGE
FILL SLOPE CHANGE

SITE 4
SITE 5
SITE 5

MATCHLINE SHEET 26
-L- STA 316+00.00

MATCHLINE SHEET 28
-L- STA 329+00.00

MATCHLINE SHEET 28
-Y8RPC- STA 25+00.00

-L- TS Sta. 325+66.89
-L- SC Sta. 327+66.89
-Y8RPC- TS Sta. 14+78.48
-Y8RPC- SC Sta. 17+02.48
-Y8RPC- POT Sta. 10+00.00 =
-L- POT Sta. 316+31.69, 71.0' RT

S 82° 50' 00.4" E
S 80° 32' 00.4" E

CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 18 TONS 25 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 66 TONS 37 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA
CLASS 'II' RIP RAP EST 35 TONS 25 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 36 TONS 41 SY GEOTEXTILE

24" RCP-III
15" RCP-III
15" RCP-IV
24" CSP
24" CSP W/ELBOWS
ENERGY DISSIPATOR BASIN #3
FS
CHORD
R 1400'

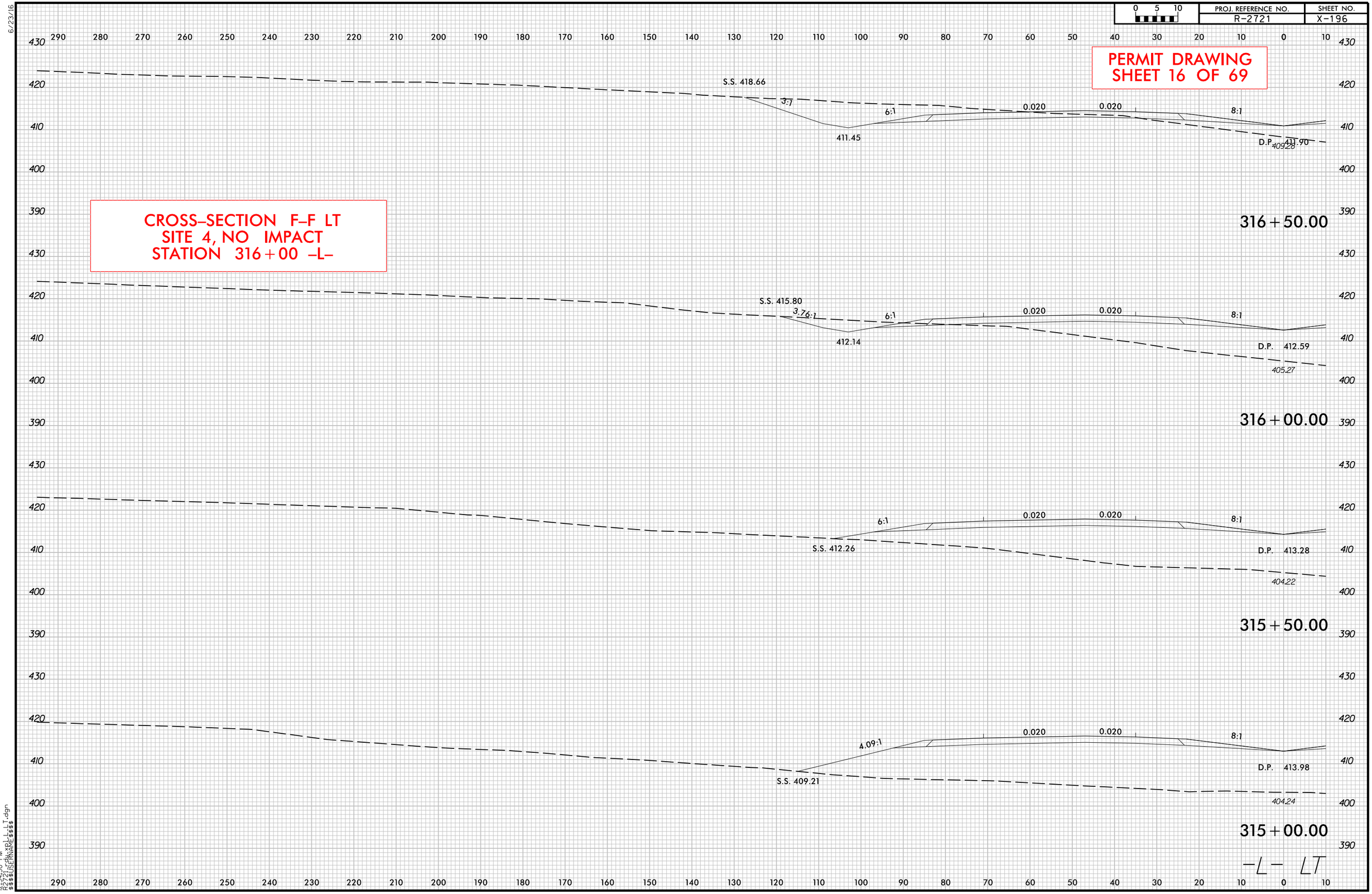
8/2/2019
R-2721_PSH_27_15Awet.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-196

PERMIT DRAWING
SHEET 16 OF 69

CROSS-SECTION F-F LT
SITE 4, NO IMPACT
STATION 316+00 -L-



12:34:30 PM
R2721_dgnXPLLLT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-484

PERMIT DRAWING
SHEET 17 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

430 420 410 400 390

8:1 0.020 0.020 0.021 0.021 2.01:1

D.P. 411.90
409.28

Y8RPC
12+61.88

S.S. 394.89

316+50.00

8:1 0.020 0.020 0.021 0.021 2.01:1

D.P. 412.59
405.27

Y8RPC
12+11.81

WLB

FILL IN WETLAND

MECHANIZED CLEARING

JS WLB JS

S.S. 394.28

316+00.00

WETLAND AY

STREAM AR
NO IMPACT

CROSS–SECTION F–F RT
SITE 4, WETLAND AY, STREAM AR
STATION 316+00 –L–

8:1 0.020 0.020 0.021 0.021 2.01:1

D.P. 413.28
404.22

Y8RPC
11+61.74

S.S. 395.02

315+50.00

8:1 0.020 0.020 0.021 0.021 2.01:1

D.P. 413.98
404.24

Y8RPC
11+11.67

S.S. 398.27

315+00.00

–L– RT

11:54:10 AM
R2721_A_xsl_L_RT.dgn
$$$$USERNAME$$$$

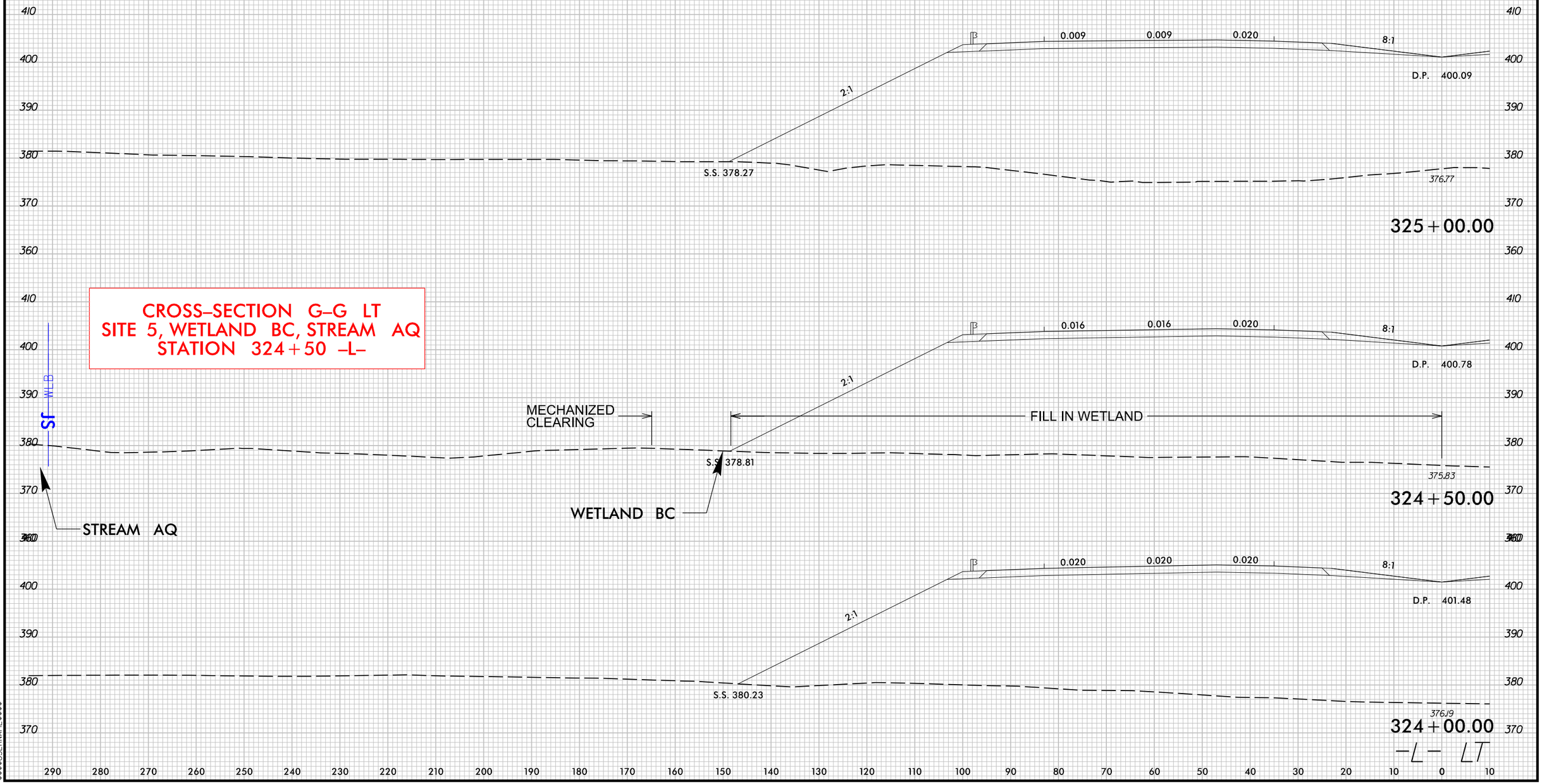
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-201

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

PERMIT DRAWING
SHEET 18 OF 69

410 400 390 380 370 360



CROSS-SECTION G-G LT
SITE 5, WETLAND BC, STREAM AQ
STATION 324+50 -L-

12:35:09 PM
K:\2520\...\XSL_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-489

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

PERMIT DRAWING
SHEET 19 OF 69

410 / 400 / 390 / 380 / 370 / 360

8:1 | 0.009 | 0.020 | 4:1 | 4.09:1 | 0.081 | 0.081 | 2.09:1

D.P. 400.09

376.77

Y8RPC
21+15.20

S.S. 372.80

325+00.00

8:1 | 0.016 | 0.020 | 4:1 | 4.06:1 | 0.081 | 0.081 | 2.07:1

D.P. 400.78

Y8RPC
20+64.22

WLB

WLB

FILL IN WETLAND

FILL IN WETLAND

MECHANIZED CLEARING

375.83

S.S. 373.07

324+50.00

WETLAND BC

WETLAND BC

8:1 | 0.020 | 0.020 | 4:1 | 4.04:1 | 0.081 | 0.081 | 2.04:1

D.P. 401.48

Y8RPC
20+13.56

376.19

324+00.00

-L- RT

CROSS-SECTION G-G RT
SITE 5, WETLAND BC
STATION 324+50 -L-

I:\55\08 AM
R2721\$\$\$\$USERNAME\$\$\$\$ PLOTDATE\$\$\$\$ X2-1_RT.dgn

PERMIT DRAWING
SHEET 20 OF 69

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	28
R-2721B ROADWAY SHEET NO. 11	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

200' 0' 200'
GRAPHIC SCALE

BRIDGE SHIFT

SITE 6

SITE 7

DITCH CHANGE

TEMPORARY CAUSEWAYS

SAS

WBF

WBE

TS

S

EASEMENT NEEDED FOR DETOUR

MATCHLINE SHEET 56
-Y8- STA 38+00.00

MATCHLINE SHEET 27
-L- STA 329+00.00

MATCHLINE SHEET 27
-Y8RPC- STA 25+00.00

MATCHLINE SHEET 55
-Y8- STA 23+00.00

MATCHLINE SHEET 29
-L- STA 355+00.00

-Y8RPA- PT Sta 30+79.59
-Y8RPA- SC Sta 28+59.45
-Y8RPA- SRS Sta 26+59.45
-Y8RPA- CS Sta 24+59.45
-Y8RPA- TS Sta 15+14.22
-Y8RPA- SC Sta 13+14.22
-Y8RPA- STA 15+00.00
-Y8RPA- POT Sta 32+43.96 = -Y8- POC Sta 36+58.77
-Y8LPA- POT Sta 21+84.48 = -Y8- POC Sta 35+70.16
-Y8LPA- ST Sta 20+81.02
-Y8LPA- CS Sta 18+41.02
-Y8LPA- SRS Sta 11+00.00
-Y8LPA- SC Sta 13+41.00
-Y8- STA 30+60.45 = -L- STA 338+11.24
-Y8LPA- ST Sta 10+00.00 = -L- POC Sta 337+43.35 TIE LT
-Y8LPC- ST Sta 10+00.00 = -L- POC Sta 336+87.43 TIE RT
-Y8LPC- SC Sta 12+40.00
-Y8LPC- ST Sta 19+95.38
-Y8LPC- CS Sta 17+55.38
-Y8LPC- POT Sta 21+50.14 = -Y8- POC Sta 25+50.70
-Y8RPC- POT Sta 33+45.81 = -Y8- POC Sta 29+23.20
-Y8RPC- SRS Sta 25+85.60
-Y8RPC- SC Sta 27+85.60
-Y8RPC- PT Sta 30+88.24
-L- CS Sta 340+83.16
-L- ST Sta 342+83.16
-L- CS Sta 23+74.68
-Y8- PT Sta 25+67.41
S 84° 27' 03.17" E
S 84° 27' 03.10" E
S 72° 40' 00.27" E
N 79° 08' 13.5" W
N 79° 08' 13.5" W
R = 2410'
R = 7990'
R = 750'

WBF

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 20A OF 69

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	28
R-2721B ROADWAY SHEET NO. 11	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

200' 0' 200'
GRAPHIC SCALE

MATCHLINE SHEET 56
-Y8- STA 38+00.00

MATCHLINE SHEET 27
-L- STA 329+00.00

MATCHLINE SHEET 27
Y8RPC- STA 22+00.00

MATCHLINE SHEET 29
-L- STA 355+00.00

MATCHLINE SHEET 55
-Y8- STA 23+00.00

SITE 6

SITE 7

BRIDGE SHIFT

DITCH CHANGE

TEMPORARY CAUSEWAYS

WBF

SAS

TS

S

EASEMENT NEEDED FOR DETOUR

F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
E E	DENOTES EXCAVATION IN WETLAND
TF TF	DENOTES TEMPORARY FILL IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-204

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

PERMIT DRAWING
SHEET 21 OF 69

410 400 390 380 370

S.S. 398.45
3.13:1
394.25
6:1
0.030
0.030
0.030
8:1
394.10
D.P. 392.90

332+50.00

410 400 390 380 370

6:1
S.S. 393.82
0.030
0.030
0.030
8:1
D.P. 392.85
389.85

332+00.00

410 400 390 380 370

3.72:1
S.S. 389.20
0.030
0.030
0.030
8:1
D.P. 392.90
384.44

331+50.00

CROSS–SECTION H–H LT
SITE 6, WETLAND BE
STATION 331+00 –L–

410 400 390 380 370

W.L.B.
W.L.B.
3.19:1
S.S. 388.00
FILL IN WETLAND
FILL IN WETLAND
0.030
0.030
0.030
8:1
D.P. 393.05

331+00.00

WETLAND BE
WETLAND BE

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

–L– LT

12:35:55 PM
R2721_Xsect_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-492

PERMIT DRAWING
SHEET 22 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

410 400 390 380 370

7.731:1 0.030 0.030 5.77:1

394.10

D.P. 392.90

S.S. 389.41

332+50.00

7.731:1 0.030 0.030 4:1

D.P. 392.85

389.85

S.S. 385.07

332+00.00

7.731:1 0.030 0.030 4:1

D.P. 392.90

384.44

S.S. 381.25

331+50.00

IMPACT IN SURFACE WATER

FILL IN WETLAND

FILL IN WETLAND

JS

Sf

7.731:1 0.030 0.030 4:1

D.P. 393.05

331+00.00

WETLAND BE

WETLAND BE

STREAM AS* NO IMPACT THIS LOCATION

-L- RT

CROSS-SECTION H-H RT
SITE 6, WETLAND BE, STREAM AS*
STATION 331+00 -L-

*note Stream AS begins downstream of this location in the .WET file. XS shown per FS file.

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

11:56:47 AM
R2721_XSL_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-210

PERMIT DRAWING
SHEET 23 OF 69

CROSS–SECTION I–I LT
SITE 7, WETLAND BF
STATION 346 + 50 –L–

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

400 / 390 / 380

TEMP. CAUSEWAY

WETLAND BF

WLB

4:1 | 0.020 | 0.020 | 8:1

D.P. 391.32

346 + 50.00

4.02:1 | 0.020 | 0.020 | 8:1

S.S. 386.68

D.P. 391.58

346 + 00.00

4.70:1 | 0.020 | 0.020 | 8:1

S.S. 388.00

D.P. 391.83

345 + 50.00

5.08:1 | 0.020 | 0.020 | 8:1

S.S. 388.73

D.P. 392.09

345 + 00.00

5.11:1 | 0.018 | 0.020 | 8:1

S.S. 389.06

D.P. 392.34

344 + 50.00

5.32:1 | 0.012 | 0.020 | 8:1

S.S. 389.70

D.P. 392.59

344 + 00.00

–L– LT

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

12:36:34 PM
R2721_X-210_I-I_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-499

PERMIT DRAWING
SHEET 24 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

400
390
380
370

8:1 0.020 0.020 0.020 3:1

D.P. 390.05

383.01

349+00.00

8:1 0.020 0.020 0.020 3:1

D.P. 390.31

382.15

348+50.00

8:1 0.020 0.020 0.020 3:1

D.P. 390.56

348+00.00

8:1 0.020 0.020 0.020 3:1

D.P. 390.82

347+50.00

8:1 0.020 0.020 0.020 3:1

D.P. 391.07

347+00.00

8:1 0.020 0.020 0.020 2.85:1

D.P. 391.32

346+50.00

–L– RT

WLB

TEMPORARY CAUSEWAY

WETLAND BF

WLB

WLB

NO IMPACT

WLB

WETLAND BF

CROSS–SECTION I–I RT
SITE 7, WETLAND BF
STATION 346+50 –L–

11:56:41 AM
R-2721_xsl_L_RT.dgn
$$$$USERNAME$$$$

5/28/99

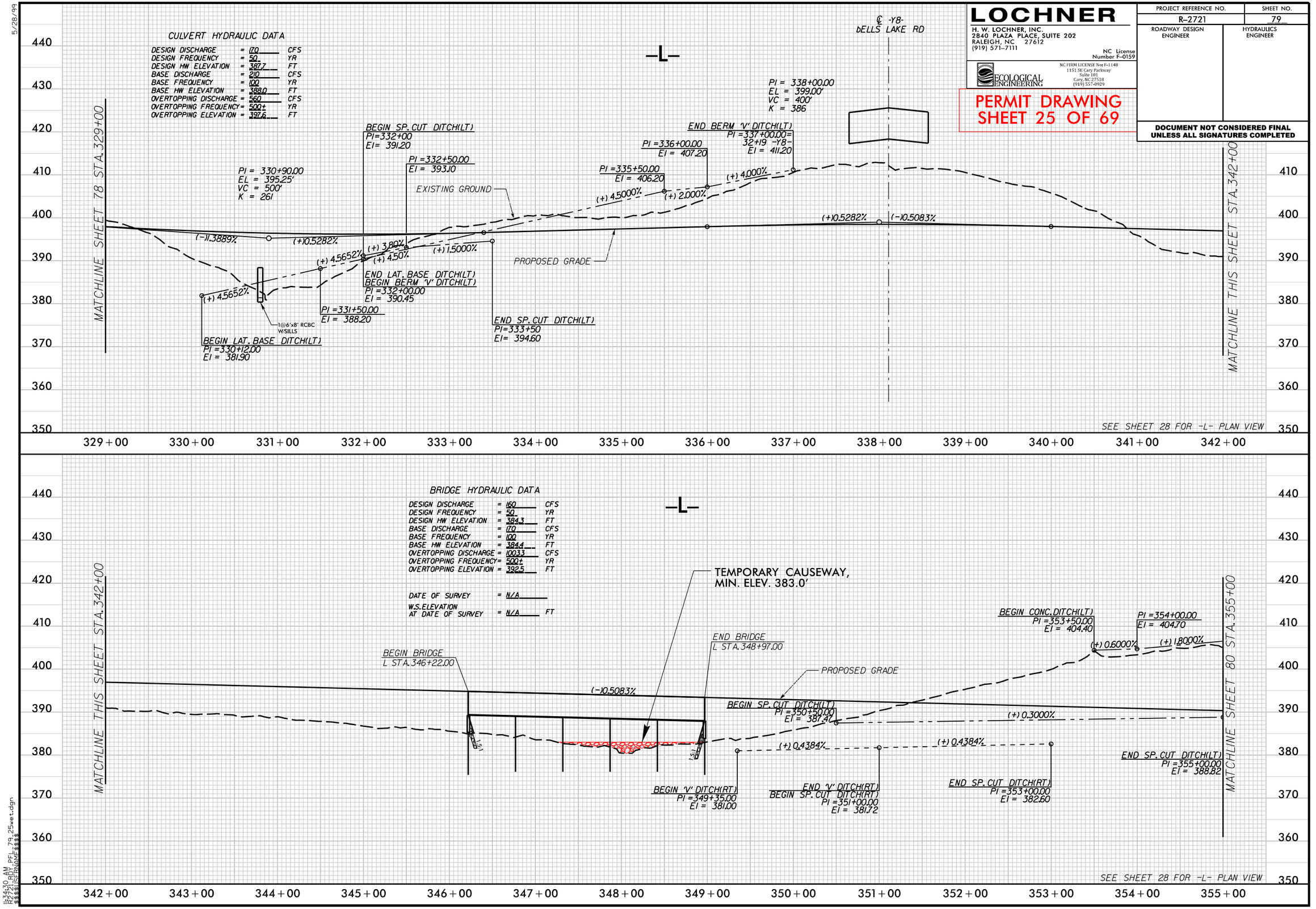
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC License Number F-0159

ECOLOGICAL ENGINEERING
NC FIRM LICENSE Nor F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2721	79
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 25 OF 69

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



IR3430 AW
R2721 PRO PFL 79_25wet.dgn
$$$$USERNAME$$$$

5/28/99

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-7111
NC License Number F-0159

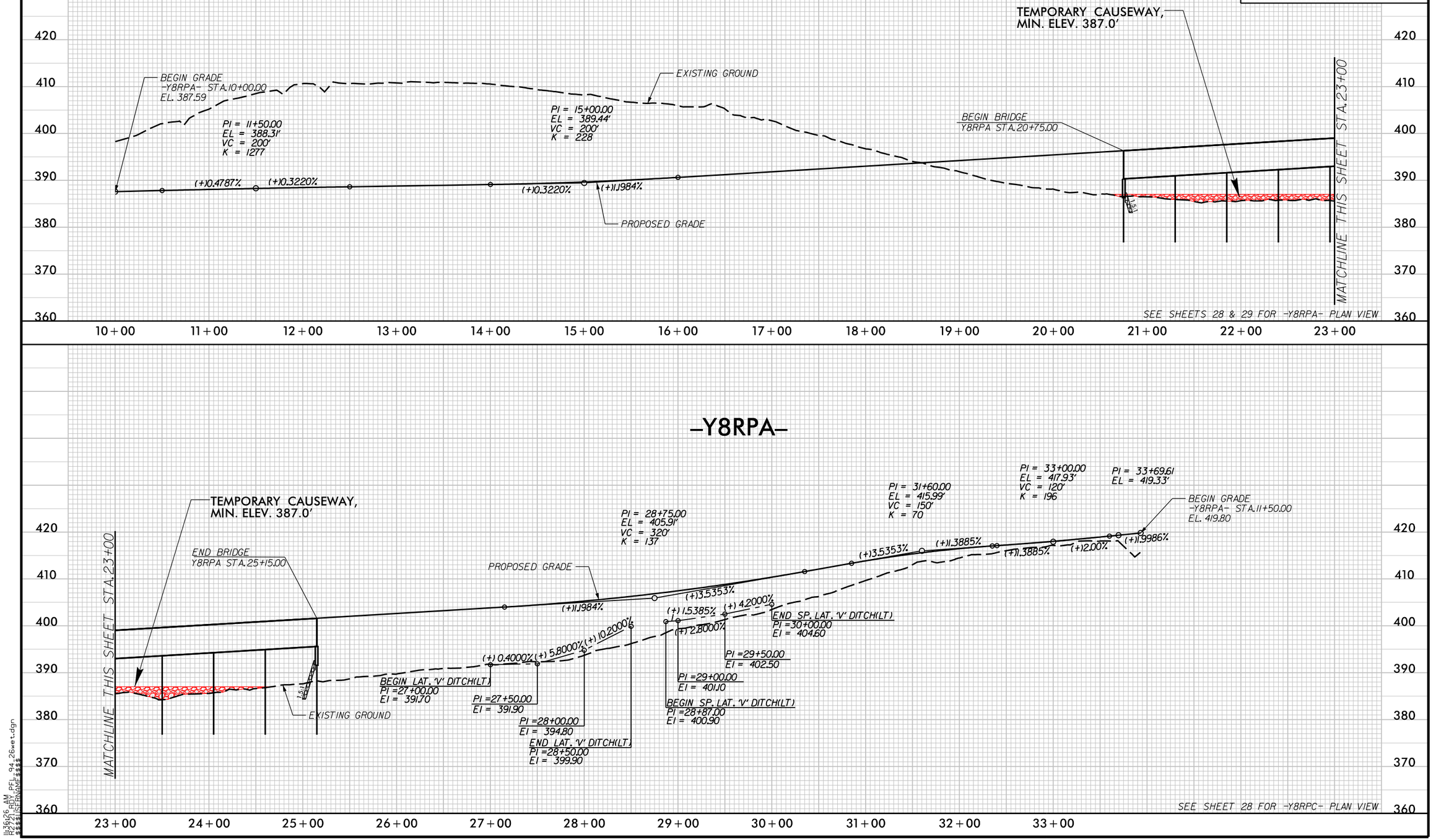
ECOLOGICAL ENGINEERING
NC FIRM LICENSE No: F-1148
1151 SE Cary Parkway
Suite 101
Cary, NC 27518
(919) 557-0929

PROJECT REFERENCE NO.	SHEET NO.
	94
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 26 OF 69

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y8RPA-



-Y8RPA-

IR3526.26 AW
R3526 PLAN PFL 94_26wet.dgn
$$$$USERNAME$$$$

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	29
R-2721B ROADWAY SHEET NO. 12 & 13	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PERMIT DRAWING SHEET 27 OF 69

INLET DETAIL AA
NTS
EXCAVATION = 25 CY
1 @ 6' x 8' RCBC
NG
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 1.5'
CLASS II RIP RAP W/GEOTEXTILE(TYP) THICKNESS = 2'

OUTLET DETAIL BA
NTS
EXCAVATION = 22 CY
1 @ 6' x 8' RCBC
NG
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 1.5'
CLASS II RIP RAP W/GEOTEXTILE(TYP) THICKNESS = 2'

100' 0' 100'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER
F F DENOTES FILL IN WETLAND
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
T T DENOTES TEMPORARY FILL IN WETLAND
E E DENOTES EXCAVATION IN WETLAND

-Y8RPA- POT Sta. 10+00.00 = -L- POT Sta. 358+30.82, 71.0' LT
S 67° 33' 00.7" W
S 71° 40' 00.7" E
S 88° 36' 00.0" E
-Y10A- POT Sta. 10+00.00
MATCHLINE SHEET 28 -L- STA 355+00.00
-Y8RPA- STA 15+00.00
MATCHLINE SHEET 30 -L- STA 368+00.00
-Y10A- STA 14+00.00

SITE 8
SITE 9
SAU
WBG
SAT
WBH
SAU

CLASS 'II' RIP RAP EST 95 TONS 120 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 25 TONS 60 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 54 TONS 115 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 105 TONS 220 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA
SPECIAL LAT' BASE DITCH SEE SHEET DETAIL 'I'

24" RCP-III
30" RCP-III
15" RCP-III
15" RCP-IV
30" CSP W/ELBOWS
24" CSP W/ELBOWS
36"
30"
FS
PDE
TDE
RW
C A L

8/2/2019
R-2721_PSH_29_27wet.dgn
$$$$USERNAME$$$$

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	29
R-2721B ROADWAY SHEET NO. 12 & 13	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PERMIT DRAWING SHEET 27A OF 69

INLET DETAIL AA
NTS
EXCAVATION = 25 CY
1 @ 6' x 8' RCBC
NG
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 1.5'
CLASS II RIP RAP W/GEOTEXTILE(TYP) THICKNESS = 2'

OUTLET DETAIL BA
NTS
EXCAVATION = 22 CY
1 @ 6' x 8' RCBC
NG
CLASS I RIP RAP W/ GEOTEXTILE (TYP) THICKNESS = 1.5'
CLASS II RIP RAP W/GEOTEXTILE(TYP) THICKNESS = 2'

100' 0' 100'
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES TEMPORARY FILL IN WETLAND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND

-Y8RPA- POT Sta. 10+00.00 = -L- POT Sta. 358+30.82, 71.0' LT
S 67° 33' 00.7" W
-Y8RPA- STA 15+00.00
MATCHLINE SHEET 28 -L- STA 355+00.00
S 71° 40' 00.7" E
MATCHLINE SHEET 30 -L- STA 368+00.00
-Y10A- POT Sta. 10+00.00
S 88° 36' 00.0" E
MATCHLINE SHEET 30 -Y10A- STA 14+00.00

SITE 8
SITE 9
SAU
WBG
SAT
WBH
SAU

CLASS 'II' RIP RAP EST 95 TONS 120 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 25 TONS 60 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 54 TONS 115 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 105 TONS 220 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA
SPECIAL LAT' BASE DITCH SEE SHEET DETAIL 1'

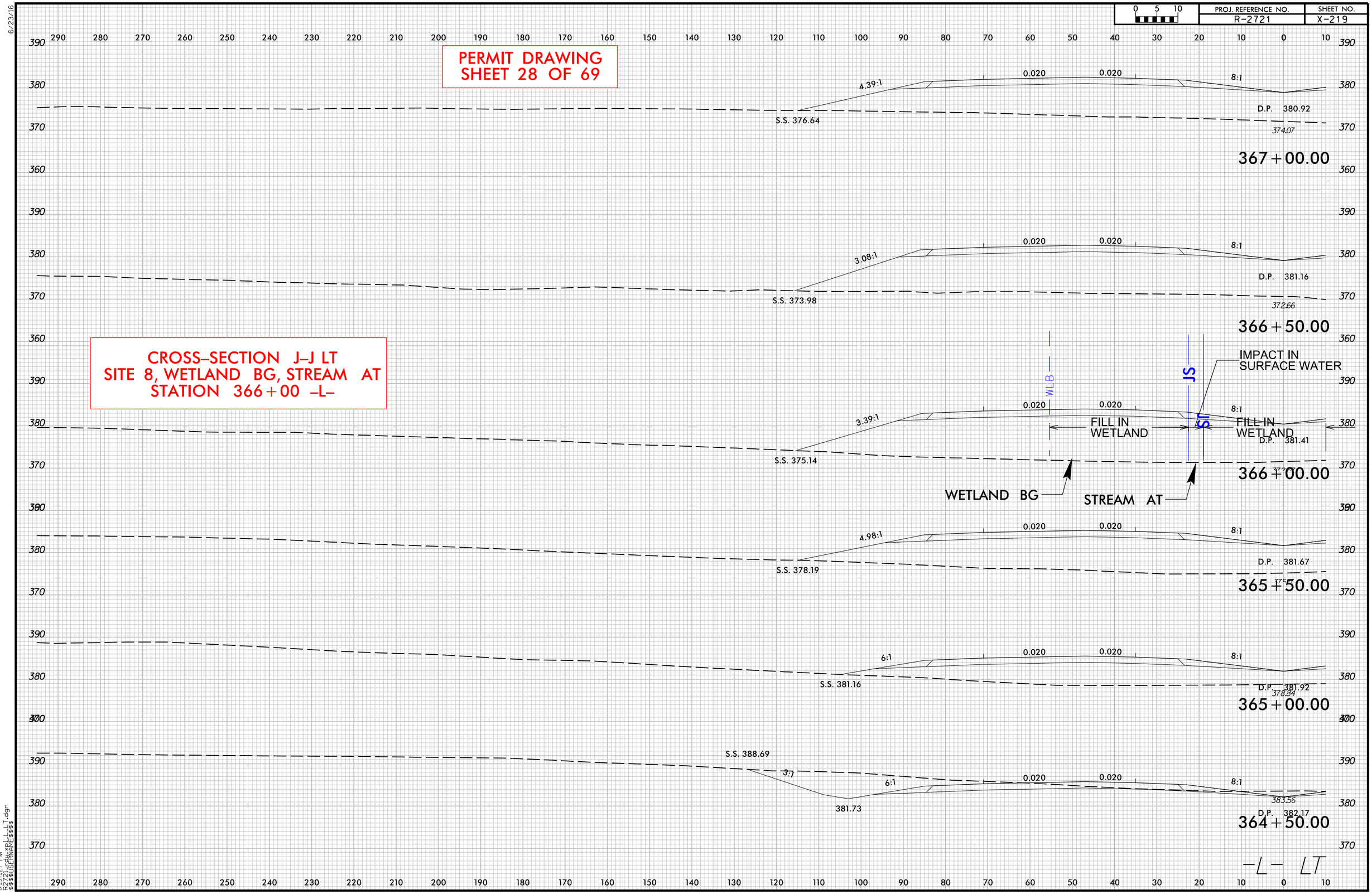
15" RCP-III
18" CSP W/ELBOWS
24" RCP-III
30" RCP-III
24" CSP W/ELBOWS
30" CSP W/ELBOWS
15" RCP-IV
30" RCP-III
30" CSP W/ELBOWS
15" RCP-IV
30" RCP-III
30" RCP-III
30" RCP-III
30"
36"
18" RCP
24" RCP
30" RCP
30" RCP
30

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-219

PERMIT DRAWING
SHEET 28 OF 69

CROSS-SECTION J-J LT
SITE 8, WETLAND BG, STREAM AT
STATION 366+00 -L-



12:37:27 PM
R2721_dwkpLLLT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-507

PERMIT DRAWING
SHEET 29 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

390 380 370 360

8:1 0.020 0.020 2.30:1

D.P. 380.92

374.07

S.S. 370.27

367+00.00

8:1 0.020 0.020 2.55:1

D.P. 381.16

372.66

S.S. 371.85

366+50.00

FILL IN WETLAND

WLB

8:1 0.020 0.020 2.81:1

D.P. 381.41

S.S. 373.29

366+00.00

WETLAND BG

WLB

WLB

CROSS–SECTION J–J RT
SITES 8 & 9, WETLANDS BG & BH
STATION 366+00 –L–

WETLAND BH
NO IMPACT

8:1 0.020 0.020 3.19:1

D.P. 381.67

365+50.00

8:1 0.020 0.020 4.25:1

D.P. 381.92

378.84

S.S. 377.42

365+00.00

–L– RT

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

11:57:29 AM
R2721_X-Sect_L_RT.dgn
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-769

PERMIT DRAWING
SHEET 30 OF 69

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

400 390 380 370 360

0.020 387.49 0.020 2:1 4:1 3:1 385.10
16+50.00

0.020 384.78 0.020 2:1 4:1 3:1 382.30
16+00.00

0.020 381.91 0.020 3:1 4:1 3:1 4:1 379.66 379.66
15+50.00

0.020 378.88 0.020 2:1 2:1
15+00.00

374.81
14+50.00

369.95
14+00.00

WLB WLB WLB

MECHANIZED CLEARING | FILL IN WETLAND | MECHANIZED CLEARING

366.34
13+50.00
-Y10A-

WETLAND BH WETLAND BH WETLAND BH

CROSS-SECTION K-K
SITE 9, WETLAND BH
STATION 13+50 -Y10A-

11:42:28 AM
R2721_cpk_XPL_Y10A.dgn
$$$$USERNAME$$$$

PERMIT DRAWING
SHEET 31 OF 69

PROJECT REFERENCE NO.	SHEET NO.
R–2721	31
R–2721B ROADWAY SHEET NO. 14	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

51499

100' 0' 100'

INSET

PF

WBJ

MATCHLINE THIS SHEET

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND

POND SHALL BE DRAINED IN ACCORDANCE WITH THE "POND DRAINAGE PLAN REQUIREMENT" SPECIAL PROVISION. POND MUCK SHALL BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER AND DISPOSED OF IN ACCORDANCE WITH THE "WASTE AND BORROW SOURCES" SPECIAL PROVISION. REMOVED MUCK SHALL BE REPLACED WITH A SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

SITE 10

PG

POND TO BE DRAINED

SITE 11

MATCHLINE SHEET INSET

STANDARD 4' BASE DITCH W/CLASS B RIP RAP FILTER & TOP X SY GEOTEXTILE SEE SHEET 2D-2 DETAIL 14-06

STANDARD 4' BASE DITCH

PF

POND TO BE DRAINED

SAX

S 71° 40' 00.7" E

MATCHLINE SHEET 30 –L– STA 379+75.00

SITE 12

ENERGY DISSIPATOR BASIN #5

SAW

SAY

WBI

DITCH CHANGE

–L– TS Sta. 386+19.34

–L– SC Sta. 388+69.34

MATCHLINE SHEET 32 –L– STA 394+00.00

BERM 'V' DITCH SEE SHEET 2B-437A DETAIL 14-07

8/8/2019
R2721_PSH_31_31vet.dgn
$$$$USERNAME$$$$

51499

PERMIT DRAWING SHEET 31A OF 69

PROJECT REFERENCE NO.	SHEET NO.
R–2721	31
R–2721B ROADWAY SHEET NO. 14	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

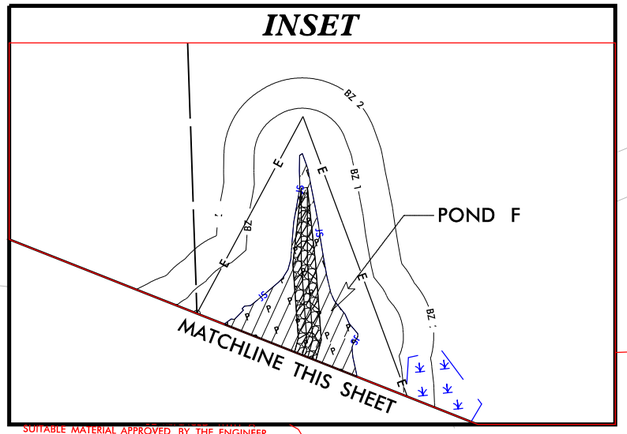
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

100' 0' 100'

INSET



- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND

POND SHALL BE DRAINED IN ACCORDANCE WITH THE "POND DRAINAGE PLAN REQUIREMENT" SPECIAL PROVISION. POND MUCK SHALL BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER AND DISPOSED OF IN ACCORDANCE WITH THE "WASTE AND BORROW SOURCES" SPECIAL PROVISION. REMOVED MUCK SHALL BE REPLACED WITH A SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

SITE 10

SITE 11

SITE 12

MATCHLINE SHEET INSET

MATCHLINE SHEET 30 –L– STA 379+75.00

MATCHLINE SHEET 32 –L– STA 394+00.00

PG

PF

SAX

SAW

SAY

WBI

WBJ

POND TO BE DRAINED

POND TO BE DRAINED

STANDARD 4' BASE DITCH W/CLASS 'B' RIP RAP TEST A TION X STY GEOTEXTILE SEE SHEET 2D–2 DETAIL 14–06

STANDARD 4' BASE DITCH

STANDARD 4' BASE DITCH

STANDARD 4' BASE DITCH W/CLASS 'B' RIP RAP TEST A TION X STY GEOTEXTILE SEE SHEET 2D–2 DETAIL 14–06

RETAIN

-L- TS Sta. 386+19.34

-L- SC Sta. 388+69.34

S 71° 40' 00.7" E

S 71° 40' 00.7" E

CHORD

CHORD

15" RCP-IV

24" RCP-III

24" RCP-III

24" RCP-III

24" RCP-III

45° RCP-III

15" RCP-III

15" RCP-IV

30"

30"

24"

18" CSP W/ELBOWS

4OTCB

ENERGY DISSIPATOR BASIN #5

PDE

TDE

TDE

TDE

TDE

TDE

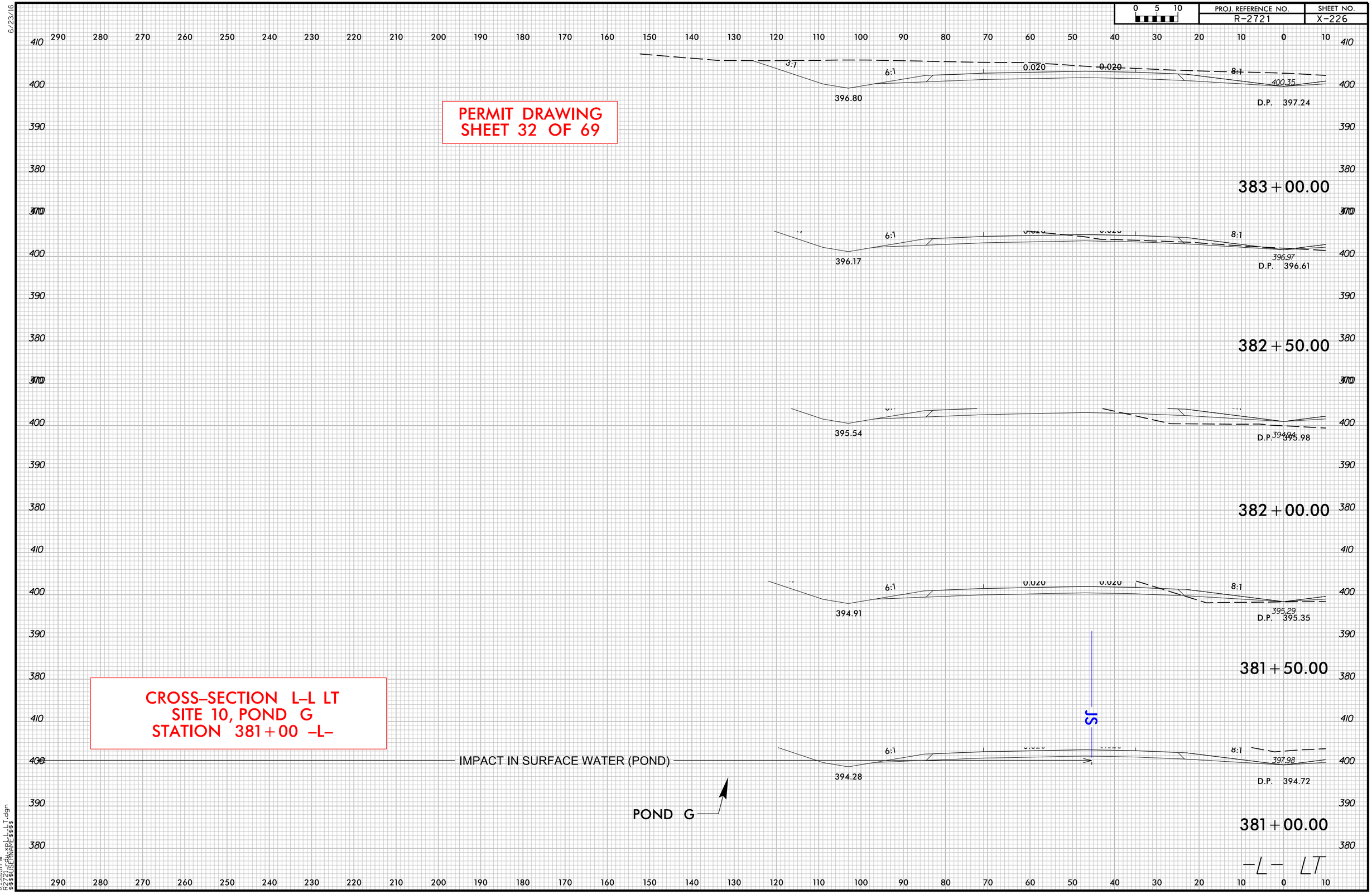
DITCH CHANGE

BERM 'V' DITCH SEE SHEET 2B–437A DETAIL 14–07

8/20/19
R2721_PSH_31_31Awet.dgn
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-226

PERMIT DRAWING
SHEET 32 OF 69



CROSS-SECTION L-L LT
SITE 10, POND G
STATION 381+00 -L-

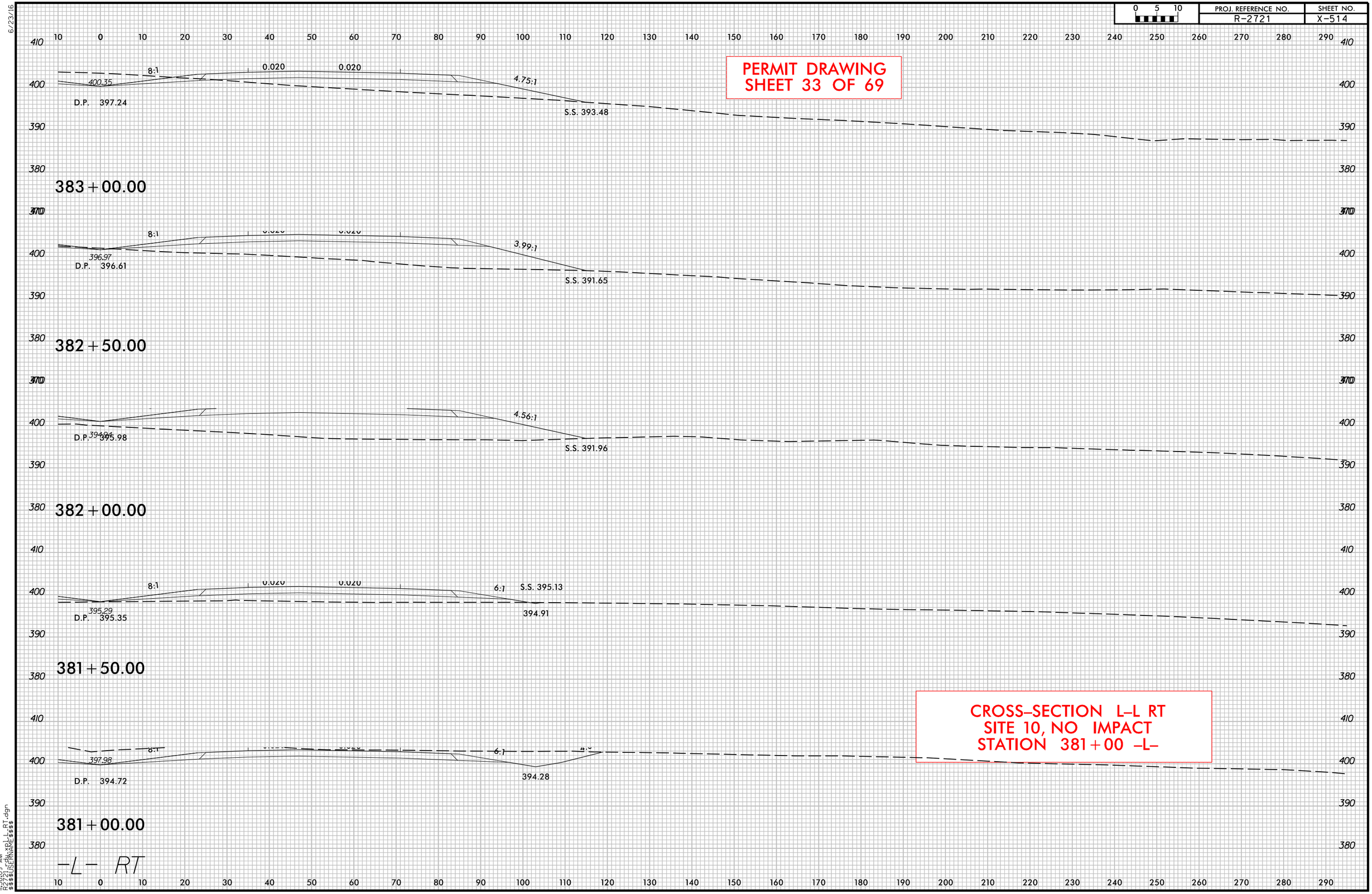
IMPACT IN SURFACE WATER (POND)

POND G

12:38:01 PM
R2721_X2_L-L_LT.dgn
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-514

PERMIT DRAWING
SHEET 33 OF 69



CROSS–SECTION L–L RT
SITE 10, NO IMPACT
STATION 381+00 –L–

11:58:09 AM
RP2521_XSL_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-228

PERMIT DRAWING
SHEET 34 OF 69

CROSS-SECTION M-M LT
SITE 12, WETLAND BI
STATION 386+00 -L-

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

420 410 400 390 380

S.S. 397.55
4.33:1
0.012
0.020
8:1
D.P. 401.17
390.61
386+50.00

WL-B
FILL IN WETLAND
S.S. 399.26
6:1
0.004
0.020
8:1
D.P. 400.71
390.20
386+00.00
WETLAND BI

S.S. 399.92
6:1
0.003
0.020
8:1
D.P. 400.22
389.01
385+50.00

S.S. 402.45
5.07:1
399.48
6:1
0.010
0.020
8:1
D.P. 399.68
390.78
385+00.00

-L- LT

12:38:39 PM
K:\Projects\R2721\Roadway\PLLLT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-516

PERMIT DRAWING
SHEET 35 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

420 410 400 390 380

8:1 0.012 0.020 2:1

D.P. 401.17

390.61

386+50.00

S.S. 387.91

IMPACT IN SURFACE WATER

EXCAVATION

JS

JS

EXCAVATION

8:1 0.004 0.020 2:1

D.P. 400.71

FILL IN WETLAND

MECHANIZED CLEARING

390.20

386+00.00

S.S. 387.12

WETLAND BI

STREAM AW

WETLAND BI

CROSS-SECTION M-M RT, SITES 11 & 12, WETLAND BI, STREAM AW STATION 386+00 -L-

8:1 0.003 0.020 2:1

D.P. 400.22

389.01

385+50.00

8:1 0.010 0.020 2:1

D.P. 399.68

390.78

385+00.00

S.S. 385.97

-L- RT

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

11:58:32 AM
R2721_xsl_L_RT.dgn
$$$$USERNAME$$$$

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
R-2721	X-229

0 5 10

PERMIT DRAWING
SHEET 36 OF 69

CROSS-SECTION N-N LT
SITE 11, POND F
STATION 389+00 -L-

IMPACT IN SURFACE WATER (POND)

SF

POND F

S.S. 405.71
6:1
0.050
0.050
8:1
405.10
389+50.00

S.S. 405.71
6:1
0.047
0.047
8:1
404.72
408.40
389+00.00

S.S. 405.71
6:1
6:1
0.040
0.040
8:1
404.11
403.76
388+50.00

S.S. 405.71
6:1
6:1
0.033
0.033
8:1
403.46
D.P. 402.32
398.94
388+00.00

S.S. 407.60
3:1
6:1
0.026
0.026
8:1
402.77
D.P. 401.97
396.25
387+50.00

S.S. 400.38
6:1
0.019
0.020
8:1
D.P. 401.59
392.92
387+00.00

-L- LT

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

420 410 400 390 380

12:39:21 PM
R2721_X21_LLT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-517

PERMIT DRAWING
SHEET 37 OF 69

CROSS–SECTION N–N RT
SITE 11, STREAM AW
STATION 389+00 –L–

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

420 410 400 390 380

389+50.00

6.980:1 | 0.050 | 0.050 | 6:1 | 3:1

S.S. 406.12

JS

IMPACT IN SURFACE WATER

Sf

389+00.00

408.40

7.110:1 | 0.047 | 0.047 | 6:1 | 3.55:1

S.S. 404.70

STREAM AW

388+50.00

403.76

7.474:1 | 0.040 | 0.040 | 6:1

S.S. 399.51

388+00.00

D.P. 402.32

398.94

7.655:1 | 0.033 | 0.033 | 3.55:1

S.S. 395.49

387+50.00

D.P. 401.97

396.25

7.841:1 | 0.026 | 0.026 | 3.02:1

S.S. 393.92

387+00.00

D.P. 401.59

392.92

8:1 | 0.019 | 0.020 | 2.27:1

S.S. 390.60

–L– RT

I:\52658_AM
RDSXPLL_RT.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	33
R-2721B ROADWAY SHEET NO. 15 & 16	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 38 OF 69

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S DENOTES IMPACTS IN SURFACE WATER
F F DENOTES IMPACTS IN SURFACE WATER (POND)
F F DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
E E DENOTES EXCAVATION IN WETLAND
T T DENOTES TEMPORARY FILL IN WETLAND

0' 100' 100'

POND SHALL BE DRAINED IN ACCORDANCE WITH THE "POND DRAINAGE PLAN REQUIREMENT" SPECIAL PROVISION. POND MUCK SHALL BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER AND DISPOSED OF IN ACCORDANCE WITH THE "WASTE AND BORROW SOURCES" SPECIAL PROVISION. REMOVED MUCK SHALL BE REPLACED WITH A SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

SBD
SBC
WBM
SAZ
PH
PI
SITE 15
POND TO BE DRAINED
SITE 13
SITE 14
WBK
WBN (1)
SBA
SBB
SAZ

-L- CS Sta. 412+19.53
-L- ST Sta. 414+69.53
-Y12B- POT Sta. 10+00.00

BANK STABILIZATION CLASS 'II' RIP RAP EST 150 TONS 220 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA

CLASS 'B' RIP RAP EMBEDDED INTO STREAM BED EST 22 TONS 85 SY GEOTEXTILE

CLASS 'B' RIP RAP EST 1 TON 14 SY GEOTEXTILE

CLASS 'B' RIP RAP EST 1 TON 5 SY GEOTEXTILE

CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 35 TONS 105 SY GEOTEXTILE

CLASS 'II' RIP RAP EST 220 TONS 280 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA

DITCH CHANGE

FILL SLOPE CHANGE AND DITCH CHANGE

MATCHLINE SHEET 32 -L- STA 407+00.00

MATCHLINE SHEET 34 -L- STA 420+00.00

24" CMP
18" RCP-III
24" RCP-III
15" RCP-IV
24" CSP W/ELBOW
PDE
TDE
CHORD
FS

8/8/2018
R2721_PSH_33_38wet.dgn
$$$$USERNAME$$$$

51499

PERMIT DRAWING SHEET 38A OF 69

FLATIRON | BRANCH CMJL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721B	33
NEW ROADWAY SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND
- DENOTES TEMPORARY FILL IN WETLAND

100' 0' 100'

POND SHALL BE DRAINED IN ACCORDANCE WITH THE "POND DRAINAGE PLAN REQUIREMENT" SPECIAL PROVISION. POND MUCK SHALL BE REMOVED TO A DEPTH DETERMINED BY THE ENGINEER AND DISPOSED OF IN ACCORDANCE WITH THE "WASTE AND BORROW SOURCES" SPECIAL PROVISION. REMOVED MUCK SHALL BE REPLACED WITH A SUITABLE MATERIAL APPROVED BY THE ENGINEER TO SUPPORT THE INSTALLATION OF PROPOSED RIP RAP LINED CHANNELS.

SBC | SBD | WBM | SAZ | PH | PI | WBK | WBN (1) | SBA | SBB

SITE 15 | SITE 14 | SITE 13

POND TO BE DRAINED

-L- CS Sta. 412+19.53

-L- ST Sta. 414+69.53

-Y12B- POT Sta. 10+00.00

BANK STABILIZATION CLASS 'II' RIP RAP EST 150 TONS 225 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL AA

CLASS 'A' RIP RAP EMBEDDED INTO STREAM BED EST 22 TONS 85 SY GEOTEXTILE

CLASS 'B' RIP RAP EST 1 TON 14 SY GEOTEXTILE

CLASS 'B' RIP RAP EST 1 TON 5 SY GEOTEXTILE

CLASS 'I' RIP RAP EST 120 TONS 285 SY GEOTEXTILE SEE SHEET 2D-2 DETAIL BA

CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 35 TONS 105 SY GEOTEXTILE

DITCH CHANGE

FILL SLOPE CHANGE AND DITCH CHANGE

MATCHLINE SHEET 32 -L- STA 407+00.00

MATCHLINE SHEET 34 -L- STA 420+00.00

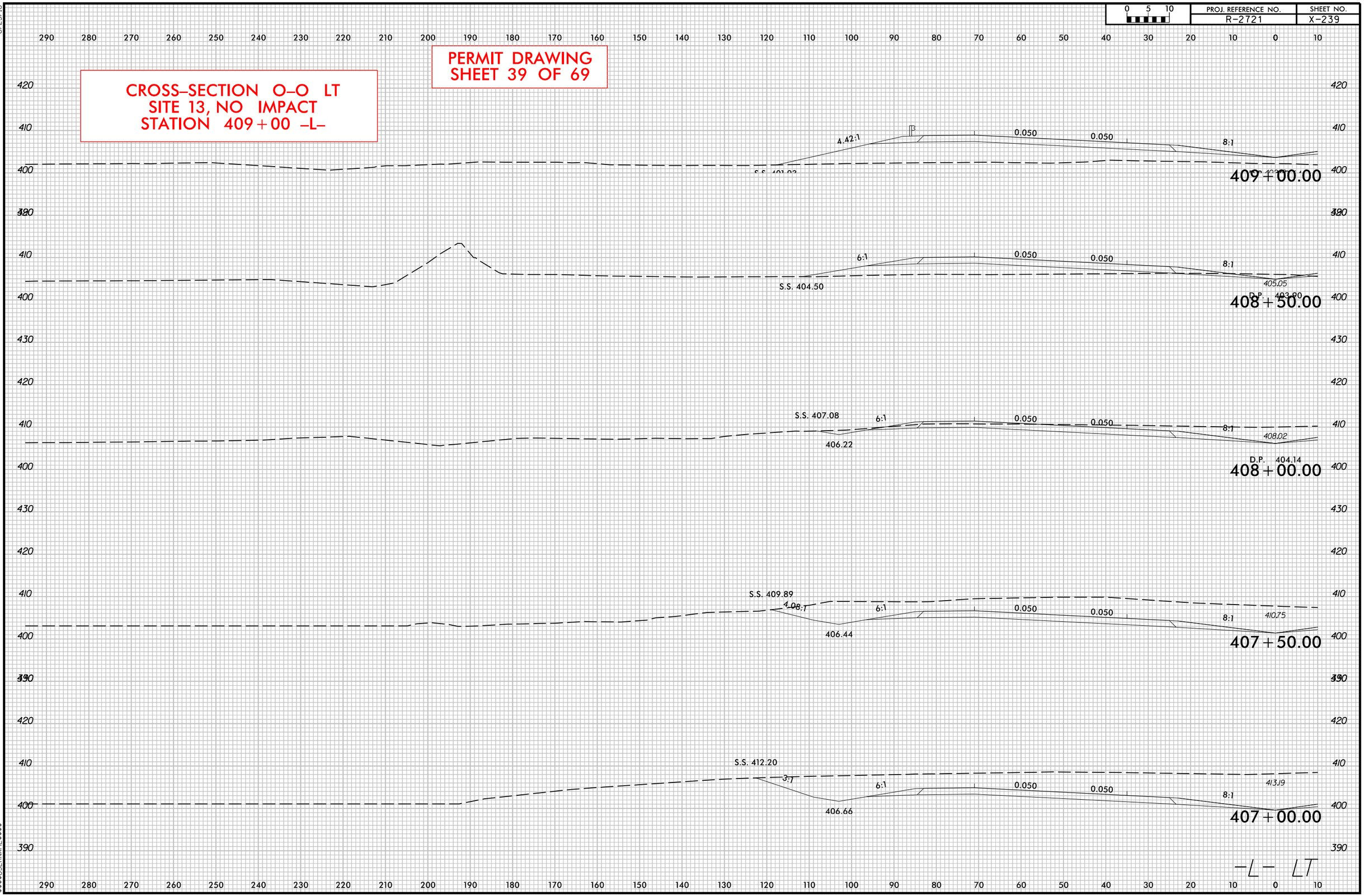
8/8/2019
R2721_PSH_33_38Awest.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-239

PERMIT DRAWING
SHEET 39 OF 69

CROSS-SECTION O-O LT
SITE 13, NO IMPACT
STATION 409+00 -L-



12:40:01 PM
R2721_X-Sect_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-529

PERMIT DRAWING
SHEET 40 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

410
400
390
380

411 + 00.00

6.980:1 0.050 0.050 4.93:1

D.P. 402.61
394.47

S.S. 397.50

410 + 50.00

6.980:1 0.050 0.050 5.86:1

D.P. 402.87
396.66

S.S. 398.72

410 + 00.00

6.980:1 0.050 0.050 6:1

D.P. 403.13
398.44

S.S. 399.39

409 + 50.00

6.980:1 0.050 0.050 5.81:1

D.P. 403.38
400.32

S.S. 399.19

FILL IN WETLAND — WLB — EXCAVATION — WLB

409 + 00.00

6.980:1 0.050 0.050 6:1

D.P. 403.64
402.44

S.S. 400.81

WETLAND BK

-L- RT

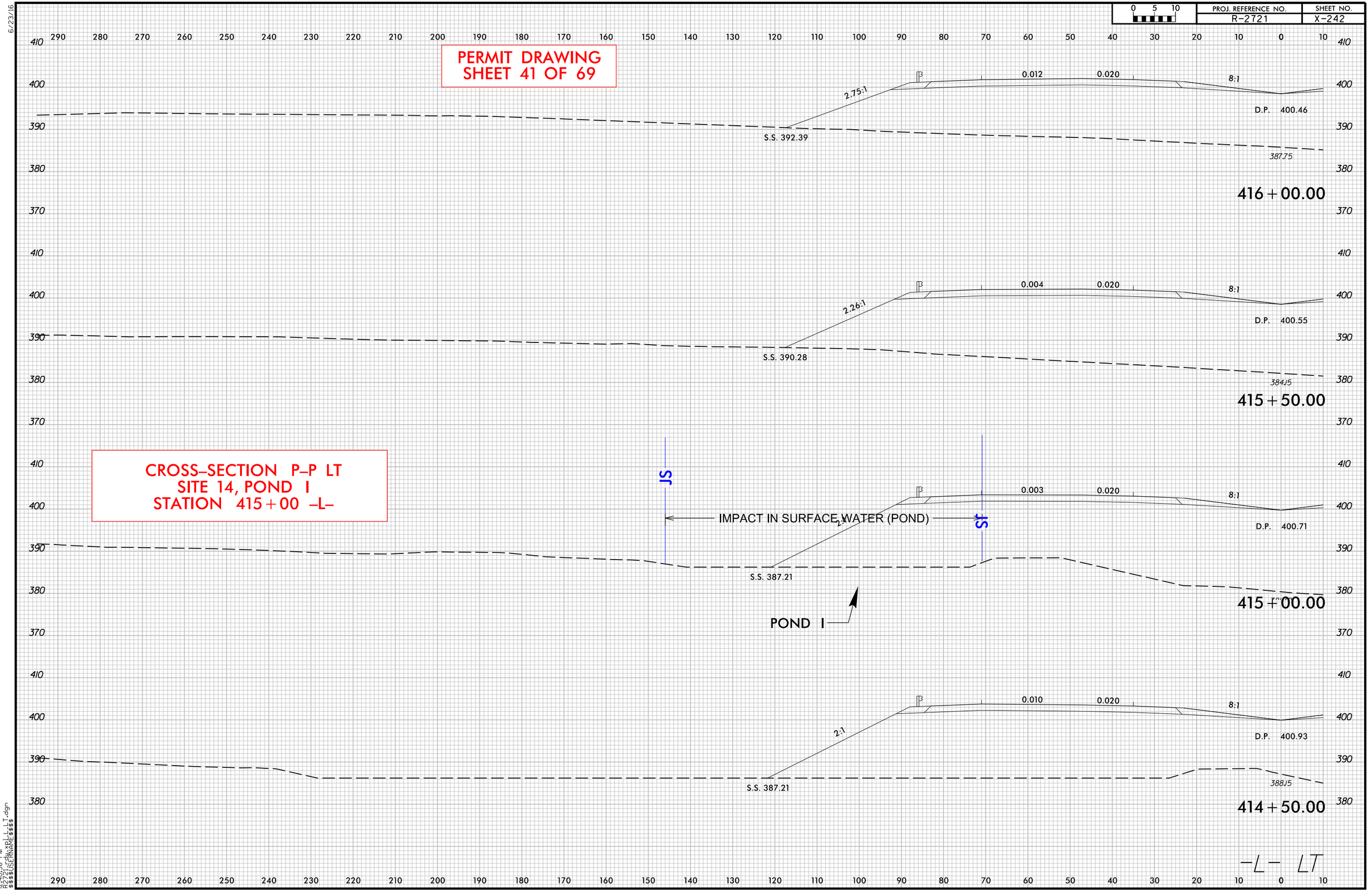
CROSS-SECTION O-O RT
SITE 13, WETLAND BK
STATION 409 + 00 -L-

I:\5922_AM\R2721_X\PLL_RT.dgn
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-242

PERMIT DRAWING
SHEET 41 OF 69

CROSS-SECTION P-P LT
SITE 14, POND 1
STATION 415+00 -L-



I:\240\36 PM
R2721_Prof_Xsec_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-531

PERMIT DRAWING
SHEET 42 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

410 / 400 / 390 / 380 / 370

8:1 0.004 0.020 2:1

D.P. 400.55

384.5

415 + 50.00

IMPACT IN SURFACE WATER

IMPACT IN SURFACE WATER

8:1 0.003 0.020 2:1

D.P. 400.71

JS JS JS JS

FILL IN WETLAND

FILL IN WETLAND

FILL IN WETLAND

EXCA-VATION

MECHANIZED CLEARING

380.00

415 + 00.00

S.S. 380.21

WETLAND BN (1)

STREAM BA

STREAM AZ

WETLAND BN (1)

CROSS–SECTION P–P RT, SITES 14 & 15, WETLAND BN, STREAMS AZ & BA, STATION 415 + 00 –L–

8:1 0.010 0.020 2:1

D.P. 400.93

388.5

414 + 50.00

S.S. 381.37

8:1 0.017 0.020 2:1

D.P. 401.19

387.21

414 + 00.00

S.S. 383.27

–L– RT

I:\59417_AM\R2721_AM_ROLL_RT.dgn
$$$$USERNAME$$$$

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	34
R-2721B ROADWAY SHEET NO. 16 & 17	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PERMIT DRAWING SHEET 43 OF 69

100' 0' 100'

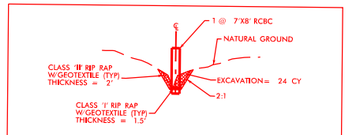
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND

-Y12- POT Sta. 19+61.01
S 74° 02' 33.6" E
-Y12B- PT Sta. 26+21.0
-Y12B- PC Sta. 24+74.16
R 200'
MATCHLINE SHEET 35 -Y12A- STA 26+00.00

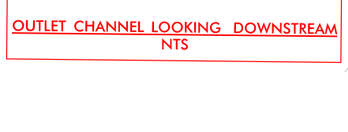
SITE 16
PIPE INLET CHANNEL STABILIZATION W/CLASS 'I' RIP RAP EST 15 TONS 25 SY GEOTEXTILE
CLASS 'B' RIP RAP EST 11 TONS 20 SY GEOTEXTILE
STANDARD 4' BASE DITCH W/CLASS 'I' RIP RAP EST 110 TONS 195 SY GEOTEXTILE
WBN (2)
WBN (2)
-L- PC Sta. 423+88.52
15" CSP W/ELBOWS
S 39° 10' 00.9" E
S 39° 10' 00.9" E
18" RCP-III
CSP W/ELBOWS
15" RCP-IV
MATCHLINE SHEET 33 -L- STA 420+00.00
S 40° 23' 15.1" E
3° 15.1" E
R 11940'
CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC
18" RCP-III
-Y12- POT Sta. 15
-L- POC Sta. 435
18" RCP-III
FS
18" RCP-III
15" RCP-III
MATCHLINE SHEET 35 -L- STA 433+00.00
REMOVE
R 12290'
LATERAL 2' BASE DITCH W/CLASS 'B' RIP RAP EST 270 TONS 615 SY GEOTEXTILE SEE SHEET 2D-3 DETAIL 17-1
DITCH CHANGE

SITE 16

INLET CHANNEL LOOKING DOWNSTREAM
NTS



OUTLET CHANNEL LOOKING DOWNSTREAM
NTS



8/8/2019
R-2721_PSH_34_43wet.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	34
R-2721B ROADWAY SHEET NO. 16 & 17	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

100' 0' 100'

PERMIT DRAWING SHEET 43A OF 69

DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND

SITE 16

PIPE INLET
CHANNEL STABILIZATION
W/CLASS 'I' RIP RAP
EST 15 TONS
25 SY GEOTEXTILE

WBN (2)

CLASS 'B' RIP RAP
EST 11 TONS
120 SY GEOTEXTILE

STANDARD 4' BASE DITCH
W/CLASS 'I' RIP RAP
EST 110 TONS
195 SY GEOTEXTILE

-L- PC Sta. 423+88.52

15" CSP
W/ELBOWS

18" CSP
W/ELBOWS

18" RCP-III

15" RCP-IV

15" RCP-III

FS

-Y12- POT Sta. 19+61.01
S 74° 02' 33.6" E
-Y12B- PT Sta. 26+21.0
-Y12B- PC Sta. 24+74.6
R 200'
-Y12A- STA 26+00.00
MATCHLINE SHEET 35

S 40° 23' 15.1" E
S 39° 10' 00.9" E
S 39° 10' 00.9" E
3° 15.1" E

R 11140'

CLASS 'B' RIP RAP
EST 3 TONS
10 SY FILTER FABRIC

-Y12- POT Sta. 15
-L- POC Sta. 435

18" RCP-III

18" RCP-III

REMOVE

R 12290'

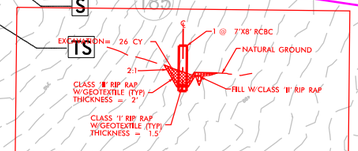
LATERAL 2' BASE DITCH
W/CLASS 'B' RIP RAP
EST 270 TONS
615 SY GEOTEXTILE
SEE SHEET 2D-3
DETAIL 17-1

MATCHLINE SHEET 33
-L- STA 420+00.00

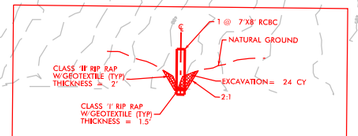
MATCHLINE SHEET 35
-L- STA 433+00.00

SITE 16

INLET CHANNEL LOOKING DOWNSTREAM
NTS



OUTLET CHANNEL LOOKING DOWNSTREAM
NTS



DITCH CHANGE

8821012
R-2721_PSH_34_43Awet.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-246

PERMIT DRAWING
SHEET 44 OF 69

CROSS-SECTION Q-Q LT
SITE 16, WETLAND BN (2)
STATION 423+00 -L-

MECHANIZED CLEARING

FILL IN WETLAND

WETLAND BN (2)

S.S. 392.82

EWLB

425+00.00
D.P. 406.06
3.69:1 | 0.020 | 0.020 | 8:1

424+50.00
D.P. 405.66
400.33
3.41:1 | 0.020 | 0.020 | 8:1

424+00.00
D.P. 405.26
397.82
2.59:1 | 0.020 | 0.015 | 8:1

423+50.00
D.P. 404.86
2.27:1 | 0.020 | 0.007 | 8:1

423+00.00
D.P. 404.46
2.13:1 | 0.020 | 0.001 | 8:1

422+50.00
D.P. 404.06
2.19:1 | 0.020 | 0.009 | 8:1

-L- LT

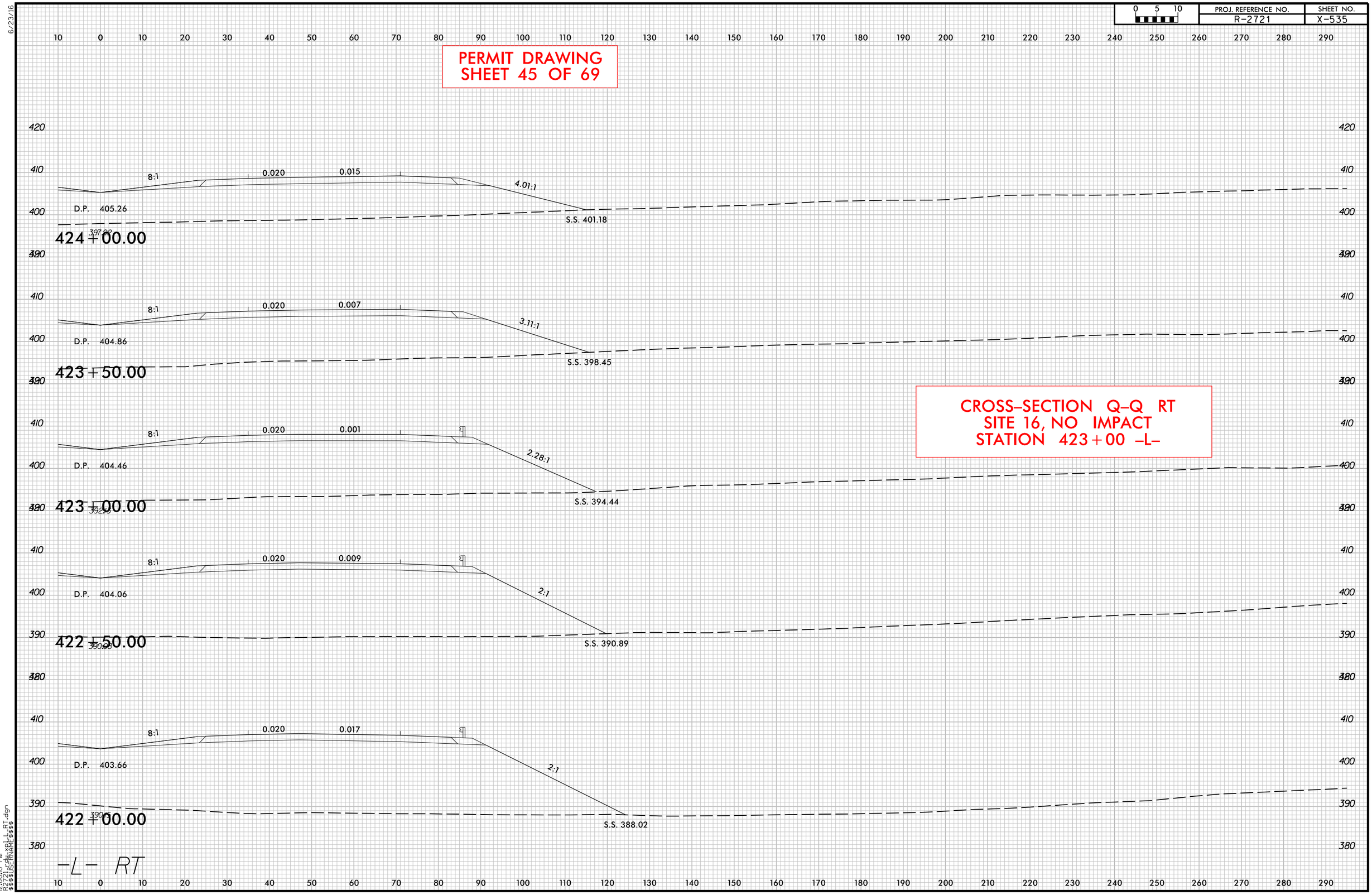
12:41:09 PM
R2721_PLAN_XPLL_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-535

PERMIT DRAWING
SHEET 45 OF 69

CROSS-SECTION Q-Q RT
SITE 16, NO IMPACT
STATION 423+00 -L-



12:30:10 PM
R2721_Xsec_Pkg_L_RT.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	35
R-2721B ROADWAY SHEET NO. 17 & 18	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 46 OF 69

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100' 0' 100'

-Y12- POT Sta.18+87.33 = -Y12B- POT Sta. 26+75.76

-Y12A- STA 26+00.00

24" RCP-V

36" RCP-V

GRADE TO DRAIN

PUE

N 15° 31' 14.3" E 51.92'

+58.87 = +01.75

R 11940'

CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE

HW

15" W/ELBOWS

24" W/ELBOWS

15" RCP-IV

24" RCP-III

FS

MATCHLINE SHEET 34 -L- STA 433+00.00

MATCHLINE SHEET 36 -L- STA 446+00.00

24" W/ ELBOWS

15

SITE 17

SBF

R 12290'

R 1360'

-Y12- PT Sta. 15+31.58

30" RCP-IV

REMOVE

PCC Sta.12+90.09

15" RCP-III

S 86° 56' 19.0" E

-Y12- PCC Sta.12+63.56 = -Y12A- POT Sta. 19+81.83

STANDARD 2' BASE DITCH W/CLASS 'I' RIP RAP EST 100 TONS 185 SY GEOTEXTILE

MATCHLINE SHEET 61 -Y12B- STA 18+00.00

R 1660'

36" RCP-V

REMOVE

CLASS 'I' RIP RAP EST 15 TONS 30 SY GEOTEXTILE

N 28° 59' 27.2" W

S

TS

TDE

FILL SLOPE CHANGE

WBP

435 440 445

410 188 189 191

8/8/2019 R-2721_PSH_35_46wet.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CMIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	35
R-2721B ROADWAY SHEET NO. 17 & 18	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 46A OF 69

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100' 0' 100'

-Y12- POT Sta.18+87.33 = -Y12B- POT Sta. 26+75.76

-Y12A- STA 26+00.00

N 15° 31' 14.3" E

+58.87 = +01.75

MATCHLINE SHEET 34 -L- STA 433+00.00

MATCHLINE SHEET 36 -L- STA 446+00.00

GRADE TO DRAIN

PUE

R 11940'

CLASS "B" RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE

HW

15" W/ELBOWS

24" W/ELBOWS

15" RCP-IV

24" RCP-III

36" RCP-V

30" RCP-IV

REMOVE

SITE 17

SBF

FILL SLOPE CHANGE

WBP

S

TS

TDE

R 12290'

R 1360'

R 1660'

-Y12- PT Sta. 15+31.58

PCC Sta.12+90.09

S 86° 56' 19.0" E

-Y12- PCC Sta.12+63.56 = -Y12A- POT Sta. 19+81.83

MATCHLINE SHEET 61 -Y12B- STA 18+00.00

STANDARD 2' R-BASE DITCH W/CLASS 'I' RIP RAP EST. 100 TONS 185 SY GEOTEXTILE

CLASS 'I' RIP RAP EST 15 TONS 30 SY GEOTEXTILE

M 2795.82 S

8/8/2019
R2721_PSH_35_46Avet.dgn
$$$$USERNAME$$$$

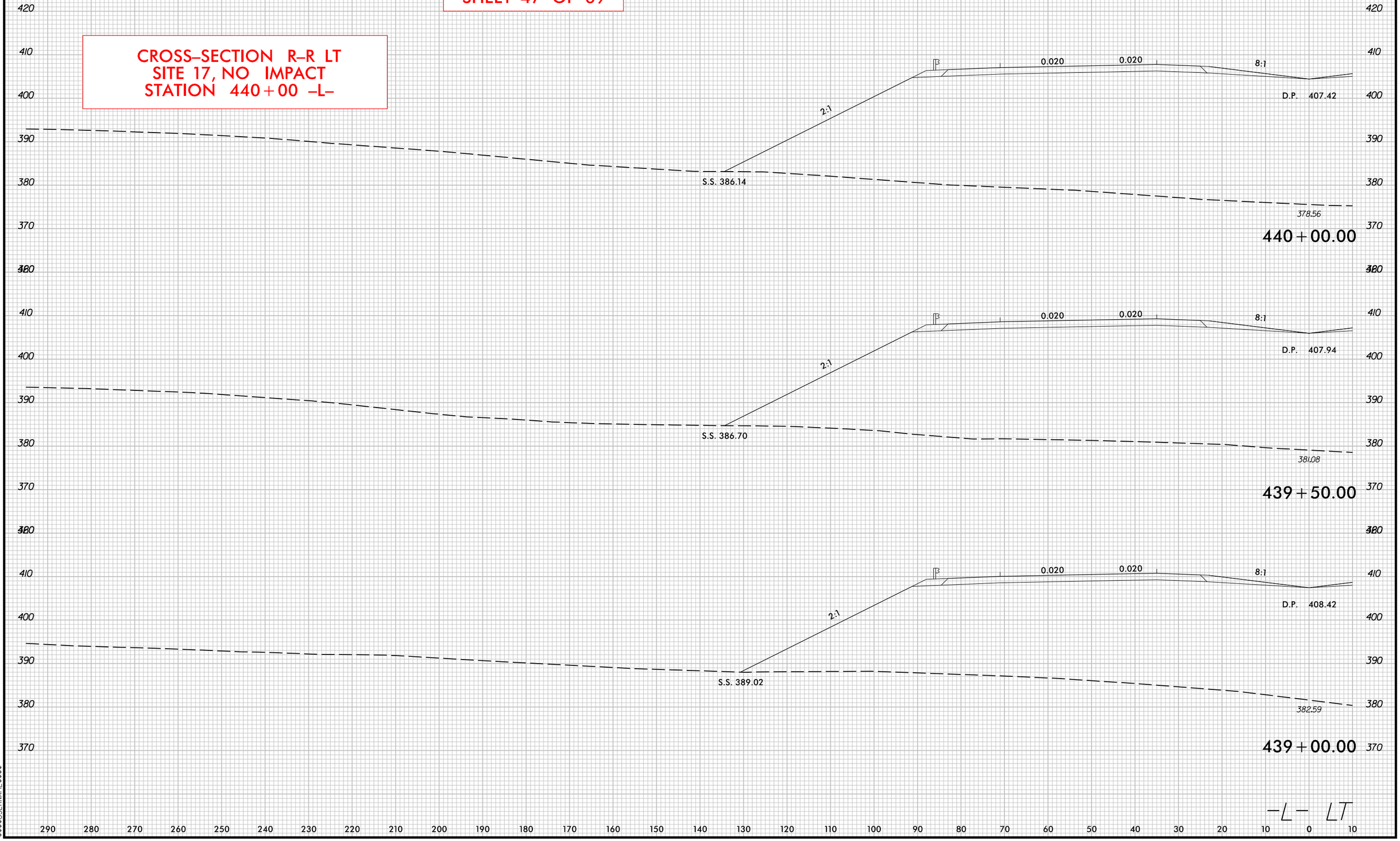
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-253

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

PERMIT DRAWING
SHEET 47 OF 69

CROSS-SECTION R-R LT
SITE 17, NO IMPACT
STATION 440+00 -L-



12:41:13 PM
R2721_PLAN_xsl_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-542

PERMIT DRAWING
SHEET 48 OF 69

CROSS-SECTION R-R RT
SITE 17, WETLAND BP, STREAM BF
STATION 440+00 -L-

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

420 410 400 390 380 370 360

8:1 0.020 0.020

D.P. 407.42

2:1

WLB

IMPACT IN SURFACE WATER

JS

JS

WLB

FILL IN WETLAND

MECHANIZED CLEARING

378.56

440+00.00

WETLAND BP

STREAM BF

WETLAND BP

8:1 0.020 0.020

D.P. 407.94

2:1

381.08

439+50.00

8:1 0.020 0.020

D.P. 408.42

2:1

382.59

439+00.00

-L- RT

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

12:00:36 PM
R2721_XSECTIONXPLL_RT.dgn
$$$$USERNAME$$$$

PERMIT DRAWING
SHEET 49 OF 69

200' 0' 200'
GRAPHIC SCALE

S S — DENOTES IMPACTS IN SURFACE WATER
E E — DENOTES FILL IN WETLAND
E E — DENOTES EXCAVATION IN WETLAND
P P — DENOTES IMPACTS IN SURFACE WATER (POND)
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 801 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	37
R-2721B ROADWAY SHEET NO. 19 & 20	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MATCHLINE SHEET 37A

MATCHLINE SHEET 64
-Y13- STA 62+00.00

MATCHLINE SHEET 36
-L- STA 459+00.00

MATCHLINE SHEET 38
-L- STA 487+00.00

MATCHLINE SHEET 65
-Y13A- STA 24+00.00

MATCHLINE SHEET 63
-Y13- STA 48+00.00

SITE 17 CONT'D.
SITE 18
SITE 19
SITE 20
SITE 21

SBG SBI SBH SBM SBS WBT WBY WBZ WBQ WBR WBS WBW

-Y13RPB- SRS Sta. 26+15.29
-Y13RPB- CS Sta. 24+05.29
-Y13RPA- SC Sta. 14+40.00
-Y13RPC- POT Sta. 01+00.00 = -L- POE Sta. 465+00.00 RT
-Y13RPC- TS Sta. 11+69.97
-Y13RPC- SC Sta. 13+09.99
-Y13RPC- CS Sta. 18+78.97
-Y13RPC- SRS Sta. 21+18.97
-Y13RPC- ST Sta. 23+56.97
-Y13RPC- PT Sta. 25+06.25
-Y13RPC- SRS Sta. 11+00.00
-Y13RPD- POT Sta. 10+24.37 = -Y13- POT Sta. 49+38.57
-Y13RPC- POT Sta. 28+48.35 = -Y13- POT Sta. 49+88.28
-Y13RPA- SC Sta. 12+00.00
-Y13LPA- CS Sta. 21+08.80
-Y13LPA- ST Sta. 21+08.80 = -Y13- POT Sta. 51+08.28, 50' RT
-Y13LPA- ST Sta. 21+10.00 = -L- POE Sta. 478+65.46, 28' RT
-Y13- POT Sta. 55+39.82 = -L- POE Sta. 471+08.79
-Y13RPA- SC Sta. 30+24.70 = -Y13RPB- POT Sta. 30+24.70 = -Y13RPB- POT Sta. 31+00.13
-Y13RPA- SC Sta. 19+40.00
-Y13RPA- SC Sta. 24+05.29
-Y13RPA- SRS Sta. 24+05.29
-Y13RPA- SR
-Y13RPA- SC Sta. 24+73.80
-Y13RPA- SRS Sta. 24+73.80
-Y13RPA- SRS Sta. 19+00.00
-Y13A- POT Sta. 10+00.00
-Y13- POT Sta. 55+39.82 = -L- POE Sta. 471+08.79
-Y13- POT Sta. 62+46.85 = -Y13RPA- POT Sta. 30+24.70 = -Y13RPB- POT Sta. 31+00.13
-Y13- POT Sta. 49+38.57 = -Y13RPD- POT Sta. 30+24.37
-Y13- POT Sta. 49+88.28 = -Y13RPC- POT Sta. 28+48.35
-Y13- POT Sta. 51+08.28, 50' RT = -Y13LPA- ST Sta. 21+08.80
-L- POE Sta. 478+65.46, 28' RT = -Y13LPA- ST Sta. 21+10.00

DITCH CHANGE

BEGIN CONSTRUCTION
-Y13C- STA. 10+25.00

PERMIT DRAWING
SHEET 49A OF 69

200′ 0′ 200′
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 600 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	37
R-2721B ROADWAY SHEET NO. 19 & 20	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

MATCHLINE SHEET 37A

SITE 18

MATCHLINE SHEET 64
–Y13– STA 62+00.00

SITE 21

MATCHLINE SHEET 36
–L– STA 459+00.00

MATCHLINE SHEET 38
–L– STA 487+00.00

SITE 20

SITE 19

SITE 17 CONT'D.

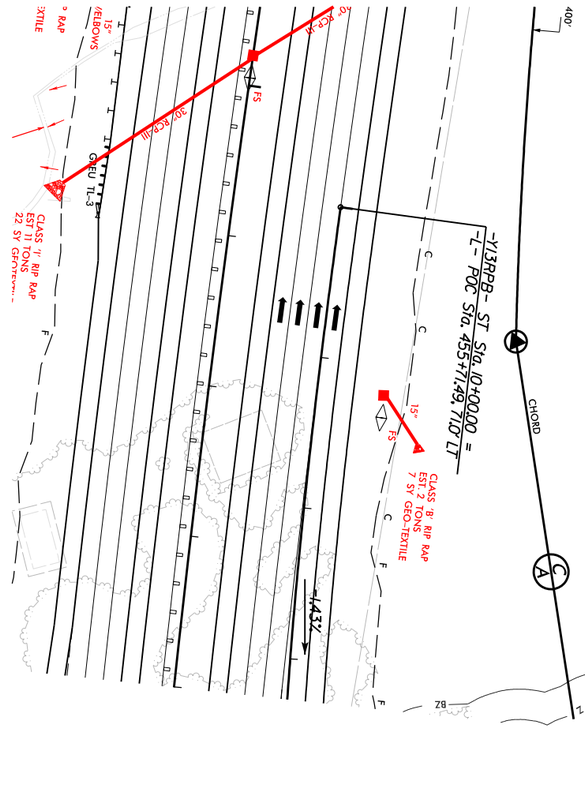
MATCHLINE SHEET 65
–Y13A– STA 24+00.00

MATCHLINE SHEET 63
–Y13– STA 48+00.00

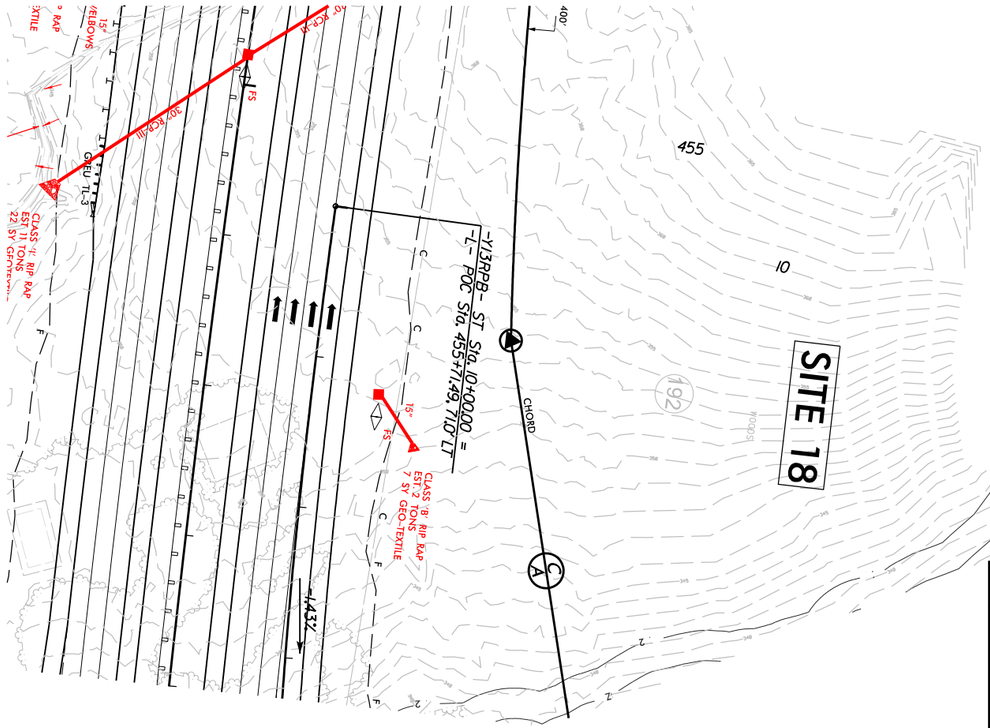
BEGIN CONSTRUCTION
–Y13C– STA. 10+25.00

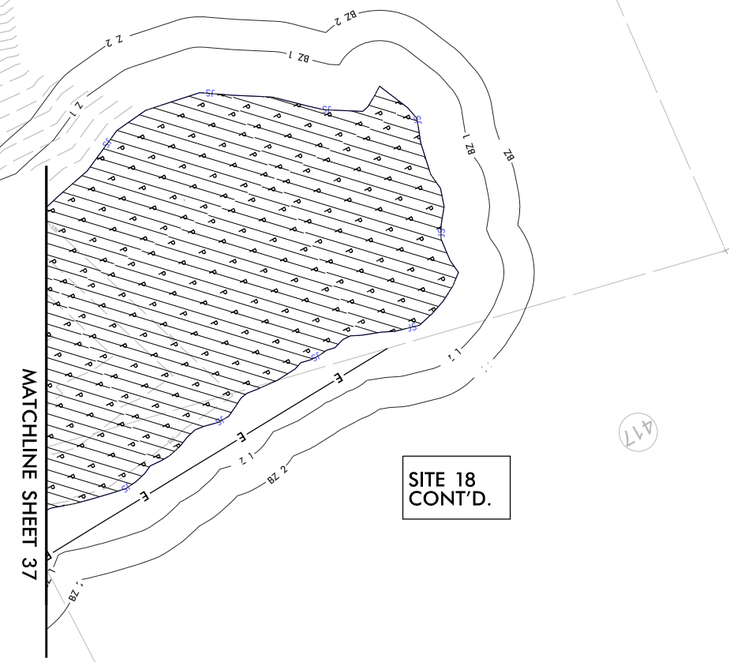
DITCH CHANGE

51499


15" RAP
EXTILE
15" ELBOWS
CLASS 'I' RIP RAP
EST 11 TONS
22 SY GEOTEXTILE
GRBU TL-3
30" RCP-W
30" RCP-W
FS
-Y13RPB- POC Sta. 10+00.00 = Sta. 455+76.40 LT
CHORD
15"
FS
CLASS 'B' RIP RAP
EST. 2 TONS
7 SY GEO-TEXTILE
-143'-
40'
C
A
455
10
192
SITE 18
S00°09'W
BZ
BZ 1
BZ 2
F
Z
Z8
Z8
Z8

51499





100' 0' 100'

GRAPHIC SCALE

FLATIRON

BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	37A
R-2721B ROADWAY SHEET NO. 19	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 50A OF 69

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DENOTES IMPACTS IN SURFACE WATER (POND)

8/2/2017
R-2721_PSH_37A_50Awet.dgn
$$$$USERNAME$$$$

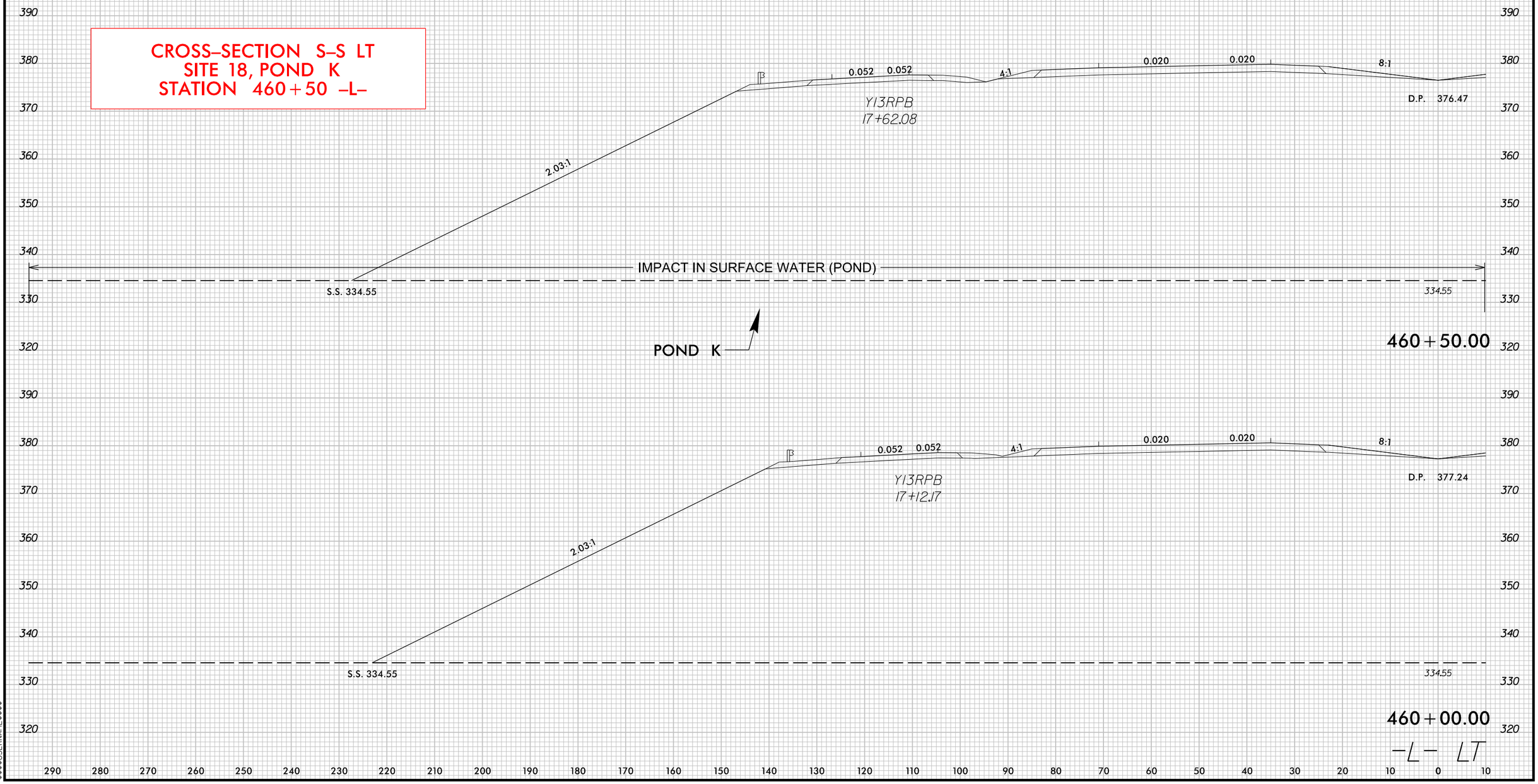
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-272

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

PERMIT DRAWING
SHEET 51 OF 69

CROSS-SECTION S-S LT
SITE 18, POND K
STATION 460+50 -L-



290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

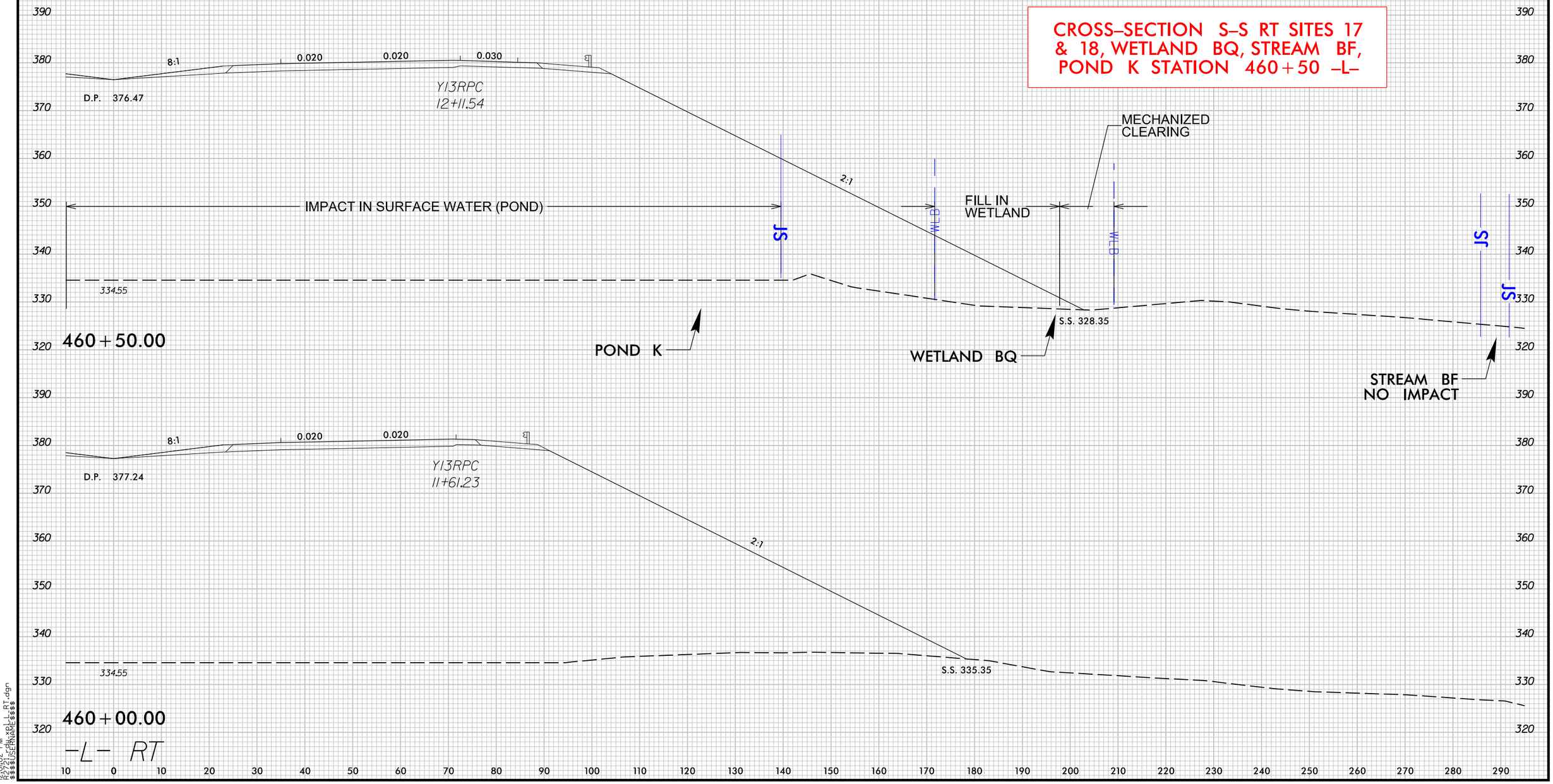
12:42:21 PM
R2721_X01_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-561

PERMIT DRAWING
SHEET 52 OF 69

CROSS–SECTION S–S RT SITES 17 & 18, WETLAND BQ, STREAM BF, POND K STATION 460+50 –L–

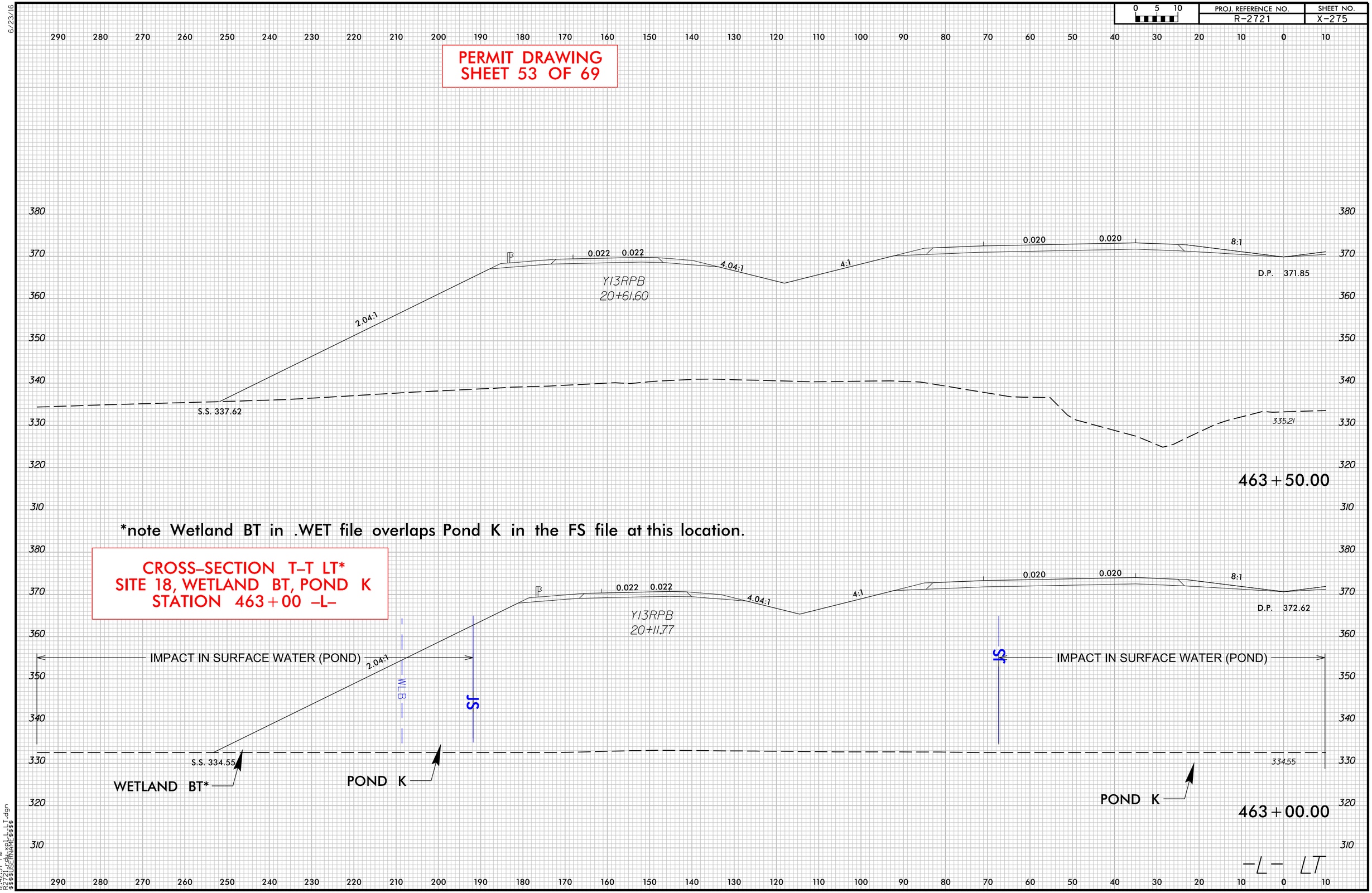


12/2002 PM
R2721_dtl_xsLL_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-275

PERMIT DRAWING
SHEET 53 OF 69



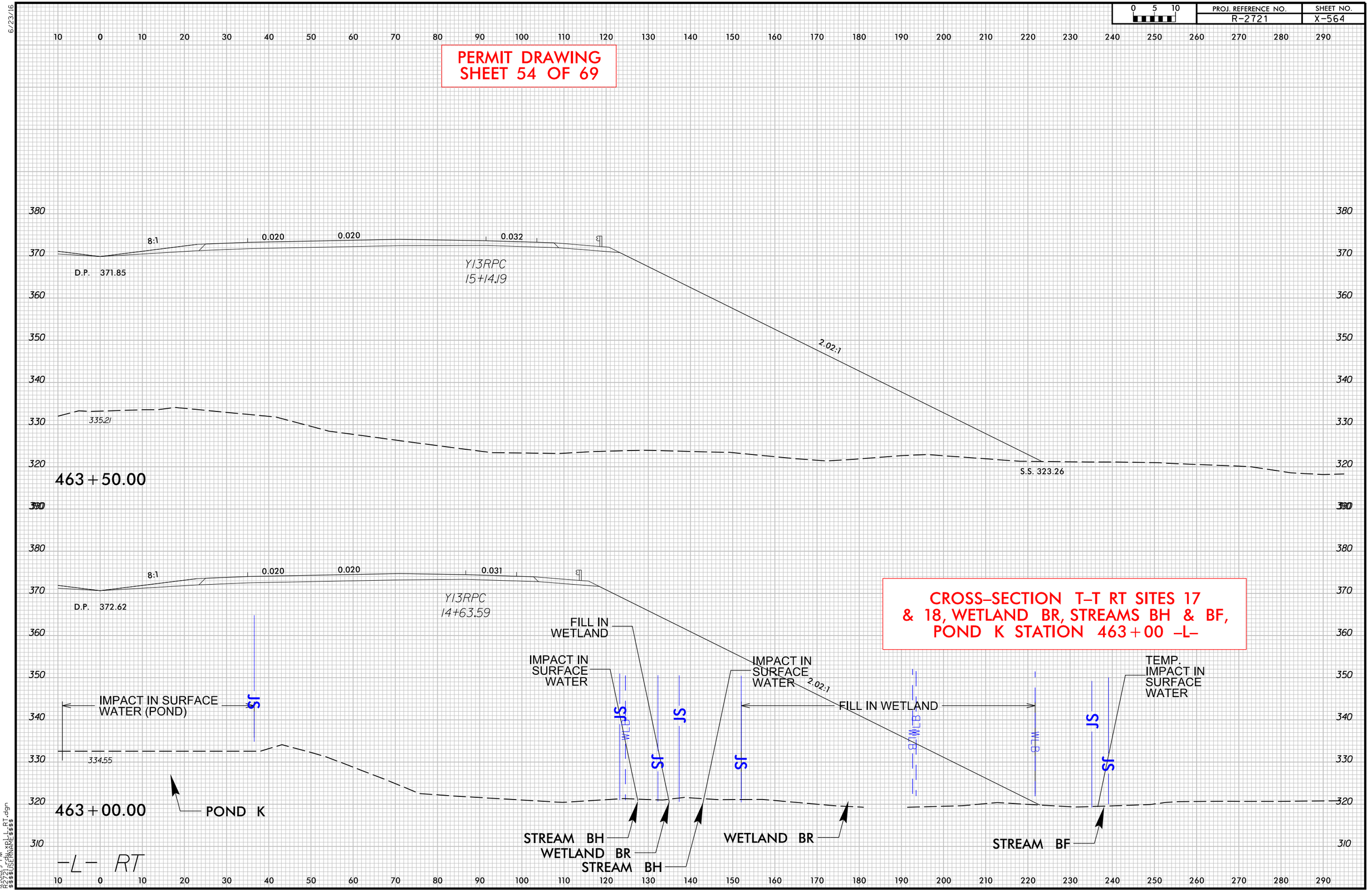
*note Wetland BT in .WET file overlaps Pond K in the FS file at this location.

CROSS-SECTION T-T LT*
SITE 18, WETLAND BT, POND K
STATION 463+00 -L-

12/20/17 PM
R2721_Pond_K_LT.dgn
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-564

PERMIT DRAWING
SHEET 54 OF 69



CROSS–SECTION T–T RT SITES 17 & 18, WETLAND BR, STREAMS BH & BF, POND K STATION 463+00 –L–

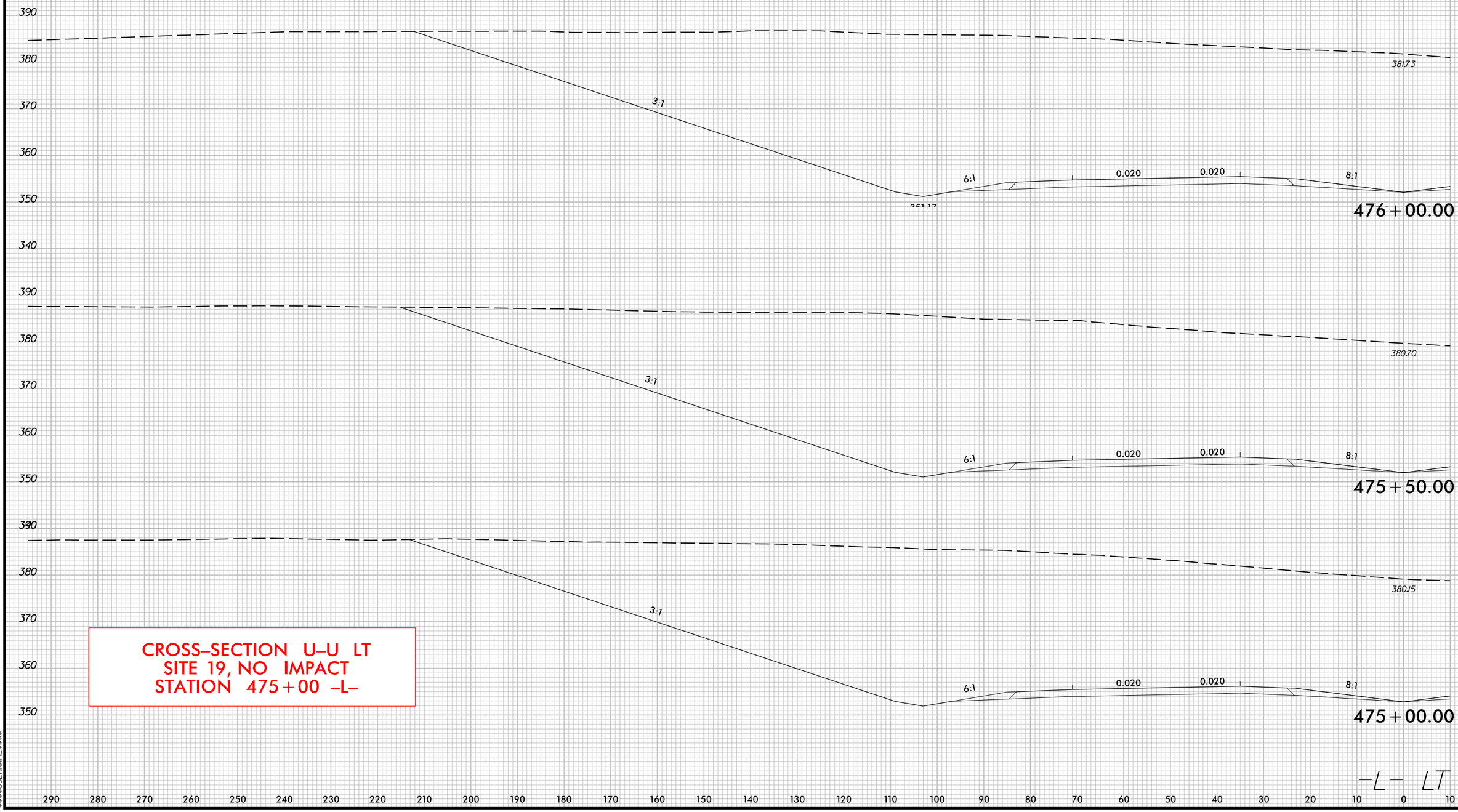
12:09:29 PM
R2721_PDP_xsLL_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-283

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

PERMIT DRAWING
SHEET 55 OF 69



CROSS–SECTION U–U LT
SITE 19, NO IMPACT
STATION 475+00 –L–

–L– LT

12:43:33 PM
R2721_PLT_xsl_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-571

PERMIT DRAWING
SHEET 56 OF 69

CROSS-SECTION U-U RT
SITE 19, WETLAND BV
STATION 475+00 -L-

WL BV

EXCAVATION

380.15

S.S. 373.30

3:1

WETLAND BV

8:1 | 0.020 | 0.020 | 0.022 | 6.01:1

Y13LPC

353.88

475+00.00

380.71

S.S. 373.21

3.03:1

8:1 | 0.020 | 0.020 | 0.028 | 0.028 | 6.07:1

Y13LPC

354.50

474+50.00

381.36

S.S. 372.79

3.15:1

8:1 | 0.020 | 0.020 | 0.026 | 0.026 | 6.31:1

Y13LPC

355.07

474+00.00

382.28

S.S. 373.61

3:1

8:1 | 0.020 | 0.020 | 6.87:1

359.55

Y13LPC

473+50.00

-L- RT

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

390 380 370 360 350

12:01:54 PM
R-2721_PLOT_XPLL_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-288

PERMIT DRAWING
SHEET 57 OF 69

CROSS-SECTION V-V LT
SITE 20, WETLAND BY
STATION 484+00 -L-

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

370 360 350 340 330

S.S. 350.24
3:1
6:1
0.020
0.020
8:1
342.18
344.35
484+50.00

WLB
EXCAVATION IN WETLAND
S.S. 350.45
3:1
6:1
0.020
0.020
8:1
342.03
344.44
D.P. 342.96
WETLAND BY
484+00.00

S.S. 352.23
3:1
6:1
0.020
0.020
8:1
341.98
345.43
D.P. 342.91
483+50.00

S.S. 352.57
3:1
6:1
0.020
0.020
8:1
342.03
347.58
D.P. 342.96
483+00.00

-L- LT

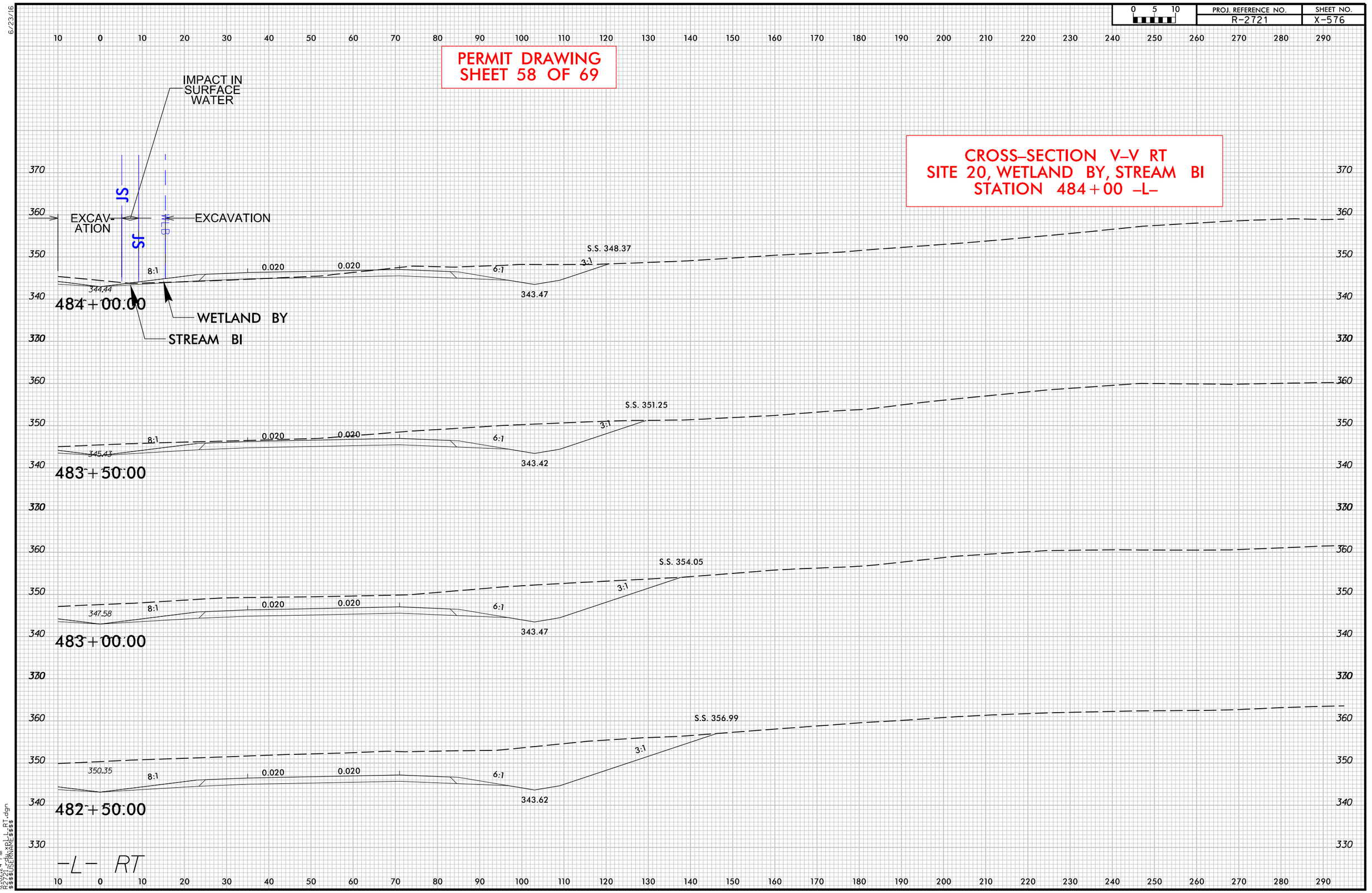
12:44:13 PM
R2721_Site20_XSLL_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-576

PERMIT DRAWING
SHEET 58 OF 69

CROSS-SECTION V-V RT
SITE 20, WETLAND BY, STREAM BI
STATION 484+00 -L-



12:02:24 PM
R2721_X-576_L_RT.dgn
$$$$USERNAME$$$$

PERMIT DRAWING
SHEET 59 OF 69

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	38
R-2721B ROADWAY SHEET NO. 20 & 21	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

100' 0' 100'

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 21
SITE 22
SITE 20 CONT'D.
DITCH CHANGE

MATCHLINE SHEET 37
-L- STA 487+00.00

MATCHLINE SHEET 39
-L- STA 499+00.00

-Y13RPA- STA 19+00.00
-Y13RPA- SC Sta. 12+40.00
-L- POC Sta. 495+93.25, 71.0' LT
-Y13RPD- ST Sta. 18+62.53
-Y13RPD- CS Sta. 16+82.53
-Y13RPD- SC Sta. 14+10.00
-Y13RPD- SRS Sta. 10+50.00
-Y13RPD- ST Sta. 10+00.00 =
-L- POC Sta. 496+95.81, 71.0' RT
-Y13RPD- STA 32+00.00
-Y14A- STA 13+00.00
-Y14A- PC Sta. 15+28.47
-Y14A- PT Sta. 17+52.54
-Y14- POT Sta. 9+00.00

WCB
SBK
SBJ
SBI

CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 65 TONS 120 SY GEOTEXTILE
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE
CLASS 'II' RIP RAP EST 95 TONS 128 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 37 TONS 82 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 39 TONS 75 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 60 TONS 80 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 25 TONS 55 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 42 TONS 64 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 95 TONS 110 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 38 TONS 125 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 45 TONS 80 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 31 TONS 65 SY GEOTEXTILE
CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO-TEXTILE
CLASS 'B' RIP RAP EST. 2 TONS 7 SY GEO-TEXTILE
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE

24" W/ELBOWS
18" W/ELBOWS
15" W/ELBOWS
24" RCP-III
15" RCP-III
2@6'x8' RCBC
2@7'x7' RCBC
18" RCP-III
TYPE B-77
REMOVE

N 21° 35' 31.2" E
N 23° 30' 40.7" E
N 19° 13' 05.1" E
S 76° 44' 56.0" E

8/8/2019
R2721_PSH_38_59+vet.dgn
$$$$USERNAME$$$$

PERMIT DRAWING
SHEET 59A OF 69

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	38
R-2721B ROADWAY SHEET NO. 20 & 21	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON | BRANCH

HDR Engineering, Inc. of the Carolinas
101 Harbor Blvd. Ste 50, Rdgy, SC 2700
N.C.B.E.L.S. License Number: P-0116

100' 0' 100'

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 21
SITE 22
SITE 20 CONT'D.
DITCH CHANGE

MATCHLINE SHEET 37
-L- STA 487+00.00

MATCHLINE SHEET 39
-L- STA 499+00.00

-Y13RPA- STA 19+00.00
-Y13RPA- SC Sta. 12+40.00
-Y13RPA- ST Sta. 10+00.00 =
-L- POC Sta. 495+93.25, 71.0' LT
-Y13RPD- STA 20+94.00
-Y13RPD- ST Sta. 18+62.53
-Y13RPD- CS Sta. 16+82.53
-Y13RPD- SC Sta. 14+10.00
-Y13RPD- SRS Sta. 10+50.00
-Y13RPD- ST Sta. 10+00.00 =
-L- POC Sta. 496+95.81, 71.0' RT
-Y14A- STA 13+00.00
-Y14A- PC Sta. 15+28.47
-Y14A- PT Sta. 17+52.54
-Y14- POT Sta. 9+00.00

WCB
SBK
SBJ
SBI

CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST. 65 TONS 120 SY GEOTEXTILE
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE
CLASS 'II' RIP RAP EST 92 TONS 128 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 37 TONS 82 SY GEOTEXTILE
CLASS 'B' RIP RAP EST. 2 TONS 10 SY GEO-TEXTILE
CLASS 'II' RIP RAP EST 95 TONS 110 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 36 TONS 75 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 25 TONS 55 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 42 TONS 64 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 60 TONS 80 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 38 TONS 125 SY GEOTEXTILE
CLASS 'II' RIP RAP EST 45 TONS 80 SY GEOTEXTILE
CLASS 'I' RIP RAP EMBEDDED INTO STREAM BED EST 31 TONS 65 SY GEOTEXTILE
CLASS 'B' RIP RAP EST. 2 TONS 7 SY GEO-TEXTILE

2@6'x8' RCBC
1@6'x8' RCBC
24" RCP-III
15" RCP-III
18" RCP-III
24" W/ELBOWS
18" W/ELBOWS
15" W/ELBOWS
TYPE B-77
REMOVE
RETAIN
RETAIN SYSTEM

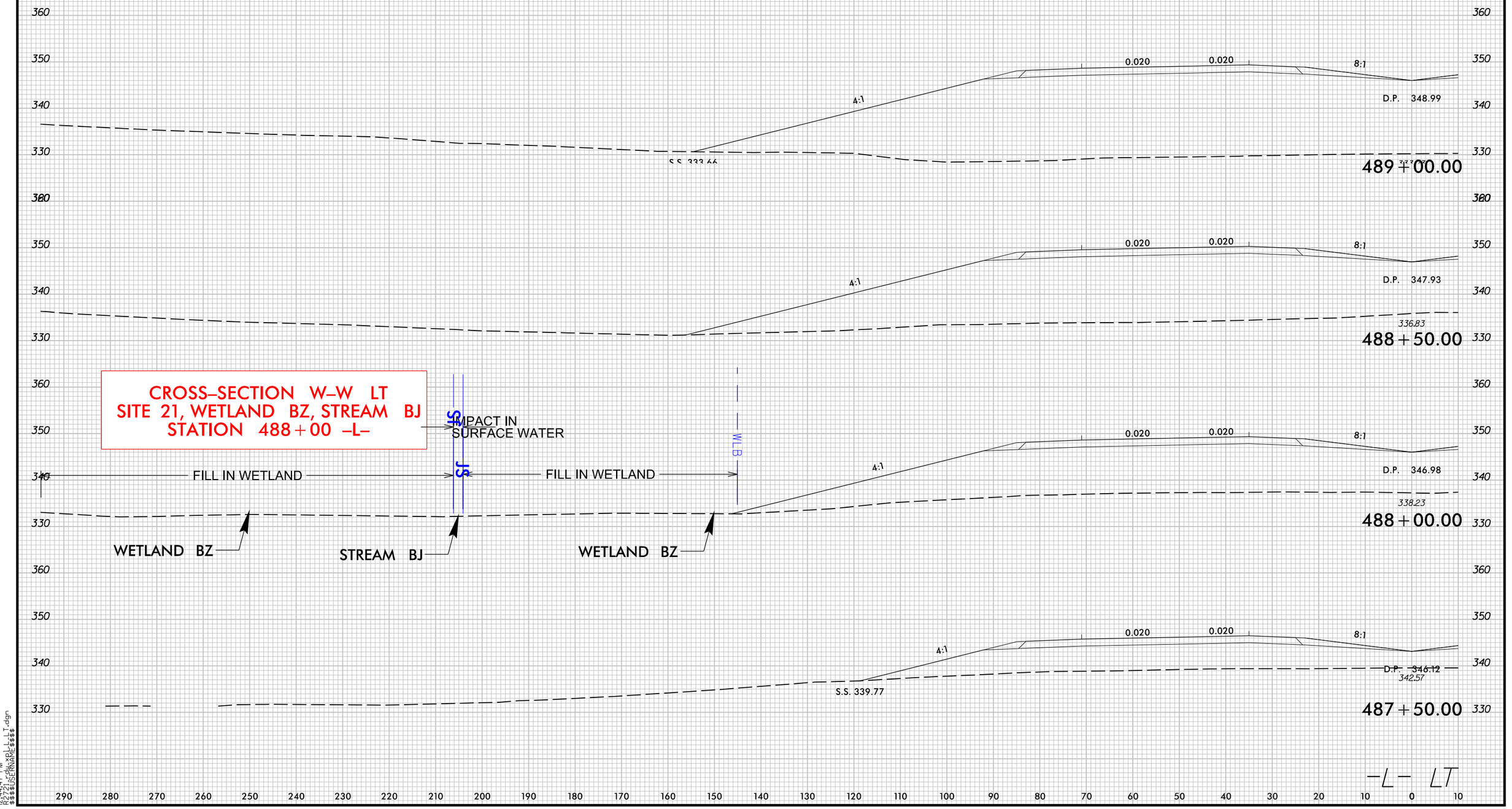
N 21° 35' 31.2" E
N 23° 30' 40.7" E
N 19° 13' 06.1" E
S 76° 44' 56.0" E

8821012
R2721_PSH_38_59Awet.dgn
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-290

PERMIT DRAWING
SHEET 60 OF 69

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10



290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-578

PERMIT DRAWING
SHEET 61 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

360 / 350 / 340 / 330 / 320

8:1 — 0.020 — 0.020 — 0.020 — 4:1

D.P. 350.14

S.S. 332.44

489+50.00

D.P. 348.99

S.S. 335.43

489+00.00

D.P. 347.93

336.83

S.S. 337.74

488+50.00

D.P. 346.98

338.23

S.S. 338.92

488+00.00

–L– RT

CROSS–SECTION W–W RT
SITE 20, WETLAND BY, STREAM BI
STATION 488+00 –L–

WLB — FILL IN WETLAND — WLB — IMPACT IN SURFACE WATER — JS — SF

WETLAND BY

STREAM BI

12:02:48 PM
R2721_Xsec_L_RT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-294

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

PERMIT DRAWING
SHEET 62 OF 69

CROSS–SECTION X–X LT
SITE 22, WETLAND CB
STATION 495+00 –L–

370 360 350 340 330 320

0.044 0.020 0.020 8:1

D.P. 362.86

Y13RPA
10+93.90

WLB

2:1

WLB

FILL IN WETLAND

S.S. 336.43

330.89

WETLAND CB

495+00.00

370 360 350 340 330 320

0.057 0.020 0.020 8:1

D.P. 361.70

Y13RPA
11+43.61

2:1

S.S. 338.16

333.73

494+50.00

370 360 350 340 330 320

0.070 0.020 0.020 8:1

D.P. 360.55

Y13RPA
11+93.34

2:1

S.S. 339.25

335.62

494+00.00

–L– LT

290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

12:45:27 PM
R2721_X-294_Sht_L_LT.dgn
$$$$USERNAME$$$$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-582

PERMIT DRAWING
SHEET 63 OF 69

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

380 370 360 350 340 330 320

8:1 0.020 0.020 4.02:1 0.022 0.022 2.02:1

D.P. 363.98

Y13RPD
22+49.70

332.75

S.S. 331.24

495+50.00

8:1 0.020 0.020 0.020 4.02:1 0.022 0.022 2.02:1

D.P. 362.86

IMPACTS IN SURFACE WATER

JS JS JS JS

IMPACT IN SURFACE WATER

Y13RPD
23+00.54

330.89

S.S. 329.53

495+00.00

STREAM BK STREAM BK STREAM BK

8:1 0.020 0.020 0.020 4.02:1 0.022 0.022 2.02:1

D.P. 361.70

Y13RPD
23+51.43

333.73

494+50.00

-L- RT

CROSS-SECTION X-X RT
SITE 22, STREAM BK
STATION 495+00 -L-

12:03:19 PM
R2721_22_xsL_L_RT.dgn
$$$$USERNAME$$$$

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	63
R-2721B ROADWAY SHEET NO. 32	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON — BRANCH CMIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PERMIT DRAWING SHEET 64 OF 69

F F DENOTES FILL IN WETLAND
S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100' 0' 100'

BEGIN CONSTRUCTION
-Y13D- STA. 11+00.00

-Y13B- POT Sta. 10+00.00
-Y13B- PT Sta. 12+94.26
-Y13B- PC Sta. 11+94.19
-Y13A- PT Sta. 15+06.
-Y13B- POT Sta. 13+82.10 =
-Y13A- POC Sta. 12+68.62
-Y13A- PC Sta. 12+15.02
-Y13- POT Sta. 38+84.03 =
-Y13A- POT Sta. 10+00.00 =
-Y13C- POT Sta. 10+00.00
-Y13C- POT Sta. 12+76.21

MATCHLINE SHEET 62 -Y13- STA 35+00.00
MATCHLINE SHEET 63 -Y13A- STA 16+00.00
MATCHLINE SHEET 37 -Y13- STA 48+00.00

SITE 25
SBO
WBW

N 55°16'00.1" E
N 43°19'21.1" E
N 56°34'34.9" W
S 12°42'08.8" E
N 18°14'19.0" E

R 540' R 410' R 385' R 375' R 255' R 1255' R 1145'

REMOVE +/- 5' OF 15" RCP
REMOVE +/- 41' OF 12" RCP
REMOVE SYSTEM
REMOVE

CLASS 'I' RIP RAP
EST 11 TONS
22 SY GEOTEXTILE

EST 8 TONS
7 SY GEO-TEXTILE

15" RCP-IV
18" RCP-IV
36" RCP-IV
24"

PUE DUE FS

388 389 203 45 40

204

8/8/2019
R-2721_PSH_63_64wet.dgn
$$$$USERNAME$$$$

51499

PERMIT DRAWING
SHEET 64A OF 69

FLATIRON

BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	63
R-2721B ROADWAY SHEET NO. 32	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND
I I DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100' 0' 100'

BEGIN CONSTRUCTION
-Y13D- STA. 11+00.00

-Y13B- POT Sta. 10+00.00

-Y13B- PT Sta. 12+94.26

-Y13B- PC Sta. 11+94.19

-Y13B- POT Sta. 13+82.10 =
-Y13A- POC Sta. 12+68.62
-Y13A- PC Sta. 12+15.02

-Y13A- PT Sta. 15+0[illegible]

-Y13- POT Sta. 38+84.03 =
-Y13A- POT Sta. 10+00.00 =
-Y13C- POT Sta. 10+00.00

-Y13C- POT Sta. 12+76.21

MATCHLINE SHEET 64
-Y13A- STA 16+00.00

MATCHLINE SHEET 62
-Y13- STA 35+00.00

MATCHLINE SHEET 37
-Y13- STA 48+00.00

SITE 25

SBO

WBW

RETAIN SYSTEM

REMOVE SYSTEM

REMOVE +/- 5' OF 15" RCP

REMOVE +/- 41' OF 12" RCP

CLASS 'I' RIP RAP
EST 11 TONS
22 SY GEOTEXTILE

CLASS 'I' RIP RAP
EST 1/2 TONS
7 SY GEO-TEXTILE

N 55°16'00.0" E

N 43°19'21.1" E

N 56°34'34.9" W

S 12°42'08.8" E

N 18°14'19.0" E

R 540'
R 410'
R 385'
R 375'
R 255'
R 1255'
R 1145'

18" RCP-IV
15" RCP-IV
24" RCP-IV
36" RCP-IV

PUE
DUE
FS
TS

388
389
203
204

8/2/2018
R-2721_PSH_63_64Avwet.dgn
$$$$USERNAME$$$$

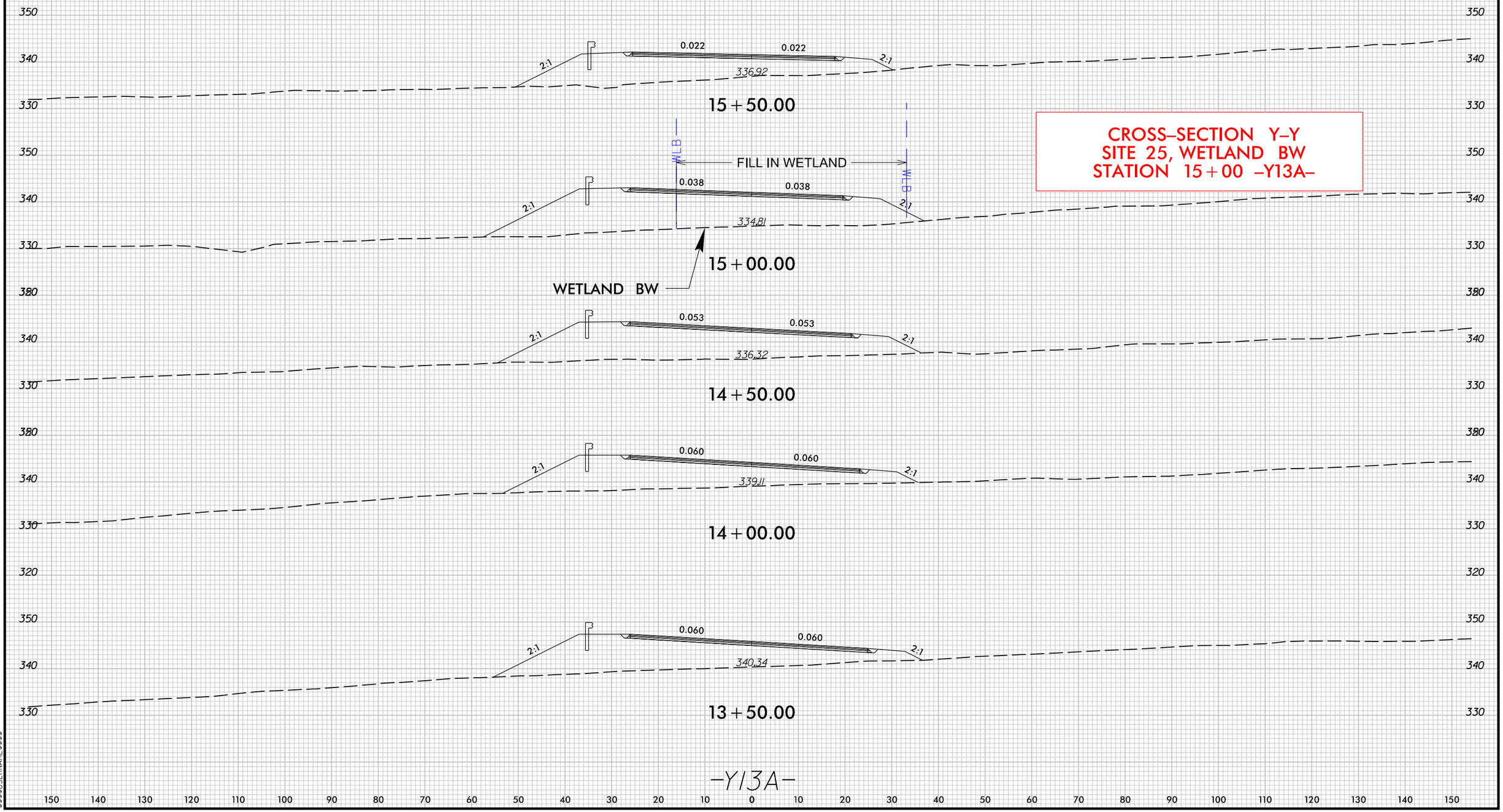
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2721	X-804

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 65 OF 69

CROSS-SECTION Y-Y
SITE 25, WETLAND BW
STATION 15+00 -Y13A-



11:40:44 AM
R2721-rdw_XPL_Y13A.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CMJL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	64
R-2721B ROADWAY SHEET NO. 33	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WBU

SBN

WBX

SITE 23

SITE 24

WET FILE START POINT

MATCHLINE SHEET 37
-Y13- STA 62+00.00

-Y13D- POT Sta. 10+00.00

-Y13D- PC Sta. 10+77.51

-Y13D- PT Sta. 12+05.68

-Y13- POT Sta. 69+34.40 =
-Y13D- POT Sta. 12+68.20

-Y13D- PC Sta. 13+67.64

-Y13D- PCC Sta. 14+86.83

-Y13D- PT Sta. 15+75.22

-Y13E- POT Sta. 10+00.00

-Y13D- POT Sta. 17+74.71 =
-Y13E- POT Sta. 11+61.11

-Y13D- POT Sta. 18+00.00

-Y13- POT Sta. 30+24.70

-Y13APA- PT Sta. 27+38.60

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY GEO-TEXTILE

CLASS 'I' RIP RAP
EST. 25 TONS
40 SY GEOTEXTILE

COLLAR & EXTEND EXISTING 15" RCP

REMOVE

PERMIT DRAWING
SHEET 66 OF 69

100' 0' 100'

8820119
R2721_PSH_64_66wet.dgn
$$$$USERNAME$$$$

51499

PROJECT REFERENCE NO.	SHEET NO.
R-2721	64
R-2721B ROADWAY SHEET NO. 33	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

FLATIRON | BRANCH CMIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WBU

SBN

WBX

SITE 23

SITE 24

WET FILE START POINT

MATCHLINE SHEET 37
-Y13- STA 62+00.00

-Y13D- POT Sta. 10+00.00

-Y13D- PC Sta. 10+77.51

-Y13D- PT Sta. 12+05.68

-Y13- POT Sta. 69+34.40 =
-Y13D- POT Sta. 12+68.20

-Y13D- PC Sta. 13+67.64

-Y13D- PCC Sta. 14+86.83

-Y13D- PT Sta. 15+75.22

-Y13E- POT Sta. 10+00.00

-Y13D- POT Sta. 17+74.71 =
-Y13E- POT Sta. 11+61.11

-Y13D- POT Sta. 18+00.00

-Y13RPA- PT Sta. 27+38.60

-Y13- POT Sta. 30+24.70

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY GEO-TEXTILE

CLASS 'I' RIP RAP
EST. 25 TONS
40 SY GEOTEXTILE

COLLAR & EXTEND EXISTING 15" RCP

PERMIT DRAWING
SHEET 66A OF 69

100' 0' 100'

8821019
R-2721_PSH_64_66Awet.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CMJL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	65
R-2721B ROADWAY SHEET NO. 35	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 67 OF 69

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

100' 0' 100'

MATCHLINE SHEET 63 –Y13A– STA 16+00.00

MATCHLINE SHEET 37 –Y13A– STA 29+00.00

SITE 26

CLASS 'B' RIP RAP EST. 8 TONS 21 SY GEO-TEXTILE

30" RCP-HW

15" RCHW

–Y13F– POT Sta. 10+00.00

–Y13F– PC Sta. 12+61.54

–Y13A– PC Sta. 24+05.43

–Y13F– PT Sta. 14+76.02

–Y13A– PT Sta. 27+64.44

–Y13F– POT Sta. 14+91.98

–Y13A– POC Sta. 27+50.04

N 4° 08' 18.7" E

N 4° 12' 25.9" W

N 46° 37' 08.1" W

N 45° 04' 58.9" E

R 280'

R 425'

R 545'

18" RCP-HW

PUE

RECPVE

WWE

8/8/2019
R2721_PSH_65_67+vet.dgn
$$$$USERNAME$$$$

51499

FLATIRON | BRANCH CIVIL

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
R-2721	65
R-2721B ROADWAY SHEET NO. 35	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 67A OF 69

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

100' 0' 100'

MATCHLINE SHEET 63 –Y13A– STA 16+00.00

MATCHLINE SHEET 37 –Y13A– STA 29+00.00

SITE 26

–Y13F– POT Sta. 10+00.00

–Y13F– PC Sta. 12+61.54

–Y13A– PC Sta. 24+05.43

–Y13F– PT Sta. 14+76.02

–Y13A– PT Sta. 14+91.98

–Y13F– POT Sta. 27+64.44

–Y13A– POC Sta. 27+50.04

N 4°08'18.7" E

N 4°12'25.9" W

N 4°12'25.9" W

N 46°37'08.1" W

N 45°04'58.9" E

CLASS 'B' RIP RAP EST. 8 TONS 21 SY GEO-TEXTILE

CLEAN, OUT AND RETAIN PIPE

30" RCP

15" RCP

FW

FS

PDE

TDE

PUE

WWE

R 280'

R 425'

R 545'

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (Pond) (ac)	Permanent SW impacts (Stream) (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	244+00-L-/248+00-L-	3@8'x10' RCBC							0.08		302		
		FILL	1.42		< 0.01	0.12			0.02		69		
		STABILIZATION							< 0.01	< 0.01	50	36	
2	279+00-L-/280+22-L-	FILL	0.86			0.13		0.95	0.03	< 0.01	398	11	
3	281+00 -L-/283+00-L-	2@7'X7' RCBC							0.04		285		
		FILL							0.01	< 0.01	96	46	
4	313+00-L-/317+00-L-	FILL	0.19		0.01	0.05			0.01	< 0.01	107	14	
5	322+00-L-/325+00-L-	1@6'X8' RCBC							0.05	< 0.01	458	52	
		FILL	1.04			0.25			0.01		57		
6	330+00-L-/332+00-L-	1@6'X8' RCBC (1)	0.41		0.03	0.03			< 0.01		284	10	
		1@6'X8' RCBC (2)							0.02		244		
		FILL	0.08		0.04				0.02	< 0.01	424		
7	346+00-L-/349+00-L-, 21+00-Y8RPA-/25+00-Y8RPA-	BRIDGES	0.20	0.45		0.02							
8	365+00-L-/366+50-L-	FILL	0.23	< 0.01	< 0.01	0.03			< 0.01		105		
9	366+50-L-/13+50 -Y10A-	1@6'X8' RCBC	0.01			0.26			< 0.01	< 0.01	252	22	
		66" RCP	0.05		< 0.01				< 0.01		105		
		FILL			< 0.01				< 0.01		319		
10++	380+00 -L-/383+00-L-	42" RCP						1.52					
11	386+00-L-/391+00-L-	48" RCP						4.43	< 0.01	< 0.01	404	60	
		FILL							< 0.01		20		
12	384+50-L-/387+00-L-	FILL	0.86		0.03	0.17			< 0.01	< 0.01	157	46	
TOTALS* THIS SHEET:			5.36	0.45	0.13	1.06		6.90	0.34	0.03	4136	296	0
TOTALS*	**ENTIRE R-2721B:**		**8.45**	**0.45**	**4.70**	**1.88**	**0.00**	**15.56**	**0.80**	**0.05**	**9283.41**	**464.59**	**0.00**

*Rounded totals are sum of actual impacts.

NOTES:
++Site includes only isolated resources.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
AUGUST 2019
WAKE COUNTY
TIP R-2721B
STATE PROJ. # 6.401078

Revised 2016 09 09

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (Pond) (ac)	Permanent SW impacts (Stream) (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
13++	408+00-L-/411+00-L-	FILL	0.21		0.06								
14	412+00-L-/416+00-L-	FILL	0.31		0.06	0.21			0.03	< 0.01	413	28	
15	414+50-L-/415+50-L-	1@7'X8' RCBC						2.30	< 0.01		142		
16	420+00-L-/425+00-L-	42" RCP	0.74		0.03	0.37			0.04	< 0.01	315	13	
		FILL							< 0.01		64		
17	437+00-L-/30+00-Y13A-	2@7'X7'RCBC	0.48			0.10			< 0.01	< 0.01	11	46	
		FILL							< 0.01		170		
		STABILIZATION							0.07		368		
18	459+50-L-/463+50-L-	2@7'X8'RCBC	0.18					6.36	0.02		256		
		FILL							< 0.01		15		
19++	15+00-Y13LPC-	EXCAVATION			2.15								
20	478+00-L-/488+00-L-	FILL	0.61		2.25	0.05			0.10		1135		
21	490+00-L-	2@6'X8'RCBC	0.40			0.09			0.08	< 0.01	977	34	
		FILL							0.04		384		
22	495+00-L-	1 @ 6'X8' RCBC	0.14		< 0.01				0.03	< 0.01	490	13	
		FILL							0.01		242		
23	65+30-Y13-	FILL							< 0.01	< 0.01	9	11	
24	10+00-Y13B-	15" RCP							< 0.01	< 0.01	1	17	
		FILL							< 0.01		13		
25	15+00-Y13A-	36" RCP	0.03						0.01	< 0.01	115	6	
		FILL							< 0.01		27		
26++	10+00-Y13A-	FILL				< 0.01							
TOTALS* THIS SHEET:			3.09		4.57	0.82		8.66	0.46	0.02	5147	168	0
TOTALS*	**ENTIRE R-2721B:**		**8.45**	**0.45**	**4.70**	**1.88**	**0.00**	**15.56**	**0.80**	**0.05**	**9283.41**	**464.59**	**0.00**

*Rounded totals are sum of actual impacts.

NOTES:
++Site includes only isolated resources.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
AUGUST 2019
WAKE COUNTY
TIP R-2721B
STATE PROJ. # 6.401078

Revised 2016 09 09