

CONSTRUCTION DRAWINGS FOR KNIGHTDALE STATION R-6 (SECTIONS A, B & C) KNIGHTDALE, WAKE COUNTY, NORTH CAROLINA

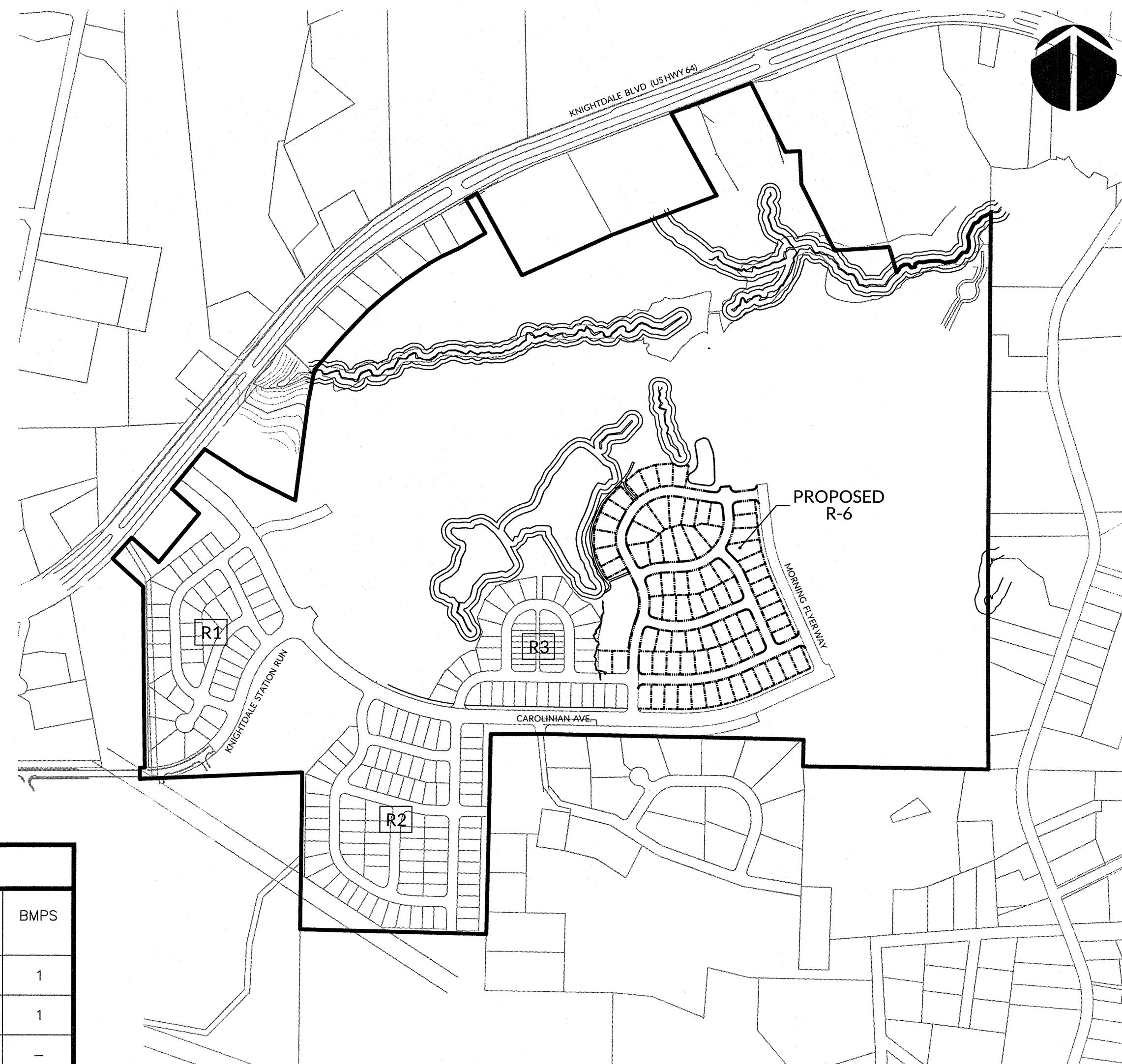
CONSTRUCTION DRAWINGS
FOR: KNIGHTDALE STATION R-6 (A, B & C)
WR PROJECT NO.: 209025.19

CITY OF RALEIGH	
ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.	
TRANSPORTATION SERVICES	N/A
PUBLIC UTILITIES	<i>K.A. Dew 2/20/14</i>
STORMWATER	N/A
PLANNING	N/A
FIRE	N/A
URBAN FORESTRY	N/A

September 16, 2016

SITE DATA TABLE	
KNIGHTDALE PROJECT No.	S-7-15
OWNER	KNIGHTDALE INVESTORS, LLC.
PARCEL PIN No.	1754867665 & 1754968812
EXISTING ZONING	UR12, GR8
PROPOSED ZONING	UR12, GR8
PROPOSED USE	SINGLE FAMILY
TOTAL PHASE AREA R-6 (A, B & C)	30.9 AC
RECREATIONAL OPEN SPACE (ACTIVE)	0.69 AC
RECREATIONAL OPEN SPACE (PASSIVE)	1.24 AC
TOTAL RECREATIONAL OPEN SPACE	1.93 AC
MAXIMUM DENSITY ALLOWED (UNITS/ACRE)	N/A
PROPOSED DENSITY (UNITS/ACRE)	2.5
TOTAL NUMBER OF LOTS ALLOWED	N/A
TOTAL NUMBER OF LOTS PROVIDED	79
TOTAL LINEAR FEET IN STREETS (PUBLIC)	3,898 LF
TOTAL LINEAR FEET OF ALLEY	N/A
TOTAL LINEAR FEET OF CURB & GUTTER	8,768 LF
TOTAL LINEAR FEET OF SIDEWALK	8,768 LF
TOTAL LINEAR FEET OF GREENWAY TRAIL	1,031 LF
TOTAL LINEAR FEET IN WATERLINES	4,464 LF
TOTAL LINEAR FEET IN SEWER LINES	3,765 LF
TOTAL LINEAR FEET IN STORM DRAINAGE	2,891 LF
PROJECTED WATER USAGE (GPD) (250 GPD/UNIT)	19,750
PROJECTED SEWER USAGE (GPD) (250 GPD/UNIT)	19,750
LOTS 180-258	
MINIMUM LOT WIDTH REQUIRED	60 LF
LOT WIDTH (TYP.)	70 LF
MINIMUM LOT AREA PROVIDED	7,992 SF
MEDIAN LOT AREA PROVIDED	9,100 SF
AVERAGE LOT AREA PROVIDED	9,533 SF
LOT SETBACKS	
FRONT YARD	10 FT
REAR YARD	25 FT
SIDE YARD	20% OF LOT WIDTH (AGGREGATE) - 5 FT MIN. SETBACK PER SIDE (WIDTH 60' OR GREATER)
* PER UDO SECTION 4.6(C)(4), ACCESSORY BUILDINGS SHALL BE A MINIMUM OF 5' FROM ANY PRINCIPAL BUILDING OR OTHER ACCESSORY BUILDING.	
** PER UDO SECTION 4.6(C), ACCESSORY BUILDINGS SHALL NOT EXCEED 800 SF; COLLECTIVELY COVER MORE THAN 20% OF THE TOTAL COMBINED AREA OF THE LOTS' REAR AND SIDE YARDS; INDIVIDUALLY EXCEED THE HEIGHT OF THE PRINCIPAL BUILDING.	
*** DRIVEWAY LENGTH FROM GARAGE TO EDGE OF ASPHALT SHALL BE A MINIMUM OF 20' ALONG ALLEYS.	

INDEX OF SHEETS	
OVERALL EXISTING CONDITIONS	SHT 1.0
EXISTING CONDITIONS	SHT 1.1
OVERALL SITE PLAN	SHT 2.0
SITE PLAN	SHT 2.1
PAVEMENT MARKINGS AND SIGNAGE PLAN	SHT 2.2
UTILITY PLAN	SHT 3.1
GRADING AND STORM DRAINAGE PLAN	SHT 4.1
EROSION CONTROL PLAN	SHT 5.1
SILVERCOMET DRIVE PLAN & PROFILE	SHT 6.1
SILVERCOMET DR. AND TWIN STAR LN. PLAN & PROFILE	SHT 6.2
GOLD COAST DR. AND HAWKEYE DR. PLAN & PROFILE	SHT 6.3
RED ARROW DR. AND SEWER OUTFALL 'H' PLAN & PROFILE	SHT 6.4
SEWER OUTFALL 'C' PLAN & PROFILE	SHT 6.5
STORMWATER MANAGEMENT PLAN	SHT 7.1
LANDSCAPE PLAN	SHT 8.1
LANDSCAPE DETAILS	SHT 8.2
ROADWAY DETAILS	SHT 9.1
STORM DRAINAGE DETAILS	SHT 9.2
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WATER UTILITY DETAILS	SHT 9.4
SEWER UTILITY DETAILS	SHT 9.5



INFRASTRUCTURE DATA											
SECTIONS	UNITS	AREA [AC]	STREETS [LF]	8" WATER MAIN [LF]	STORM DRAINAGE [LF]	8" SEWER MAIN [LF]	SEWER FLOW [GPD]	SIDEWALK [LF]	CURB AND GUTTER [LF]	DENUDED AREA [AC]	BMPS
SECTION A	24	9.0	1,247	1,147	864	1,527	6,000	2,495	2,495	2.96	1
SECTION B	34	15.1	2,199	2,200	1,545	1,480	8,500	4,137	4,137	7.93	1
SECTION C	21	6.8	452	1,117	482	758	5,250	2,136	2,136	2.11	-
TOTAL	79	30.9	3,898	4,464	2,891	3,765	19,750	8,768	8,768	13.00	-

DEVELOPER/OWNER
KNIGHTDALE INVESTORS, LLC.
P.O. BOX 3557
CARY, NC 27519

ATTN: THAD MOORE
TELEPHONE: (919) 481-3000
FAX: (919) 677-8600

PREPARED BY:

WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

ATTENTION CONTRACTORS
THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4540 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM FLUX, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
BY: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER
THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
BY: *[Signature]* DATE: 3-6-17
ADMINISTRATOR

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *W-3450*
AUTHORIZATION TO CONSTRUCT *Keith A. Dew*
DATE: 2/20/14

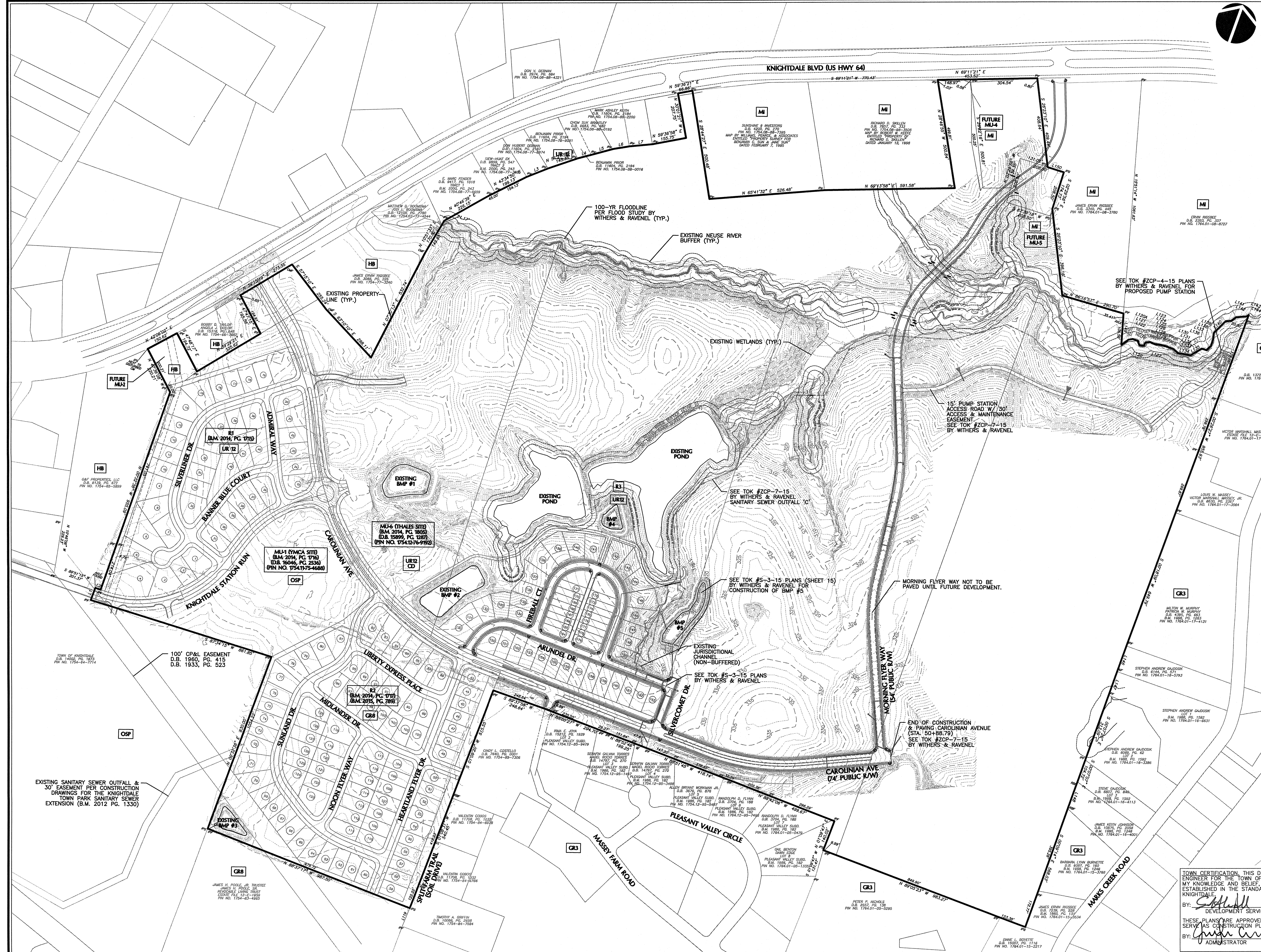
TOWN APPROVED STANDARDS SHALL CONTROL. IN THE EVENT OF A CONFLICT OR INCONSISTENCY BETWEEN THESE CONSTRUCTION DRAWINGS AND THE TOWN OF KNIGHTDALE'S APPROVED STANDARDS FOR THIS PROJECT, THE APPROVED STANDARDS SHALL CONTROL. TOWN OF KNIGHTDALE APPROVED STANDARDS SHALL MEAN ALL DEVELOPMENT DOCUMENTS NECESSARY FOR APPROVAL FOR THE PROPERTY INCLUDING, BUT NOT LIMITED TO, ANY SPECIAL USE PERMIT, SUBDIVISION PLAN, SITE PLAN, SUBDIVISION (S), PHASING SCHEDULE, DEVELOPMENT AGREEMENT, UTILITY ALLOCATION AGREEMENT, ANNEXATION AGREEMENT, THE TOWN OF KNIGHTDALE STANDARD SPECIFICATION AND DETAILS MANUAL AND APPLICABLE PROVISIONS OF THE NORTH CAROLINA STATE BUILDING CODE.

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM
THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.
CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *5-4269*
AUTHORIZATION TO CONSTRUCT *Keith A. Dew*
DATE: 2/20/14

PROFESSIONAL DESIGN ENGINEER CERTIFICATION: THESE IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING DRAWINGS AND WITH THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE. I, NICHOLAS J. ANTRILL, PE, CERTIFY THAT THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE HAVE BEEN THOROUGHLY CHECKED AND FOUND TO BE APPLICABLE TO THIS PROJECT. ALL EXCEPTIONS TO THE APPLICABLE TOWN STANDARDS HAVE BEEN PREVIOUSLY APPROVED BY THE TOWN OF KNIGHTDALE AND SAID EXCEPTIONS ARE SHOWN ON SHEET(S) _____ OF THESE DRAWINGS.
BY: *[Signature]* PE
DATE: 10/17/16

K:\V\09-020\09025.19-Knightdale Station - REVISED MASTER CONSTRUCTION DRAWINGS\0.0 COVER.dwg - Tuesday, September 20, 2016 10:21:59 AM - STRUCTLAND, ORCA

LINE#	BEARING	DISTANCE	LINE#	BEARING	DISTANCE	LINE#	BEARING	DISTANCE
L1	N 02°22'00" E	59.65	L83	N 33°59'04" E	16.36	L105	N 32°27'09" E	32.64
L2	N 89°51'15" E	25.63	L84	N 15°33'56" W	11.19	L106	S 63°40'02" W	52.60
L3	N 48°34'21" E	104.44	L85	N 48°02'26" W	8.13	L107	S 17°39'37" W	30.82
L4	N 50°32'01" E	59.25	L86	N 05°54'50" W	9.27	L108	S 64°52'50" W	16.37
L5	N 55°09'01" E	104.37	L87	S 85°02'31" W	13.30	L109	S 55°48'35" W	25.59
L6	N 60°47'31" E	73.31	L88	S 46°05'13" W	28.56	L110	S 79°45'59" W	16.62
L7	N 64°39'57" E	105.54	L89	S 46°05'13" W	49.52	L111	N 74°36'14" W	36.71
L8	N 69°17'12" E	127.74	L90	N 89°40'53" W	21.04	L112	S 20°05'46" W	36.19
L9	N 02°29'58" E	59.65	L91	N 49°20'51" W	31.06	L113	S 78°07'00" W	65.12
L10	S 02°29'58" E	33.77	L92	S 75°13'55" W	35.45	L114	S 89°59'43" W	20.11
L11	S 11°15'13" W	36.21	L93	N 49°48'00" W	51.18	L115	S 23°48'01" W	19.65
L12	S 48°43'53" W	54.97	L94	S 51°15'10" W	20.62	L116	N 89°44'17" W	24.55
L13	N 70°45'12" W	67.19	L95	N 67°28'31" W	33.64	L117	S 40°32'27" W	20.21
L14	S 23°59'54" W	13.97	L96	S 46°25'50" W	42.97	L118	N 67°46'43" W	5.10
L15	N 59°53'58" W	54.20	L97	N 74°55'41" W	59.78	L119	S 01°08'31" W	85.86
L16	N 08°15'51" W	22.08	L98	S 70°21'30" W	37.87	L120	N 50°58'10" E	3.14
L17	N 50°41'49" W	20.04	L99	N 82°12'58" W	33.48	L120A	N 34°54'58" E	22.43
L18	N 28°47'25" W	23.41	L100	N 81°41'08" W	20.32	L121	N 31°17'10" E	13.42
L19	N 82°35'54" W	100.65	L101	S 32°21'54" W	23.32	L122	N 61°23'47" E	16.81
L20	N 41°08'34" W	18.42	L102	S 77°17'29" W	36.88	L123	N 88°07'43" E	25.12
L21	S 82°38'28" W	36.21	L103	N 33°08'49" W	19.48	L124	S 35°28'54" W	14.50
L22	N 63°40'12" W	21.24	L104	N 80°18'23" W	28.24	L125	S 49°04'08" E	6.96
L23	S 80°04'35" W	27.76	L105	S 09°07'59" W	36.83	L126	N 76°45'33" E	21.02
L24	N 44°35'57" W	61.10	L106	S 33°46'53" W	51.77	L127	N 00°41'30" E	15.64
L25	S 81°50'57" W	13.96	L107	S 89°25'50" W	11.01	L128	N 64°19'57" E	21.82
L26	S 74°40'33" W	41.09	L108	S 62°28'11" W	51.09	L129	S 89°49'12" E	23.02
L27	S 00°02'37" E	32.13	L109	N 84°40'51" W	12.45	L130	N 79°48'20" E	24.25
L28	S 40°28'55" W	30.51	L110	S 64°00'43" W	25.92	L131	N 80°07'23" E	31.84
L29	S 18°04'04" E	16.83	L111	S 87°55'54" W	49.90	L132	S 87°11'45" E	11.66
L30	S 38°19'29" W	17.56	L112	N 53°01'14" W	13.97	L133	S 68°43'52" E	28.48
L31	S 08°59'58" W	37.25	L113	N 82°07'59" W	43.83	L134	N 79°27'36" E	58.20
L32	S 38°35'35" W	39.65	L114	N 60°04'36" W	20.77	L135	N 38°33'27" E	58.30
L33	S 31°12'51" W	39.65	L115	N 67°49'04" W	44.29	L136	N 87°19'08" E	22.82
L34	S 37°03'11" W	76.44	L116	S 56°47'51" W	23.50	L137	N 27°15'21" E	22.33
L35	N 71°16'18" W	27.65	L117	N 71°24'54" W	57.45	L138	N 01°34'30" W	33.94
L36	S 44°22'26" W	31.42	L118	N 89°28'54" W	36.97	L139	N 13°45'00" W	27.28
L37	N 78°15'11" W	41.65	L119	N 62°12'54" W	36.41	L140	N 25°45'01" E	75.79
L38	S 61°02'28" W	70.91	L120	N 49°38'30" W	8.51	L141	N 67°35'44" E	24.74
L39	N 39°43'50" W	25.78	L121	S 76°01'53" W	17.00	L142	N 35°31'57" E	22.99
L40	S 75°38'12" W	67.4	L122	S 58°32'56" W	66.69	L143	N 65°15'43" E	48.28
L41	S 24°48'35" W	14.31	L123	N 77°21'53" W	58.23	L144	N 36°13'05" E	11.27
L42	S 02°18'08" W	18.51	L124	N 08°25'56" W	22.63	L145	S 00°02'36" E	114.07
L43	S 48°01'05" W	42.25	L125	S 59°10'15" W	13.15	L146	S 00°02'54" W	129.44
L44	S 64°35'57" W	58.44	L126	S 58°30'47" W	20.15	L149	S 12°51'14" E	140.82
L45	N 48°41'18" W	29.35	L127	S 58°30'47" W	20.15	L150	N 87°39'18" E	77.48
L46	S 77°22'44" W	100.00	L128	S 40°14'59" W	16.38			
L47	S 82°17'12" W	124.79	L129	S 87°10'27" W	39.41			
L48	S 54°21'12" W	64.74	L130	S 26°18'42" W	50.48			
L49	S 54°52'17" W	53.33	L131	S 69°29'46" W	36.98			
L50	N 59°01'39" W	27.59	L132	N 69°45'05" W	10.17			
L51	N 71°44'52" W	83.28	L133	S 43°10'59" W	44.16			
L52	S 54°18'37" W	90.25	L134	N 88°16'59" W	42.67			

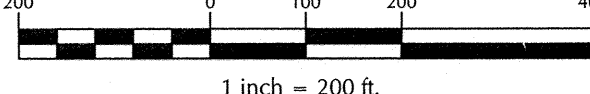
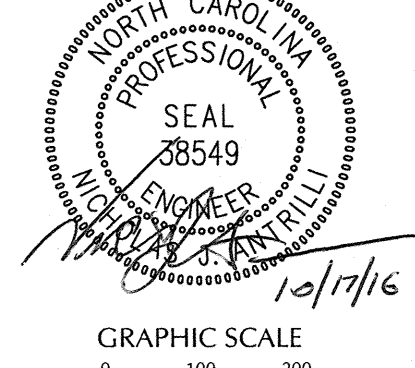


TOWN CERTIFICATION. THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3.16.17
ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SJV

Designer	WR	Scale	As Noted
Drawn By	LEG/GAS	Date	02/02/16
Checked By	NJA	Job No.	2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Knightdale Wake County North Carolina

OVERALL EXISTING CONDITIONS




WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No. **1.0**

K:\09\0250\02501.9-Knightdale Station - R6 (OVERALL EXISTING CONDITIONS.dwg) - Tuesday, September 20, 2016 10:22:46 AM - STRICKLAND, ORGD

TREE LEGEND

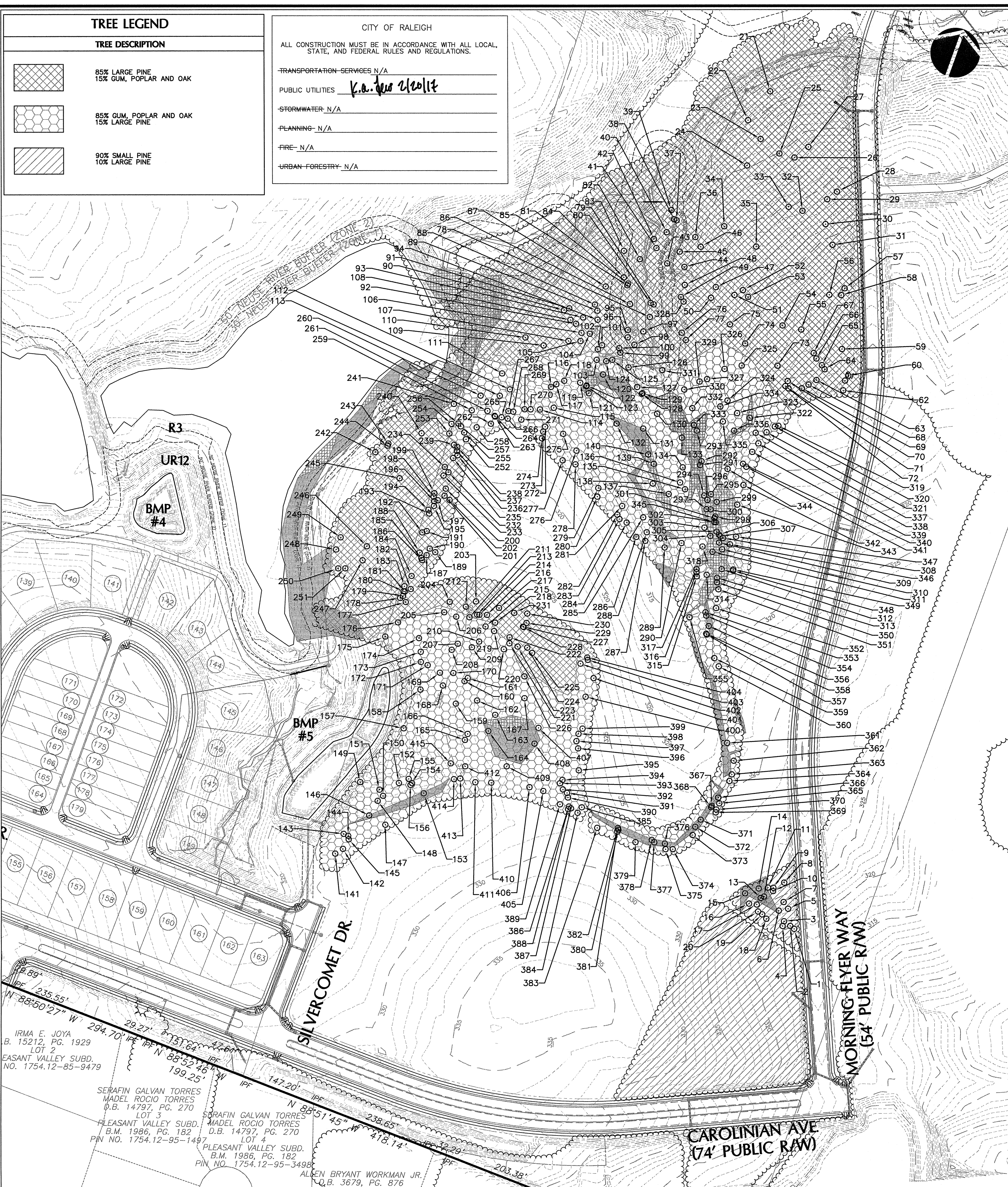
TREE DESCRIPTION

-  85% LARGE PINE
15% GUM, POPLAR AND OAK
-  85% GUM, POPLAR AND OAK
15% LARGE PINE
-  90% SMALL PINE
10% LARGE PINE

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

- TRANSPORTATION SERVICES N/A
- PUBLIC UTILITIES *V.A. New 2/6/17*
- STORMWATER N/A
- PLANNING N/A
- FIRE N/A
- URBAN FORESTRY N/A


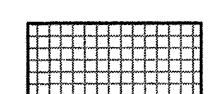


TREE ID	DESCRIPTION	TREE ID	DESCRIPTION	TREE ID	DESCRIPTION	TREE ID	DESCRIPTION	TREE ID	DESCRIPTION
0	30.8 GUM	84	NO DESCRIPTION	168	28.3 PINE	252	18.0 OAK DOUBLE STEM	336	18.0 OAK DOUBLE STEM
1	12.6 GUM	85	16.9 POPLAR	169	12.7 GUM	253	21.5 PINE	337	12.8 PINE
2	14.0 GUM	86	12.1 PINE	170	18.4 GUM	254	16.7 GUM	338	16.5 OAK
3	13.3 PINE	87	14.5 PINE	171	18.5 GUM	255	22.4 GUM	339	16.2 OAK
4	22.0 PINE	88	12.8 PINE	172	13.1 POPLAR	256	14.9 GUM	340	12.7 GUM
5	22.0 PINE	89	12.0 POPLAR	173	18.5 POPLAR	257	16.5 GUM	341	12.5 PINE
6	13.1 MAPLE - HOLLOW	90	12.3 POPLAR	174	32.9 GUM	258	12.7 RED OAK	342	16.8 ELM
7	16.7 POST OAK	91	13.1 PINE	175	17.2 ELM	259	15.0 DOUBLE WHITE OAK	343	12.3 PINE
8	13.7 GUM	92	13.1 PINE	176	56.1 WILLOW OAK	260	14.6 GUM	344	35.1 MULTISTEM POPLAR
9	12.5 RED OAK	93	14.8 PINE	177	14.8 PINE	261	14.0 GUM	345	13.9 POPLAR
10	13.0 GUM	94	14.3 POPLAR	178	18.3 PINE	262	12.7 GUM	346	19.9 ELM
11	16.3 POPLAR	95	16.7 POPLAR	179	16.7 PINE	263	18.0 GUM	347	16.2 MAPLE
12	17.9 PINE	96	15.9 POPLAR	180	12.5 MAPLE	264	14.9 GUM	348	12.6 PERSIMMON
13	16.3 PINE	97	30.1 DOUBLE POPLAR	181	12.8 MAPLE	265	16.7 GUM	349	23.6 MAPLE
14	20.1 PINE	98	15.0 PINE	182	24.8 PINE	266	19.8 DOUBLE GUM	350	12.2 PERSIMMON
15	13.7 RED OAK	99	13.4 PINE	183	29.3 WILLOW OAK	267	17.2 DOUBLE GUM	351	40.3 RED OAK
16	19.5 TWIN POST OAK	100	12.2 PINE	184	26.8 PINE	268	22.1 PINE	352	12.9 MAPLE
17	12.9 RED OAK	101	14.0 PINE	185	21.3 PINE	269	14.0 GUM	353	39.3 POPLAR TWIN STEM
18	14.5 PINE	102	12.1 PINE	186	17.5 PINE	270	13.2 ELM	354	13.2 RED OAK
19	12.4 PINE	103	15.5 POPLAR	187	19.9 PINE	271	12.3 RED OAK	355	16.0 RED OAK TWIN
20	13.1 PINE	104	12.1 POPLAR	188	33.1 DOUBLE RED OAK	272	13.0 CHERRY	356	12.6 RED OAK
21	12.1 PINE	105	NO DESCRIPTION	189	24.9 PINE	273	12.1 RED OAK	357	23.0 RED OAK
22	12.3 PINE	106	12.1 GUM	190	13.0 RED OAK	274	12.2 RED OAK	358	24.9 RED OAK
23	12.1 PINE	107	33.5 MULTISTEM POPLAR	191	27.2 PINE	275	13.0 PINE	359	30.8 RED OAK
24	13.2 PINE	108	13.9 POPLAR	192	16.5 RED OAK	276	22.8 DOUBLE RED OAK	360	23.4 RED OAK
25	12.2 OAK RED	109	14.7 POPLAR	193	19.2 PINE	277	12.6 WHITE OAK	361	13.2 RED OAK
26	25.2 POPLAR TRIPLE STEM	110	13.7 PINE	194	17.8 PINE	278	12.6 WHITE OAK	362	25.1 RED OAK
27	21.4 POPLAR DOUBLE STEM	111	12.7 RED OAK	195	21.7 PINE	279	17.4 RED OAK	363	21.0 RED OAK
28	13.6 POPLAR	112	15.8 GUM	196	18.3 PINE	280	12.3 PINE	364	13.2 PINE
29	34 POPLAR MULTISTEM	113	18.7 DOUBLE RED OAK	197	13.1 RED OAK	281	12.9 RED OAK	365	15.0 PINE
30	12.4 PINE	114	15.5 RED OAK	198	15.5 RED OAK	282	12.0 PINE	366	12.0 PINE
31	13.4 PINE	115	12.1 RED OAK	199	14.9 RED OAK	283	12.4 RED OAK	367	15.0 PINE
32	12.3 PINE	116	13.9 RED OAK	200	23.1 PINE	284	12.5 PINE	368	16.5 PINE
33	12.9 PINE	117	12.0 PINE	201	26.9 RED OAK	285	18.9 RED OAK	369	13.4 PINE
34	28.4 POPLAR TRIPLE STEM	118	13.2 PINE	202	16.0 PINE	286	14.0 RED OAK	370	42.1 PINE
35	12.5 PINE	119	13.3 PINE	203	12.7 PINE	287	14.0 RED OAK	371	22.8 PINE
36	13.5 POPLAR	120	15.0 WHITE OAK	204	14.1 PINE	288	12.3 RED OAK	372	18.8 PINE
37	13.0 POPLAR	121	15.5 POPLAR	205	16.2 PINE	289	51.5 RED OAK MULTISTEM	373	27.9 PINE
38	12.4 PINE	122	14.9 WHITE OAK	206	12.5 GUM	290	23.2 POPLAR	374	12.8 RED OAK
39	18.5 POPLAR	123	12.5 MAPLE	207	12.0 GUM	291	51.1 POPLAR MULTISTEM	375	18.2 PINE
40	12.6 PINE	124	12.3 POPLAR	208	12.0 PINE	292	39.0 MULTISTEM POPLAR	376	18.5 RED CEDAR
41	12.5 GUM	125	22.7 POPLAR	209	13.1 POPLAR	293	16.0 GUM	377	13.8 RED OAK
42	21.0 DOUBLE POPLAR	126	33.1 MULTISTEM POPLAR	210	16.1 PINE	294	57.1 MULTISTEM POPLAR	378	15.6 MAPLE
43	13.1 PINE	127	16.1 POPLAR	211	12.4 PINE	295	17.2 POPLAR	379	18.7 PINE
44	13.8 PINE	128	14.9 POPLAR	212	12.7 PINE	296	20.9 POPLAR	380	15.1 RED OAK
45	67.5 POPLAR MULTISTEM	129	12.3 PINE	213	14.1 PINE	297	12.5 GUM	381	12.3 PINE
46	12.1 PINE	130	12.5 POPLAR	214	15.0 PINE	298	13.4 GUM	382	15.7 CHERRY
47	14.2 PINE	131	12.2 POPLAR	215	14.0 PINE	299	14.0 GUM	383	23.1 RED OAK
48	13.0 PINE	132	66.3 MULTISTEM POPLAR	216	12.2 PINE	300	14.1 POPLAR	384	15.1 RED OAK
49	12.5 PINE	133	14.4 WHITE OAK	217	15.6 PINE	301	13.6 PINE	385	12.5 PINE
50	27.6 POPLAR TWIN	134	12.5 PINE	218	31.5 QUADRUPLE CHERRY	302	37.7 MULTISTEM POPLAR	386	13.5 PINE
51	16.8 POPLAR	135	12.8 PINE	219	15.4 PINE	303	15.1 RED OAK	387	16.8 RED OAK
52	12.3 PINE	136	14.3 RED OAK	220	13.5 PINE	304	14.0 MAPLE	388	19.9 PINE
53	12.6 PINE	137	12.0 RED OAK	221	12.1 PINE	305	20.9 DOUBLE POPLAR	389	15.7 RED OAK
54	12.2 PINE	138	12.8 POPLAR	222	13.5 PINE	306	12.9 POPLAR	390	24.1 RED OAK
55	13.1 GUM	139	12.0 PINE	223	15.8 PINE	307	14.4 POPLAR	391	21.8 PINE
56	12.3 PINE	140	12.3 GUM	224	15.0 PINE	308	16.7 POPLAR	392	14.4 RED OAK
57	12.6 PINE	141	14.1 CRAB APPLE	225	12.9 ELM	309	19.8 POPLAR	393	15.6 RED OAK
58	12.5 POPLAR	142	NO DESCRIPTION	226	29.4 DOUBLE WILLOW OAK	310	19.6 POPLAR	394	25.4 RED OAK
59	12.5 OAK	143	20.8 POPLAR	227	22.3 WILLOW OAK	311	41.4 DOUBLE POPLAR	395	19.9 RED OAK
60	12.4 GUM	144	23.9 POPLAR	228	14.4 RED OAK	312	16.0 POPLAR	396	12.0 RED OAK
61	12.1 GUM	145	31.5 WHITE OAK	229	14.9 RED OAK	313	13.5 GUM	397	14.5 RED OAK
62	31.5 POPLAR DOUBLE STEM	146	23.5 RED OAK	230	14.6 PINE	314	13.5 CHERRY	398	15.1 RED OAK
63	13.7 POPLAR	147	15.5 POPLAR	231	25.9 PINE	315	13.5 PINE	399	19.7 ELM
64	13.3 POPLAR	148	22.9 POPLAR	232	37.1 PINE	316	15.1 PINE	400	13.9 RED OAK
65	12.8 ELM	149	16.5 POPLAR	233	27.9 PINE	317	14.2 GUM	401	13.3 ELM
66	13.2 ELM	150	21.2 POPLAR	234	19.4 PINE	318	12.5 PINE	402	14.7 ELM
67	14.0 MAPLE	151	14.6 POPLAR	235	17.5 PINE	319	12.0 PINE	403	15.5 RED OAK
68	15.7 POPLAR	152	36 WHITE OAK	236	26.5 PINE	320	18.3 PINE	404	12.5 PINE
69	23.0 GUM DOUBLE STEM	153	14.8 POPLAR	237	20.6 PINE	321	13.5 POPLAR	405	45.8 WHITE OAK
70	13.7 GUM	154	12.7 POPLAR	238	27.0 PINE	322	14.8 GUM	406	13.2 PINE
71	29.2 GUM DOUBLE STEM	155	12.2 POPLAR	239	15.8 PINE	323	13.9 POPLAR	407	12.5 PINE
72	12.5 PINE	156	25.3 ELM	240	20.3 PINE	324	14.1 OAK	408	29.8 WHITE OAK
73	12.5 PINE	157	39.7 WHITE OAK	241	13.4 PINE	325	12.2 PINE	409	43.5 QUADRUPLE RED OAK
74	13.8 PINE	158	47.5 WHITE OAK	242	16.7 PINE	326	12.2 PINE	410	26.3 DOUBLE ELM
75	13.5 PINE	159	19.7 POPLAR	243	12.1 PINE	327	12.3 PINE	411	12.6 ELM
76	12.3 GUM	160	23.6 POPLAR	244	13.0 PINE	328	29.5 POPLAR TRIPLE STEM	412	29.9 WHITE OAK
77	12.5 PINE	161	41.3 WHITE OAK	245	24.4 PINE TRIPLE	329	13.0 PINE	413	16.5 CHERRY
78	28.8 MULTISTEM POPLAR	162	32.1 WHITE OAK	246	15.5 PINE	330	20.6 MAPLE	414	14.1 ELM
79	15.5 POPLAR	163	31.1 WHITE OAK	247	19.1 PINE DOUBLE	331	14.6 RED OAK		
80	13.6 PINE	164	15.9 MAPLE	248	16.3 PINE	332	12.4 POPLAR		
81	52.9 MULTISTEM POPLAR	165	16.9 ELM	249	16.7 PINE	333	13.4 POPLAR		
82	13.7 POPLAR	166	12.3 SWEET GUM	250	14.5 PINE	334	12.9 PINE		
83	12.3 PINE	167	15.3 PINE	251	14.0 GUM	335	13.8 POPLAR		

NOTE:
-SEE SHEET 2.1 FOR TREE PROTECTION AND REPLACEMENT CALCULATIONS.
-SEE SHEET 8.1 FOR LOCATION OF REPLACEMENT TREES.

EXISTING SLOPE LEGEND

SLOPE DESCRIPTION

-  SLOPES 15% - 25%
-  SLOPES > 25%

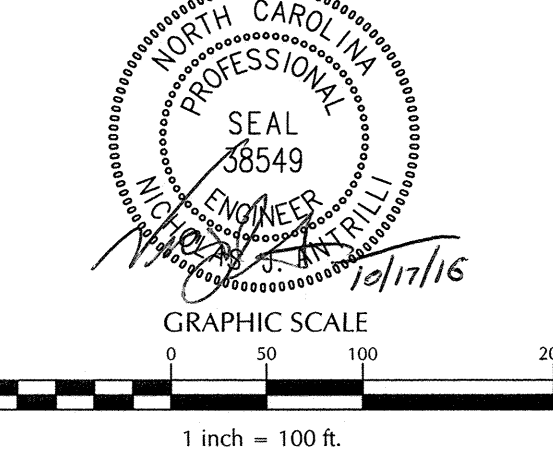
***TREE SURVEY BASED ON FIELD LOG PREPARED BY ELLEN & ASSOCIATES CONSULTING FORESTRY, INC. IN JANUARY 2016. TREES WERE COLLECTED VIA GPS BY WITHERSRAVENEL, INC.**

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *John S. Sullivan* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *John S. Sullivan* DATE: 3-6-17
ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SYJ

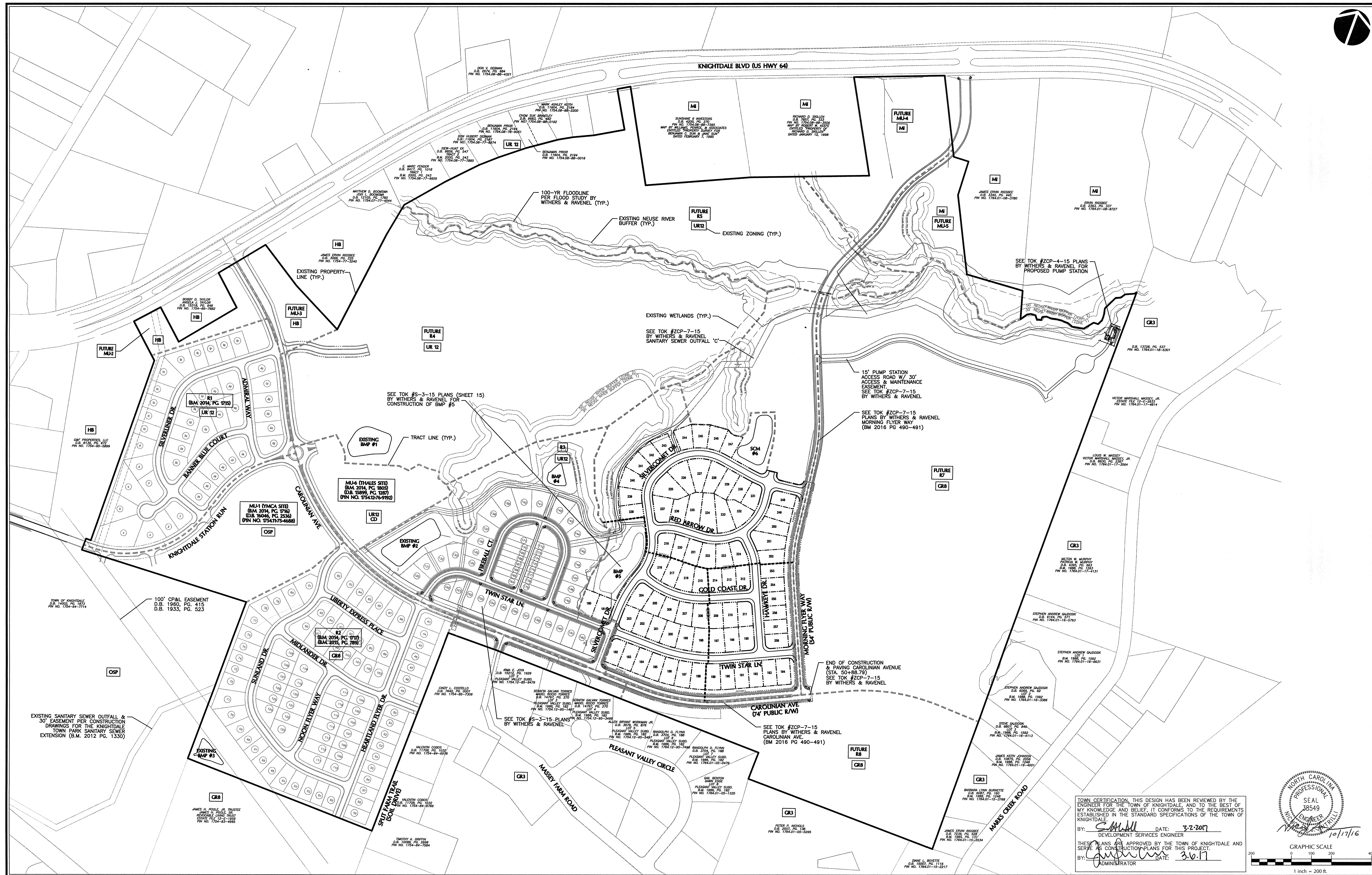
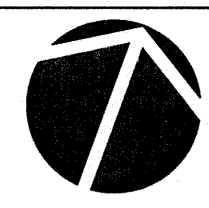
Designer: WR Scale: As Noted
Drawn by: LEG/GAS Date: 02/02/16
Checked by: N/A Job No.: 2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Knightdale Wake County North Carolina

EXISTING CONDITIONS

WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No. **1.1**

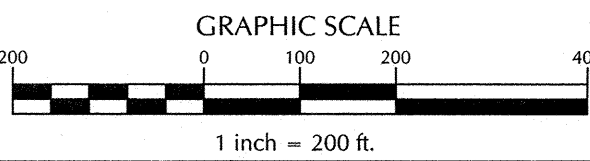
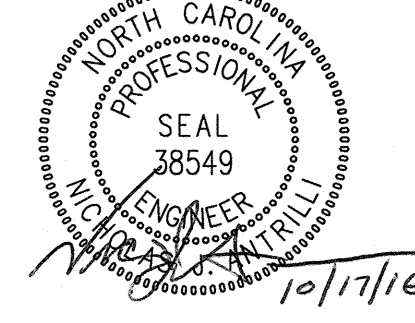


TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3.2.2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3.6.17
ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SH

Designer	WR	Date	As Noted
Drawn By	LEG/GAS	Date	02/02/16
Checked By	NJA	Job No.	2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County
North Carolina

OVERALL SITE PLAN

WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKenzie Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No.
2.0

K:\09-0250\090251.9-Knightdale Station - R6\CAMASTER-CONSTRUCTION DRAWINGS\3.0 OVERALL SITE PLAN.dwg - Tuesday, September 20, 2016 10:24:02 AM - STRICKLAND, GREG

CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.
 TRANSPORTATION SERVICES N/A
 PUBLIC UTILITIES *K.A. J. 11/16/17*
 STORMWATER N/A
 PLANNING N/A
 FIRE N/A
 URBAN FORESTRY N/A

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: *[Signature]* DATE: 3-2-2017
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: *[Signature]* DATE: 3.0.17
 ADMINISTRATOR

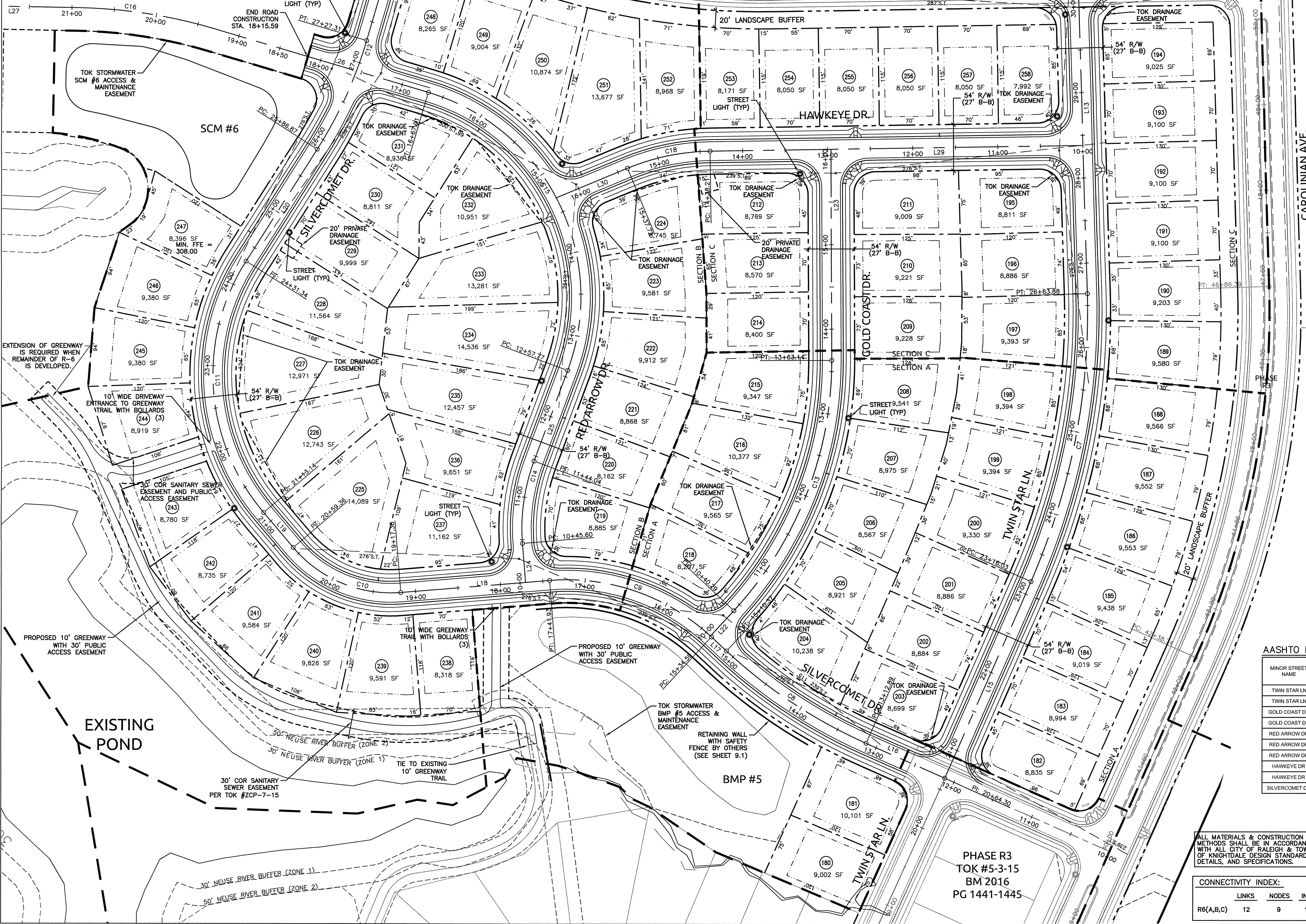
- GENERAL NOTES**
- SEE SHEET 2.0 FOR EXISTING ZONING AND PROPOSED ZONING.
 - BOUNDARY SURVEY PERFORMED BY WITHERSRAVENEL.
 - WETLANDS AND STREAM BUFFERS DELINEATED AND SURVEYED BY WITHERSRAVENEL.
 - PROPERTY ANNEXED INTO TOWN OF KNIGHTDALE SEPT. 3, 2013.
 - WATER ALLOCATION HAS BEEN AWARDED BASED ON THE UTILITY ALLOCATION AND INFRASTRUCTURE AGREEMENT, D.B. 014722, PAGES 01758 - 01813.
 - STREET LIGHTS SHALL BE PROVIDED FOR R-6 PER UDO SECTION 11.5 - STREET LIGHTING POLICY. IF UPGRADES FROM THE TOWN'S STANDARD LIGHT SPECIFICATION ARE REQUESTED, THE DEVELOPER WILL BE REQUIRED TO PAY THE TOWN THE DIFFERENCE IN THE COSTS TO MAINTAIN THE DESIRED FIXTURE AND POLE COVERING A PERIOD OF 10 YEARS.
 - ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES.
 - THIS PROPERTY DOES NOT LIE WITHIN THE FEMA FLOODPLAIN PER MAP NUMBER 3720175400L AND 3720176400L, WITH AN EFFECTIVE DATE OF MAY 2, 2008.
 - DIVISION OF WATER QUALITY (DWQ) AND/OR UNITED STATES ARMY CORPS OF ENGINEERS (USACE) APPROVAL SHALL BE REQUIRED PRIOR TO CONSTRUCTION WITHIN WETLANDS OR STREAM BUFFER AREAS.
 - THE TURNOUT RADIUS AT ALL INTERSECTIONS SHALL BE A MINIMUM OF 30 FEET MEASURED AT THE BACK OF CURB UNLESS OTHERWISE NOTED.
 - ALL RIGHT-OF-WAY SHOWN HEREIN IS PUBLIC RIGHT-OF-WAY, UNLESS OTHERWISE NOTED.
 - NO SIGHT OBSTRUCTION, OR PARTIALLY OBSTRUCTING WALL, FENCE, FOLIAGE, BERM, SIGN, OR PARKED VEHICLE BETWEEN THE HEIGHTS OF TWO (2') AND EIGHT (8') ABOVE THE CURB LINE ELEVATION OR THE NEAREST TRAVELED WAY IN NO CURB EXISTS SHALL BE PLACED WITHIN A SIGHT TRIANGLE.

FUTURE DEVELOPMENT - PHASE R6

FUTURE DEVELOPMENT - PHASE R7

MORNING FLYER WAY

FUTURE DEVELOPMENT PHASE R8



TREE CANOPY SUMMARY

OVERALL TREE COVER AREA REQUIRED PER UAA = 8.90 AC
 TREE COVER AREA PROVIDED W/ R1 & R2 = 2.19 AC
 TREE COVER AREA PROVIDED W/ R3 = 0.79 AC
 TREE COVER AREA PROVIDED W/ R6 = 1.34 AC
 TREE COVER AREA PROVIDED W/ R1,R2,R3,R6 = 4.32 AC

PROJECT AREA - R1 & R2 = 41.89 AC
 PROJECT AREA - R3 = 20.01 AC
 PROJECT AREA - R6 = 30.90 AC
 HALES MU-1 = 4.56 AC
 MU-1 = 8.09 AC

TOTAL TRACT AREA APPROVED/RECORDED (TO DATE) = 105.45 AC
 TOTAL SITE ACREAGE = 278.81 AC

TREE CANOPY AREA REQUIRED (TO DATE) = 105.45 AC
 = (105.45 AC) x (8.9 AC) = 3.37 AC
 (278.81 AC)

4.32 AC PROVIDED > 3.37 AC REQUIRED (TO DATE)

REMAINING TREE COVER AREA REQUIRED FOR FUTURE PHASES PER UAA = 4.58 AC

RECREATIONAL OPEN SPACE SUMMARY

OVERALL RECREATIONAL OPEN SPACE = 17.00 AC (8.50 AC ACTIVE)
 RECREATIONAL OPEN SPACE DEDICATED W/ R1, R2 & R3 = 10.70* (ACTIVE)
 L21 8,866 SF
 L22 5,701 SF
 L23 9,203 SF
 L24 45.60 SF
 L25 113.73 SF
 L26 147.69 SF
 L29 438.21 SF

REQUIRED RECREATIONAL OPEN SPACE W/ R6(A,B,C) = 1.65 AC**
 RECREATIONAL OPEN SPACE PROVIDED W/IN 30' GREENWAY EASEMENT = 0.69 AC (ACTIVE)
 RECREATIONAL OPEN SPACE PROVIDED W/IN EXISTING PONDS = 1.24 AC (PASSIVE)

REMAINING RECREATIONAL OPEN SPACE REQUIRED FOR FUTURE PHASES PER UAA = 4.37 AC (0.00 ACTIVE)

* SEE B.M. 2015 PG. 536, ALSO APPROVED R3 CONSTRUCTION DRAWINGS
 ** TOTAL BEDROOMS (79 SINGLE-FAMILY x 3.5 BEDROOM) = 276.5
 MIN TYPICAL = 260 SF BEDROOM BASED ON 2-6 DU AC AND ADJACENT TO PARK
 REQUIRED REC. OPEN SPACE W/ R3 = 276.5 x 260 = 71,890 SF = 1.65 AC

LINE TABLE

LINE	BEARING	DISTANCE
L13	N85°18'50"E	363.15'
L15	S89°17'02"E	251.72'
L16	N0°57'45"E	101.07'
L17	N19°49'16"E	24.21'
L18	N27°41'56"W	175.43'
L19	N26°32'17"E	53.78'
L20	S80°32'10"E	155.53'
L21	N83°22'15"E	156.44'
L22	S70°10'44"E	40.29'
L23	N66°48'09"E	248.44'
L24	N62°18'04"E	45.60'
L25	N87°22'01"E	113.73'
L26	N6°37'45"W	147.69'
L29	N23°55'03"W	438.21'
L30	N45°25'54"W	90.57'

CURVE TABLE

CURVE	RADIUS	LENGTH	CHORD	BEARING
C8	600.00'	197.49'	196.60'	N10°23'30"E
C9	250.00'	207.35'	201.45'	N3°56'20"W
C10	150.00'	141.99'	136.75'	N0°34'50"W
C11	250.00'	318.20'	297.15'	N63°00'04"E
C12	500.00'	140.44'	139.98'	S88°34'58"E
C7	786.00'	348.48'	345.63'	N78°00'54"E
C13	430.00'	322.85'	315.32'	N88°18'43"E
C14	225.00'	98.43'	97.65'	N74°50'02"E
C15	250.00'	410.14'	365.67'	N40°22'08"E
C16	608.00'	162.44'	161.95'	N14°18'30"W
C18	265.00'	99.51'	98.92'	N34°40'29"W

PROPOSED POSTED SPEED LIMIT

ROAD	SPEED LIMIT
SILVERCOMET DR.	25 MPH
TWIN STAR LN	25 MPH
GOLD COAST DR.	25 MPH
RED ARROW DR.	25 MPH
HAWKEYE DR.	25 MPH

PROPOSED STREET CLASSIFICATION

ROAD	CLASSIFICATION
SILVERCOMET DR.	LOCAL STREET
TWIN STAR LN	LOCAL STREET
GOLD COAST DR.	LOCAL STREET
RED ARROW DR.	LOCAL STREET
HAWKEYE DR.	LOCAL STREET

TREE PROTECTION

	TOTAL TREES	12"-23.9" DBH	24"-35.9" DBH	36"-47.9" DBH	48"-59.9" DBH	60"-71.9" DBH	REPLACEMENT TREES NEEDED*
TIER 1	29	23	1	2	2	1	-
TIER 2	31	25	3	3	0	0	40
TIER 3	22	0	16	4	2	0	52

*PER TOK UDO SECTION 8.5, REPLACEMENT TREES FOR TIER 2 AND TIER 3 SHALL BE PLANTED AT A RATE OF 1 TREE PER 12" DBH.
 NOTE: 92 - REPLACEMENT TREES WILL BE REQUIRED TO BE PLANTED. REPLACEMENT TREES WILL BE PLANTED IN PROPOSED BUFFER YARD LOCATIONS OR OPEN SPACE. SEE LANDSCAPE PLAN FOR BUFFER YARD PLANTING DETAIL.

AASHTO INTERSECTION SIGHT DISTANCE SUMMARY

MINOR STREET NAME	MAJOR STREET NAME	DESIGN SPEED OF MAJOR STREET (MPH)	APPROACH GRADE OF MAJOR STREET (%)	LEFT TURN TIME GAP (SEC)	RIGHT TURN TIME GAP (SEC)	LEFT TURN SIGHT DISTANCE (FT)	RIGHT TURN SIGHT DISTANCE (FT)
TWIN STAR LN	SILVERCOMET DR	25,000	2.32	7.50	6.50	276	239
TWIN STAR LN	MORNING FLYER WAY	30,000	3.00	7.50	6.50	331	287
GOLD COAST DR	SILVERCOMET DR	25,000	2.50	7.50	6.50	276	239
GOLD COAST DR	HAWKEYE DR	25,000	1.51	7.50	6.50	276	239
RED ARROW DR	SILVERCOMET DR	25,000	2.22	7.50	6.50	276	239
RED ARROW DR	SILVERCOMET DR	25,000	1.77	7.50	6.50	276	239
RED ARROW DR	SILVERCOMET DR	25,000	3.00	7.50	6.50	276	239
HAWKEYE DR	TWIN STAR LN	25,000	1.69	7.50	6.50	276	239
HAWKEYE DR	RED ARROW DR	25,000	3.36	8.17	7.17	300	264
SILVERCOMET DR	MORNING FLYER WAY	30,000	1.07	7.50	6.50	331	287

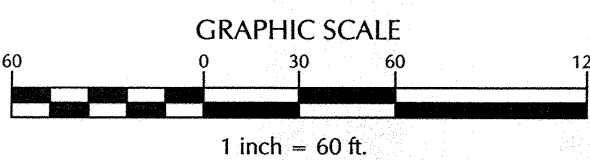
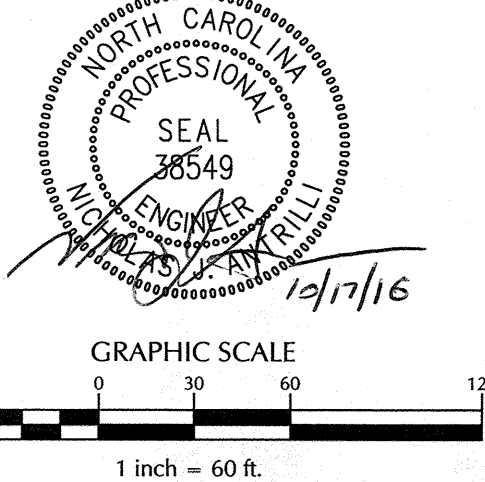
ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH ALL CITY OF RALEIGH & TOWN OF KNIGHTDALE DESIGN STANDARDS, DETAILS, AND SPECIFICATIONS.

CONNECTIVITY INDEX:

	LINKS	NODES	INDEX
R6(A,B,C)	12	9	1.3

SITE IMPERVIOUS - R6(A,B,C)

TOTAL TRACT AREA = 30.9 AC
 SUBDIVISION ROADWAYS & SIDEWALKS = 3.9 AC
 LOT IMPERVIOUS AREA (79 LOTS @ 4,000 SF/LOT) = 7.2 AC
 PERCENT IMPERVIOUS (11.2 AC/30.9 AC) = 35.9 %
 EXISTING IMPERVIOUS (0.0 AC) = 0.0 %



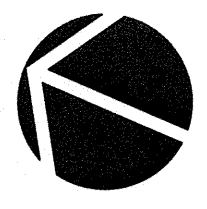
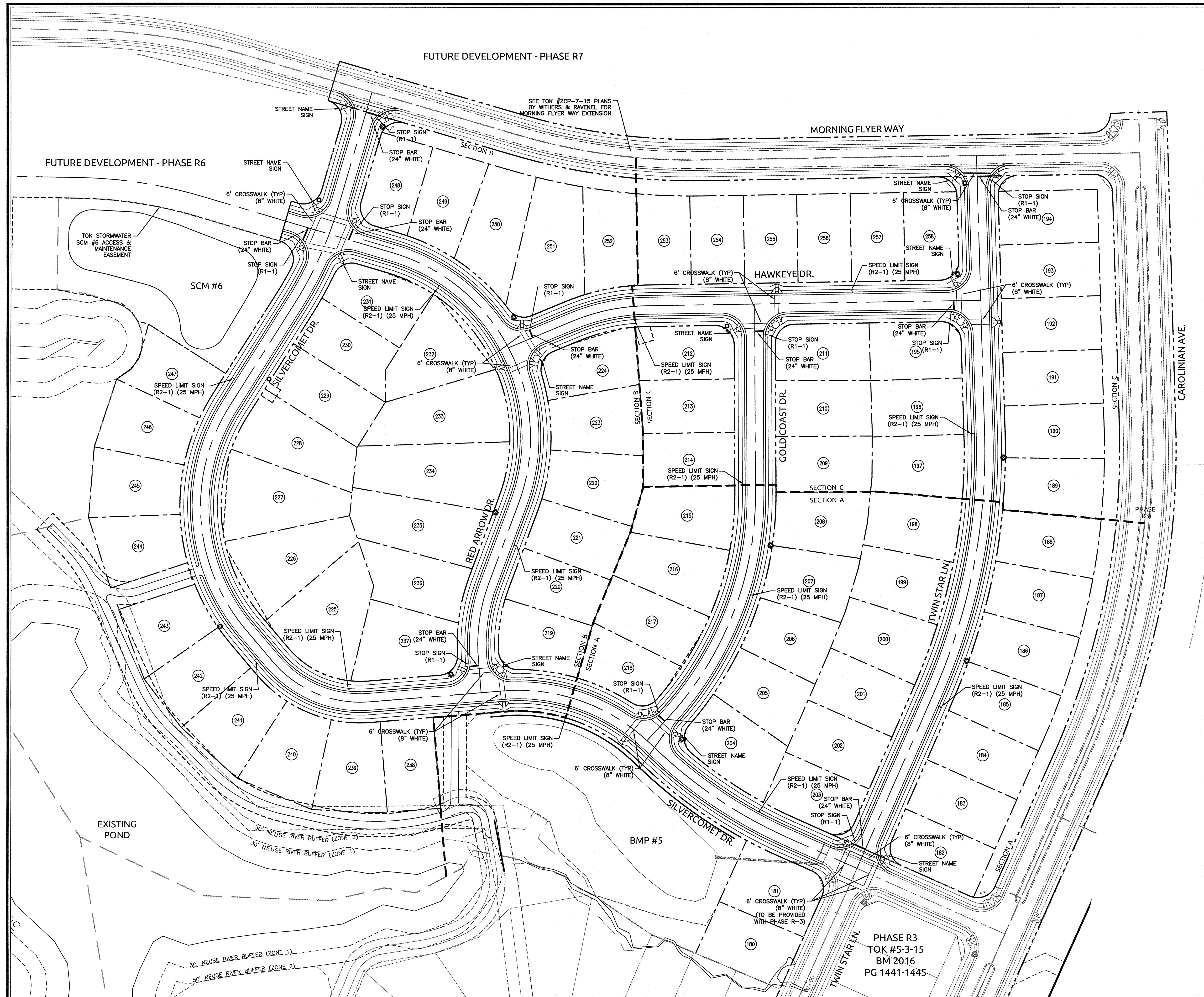
No.	Revision	Date	By	Design	Scale
1	REVISION PER TOK COMMENTS	03/28/16	GAS	WR	As Noted
2	REVISION PER TOK COMMENTS	05/27/16	GAS		
3	REVISION PER TOK COMMENTS	06/30/2016	SJY	LEG/GAS	02/02/16

KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Knightdale Wake County North Carolina

SITE PLAN

WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKenran Drive | Cary, NC 27511 | 919.469.3340 | license #: C-0832 | www.withersravenel.com

- PAVEMENT MARKINGS & SIGNAGE NOTES**
1. ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE TO TOWN OF KNIGHTDALE STANDARDS & SPECIFICATIONS, LATEST REVISIONS.
 2. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARDS.
 3. ALL SIGNAGE SHALL BE IN ACCORDANCE WITH MUTCD, LATEST REVISION.
 4. STREET SIGNS SHALL FOLLOW THE TOWN OF KNIGHTDALE DETAIL 3.17.



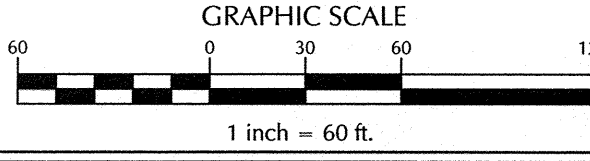
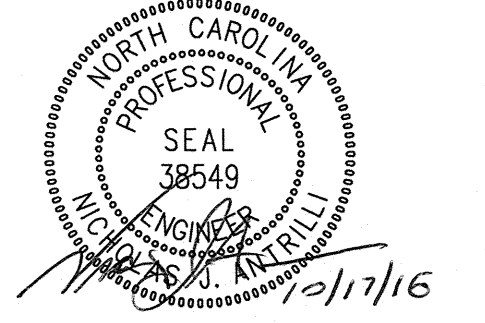
FUTURE DEVELOPMENT PHASE R8

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SEAVE'S CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3-6-17
ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
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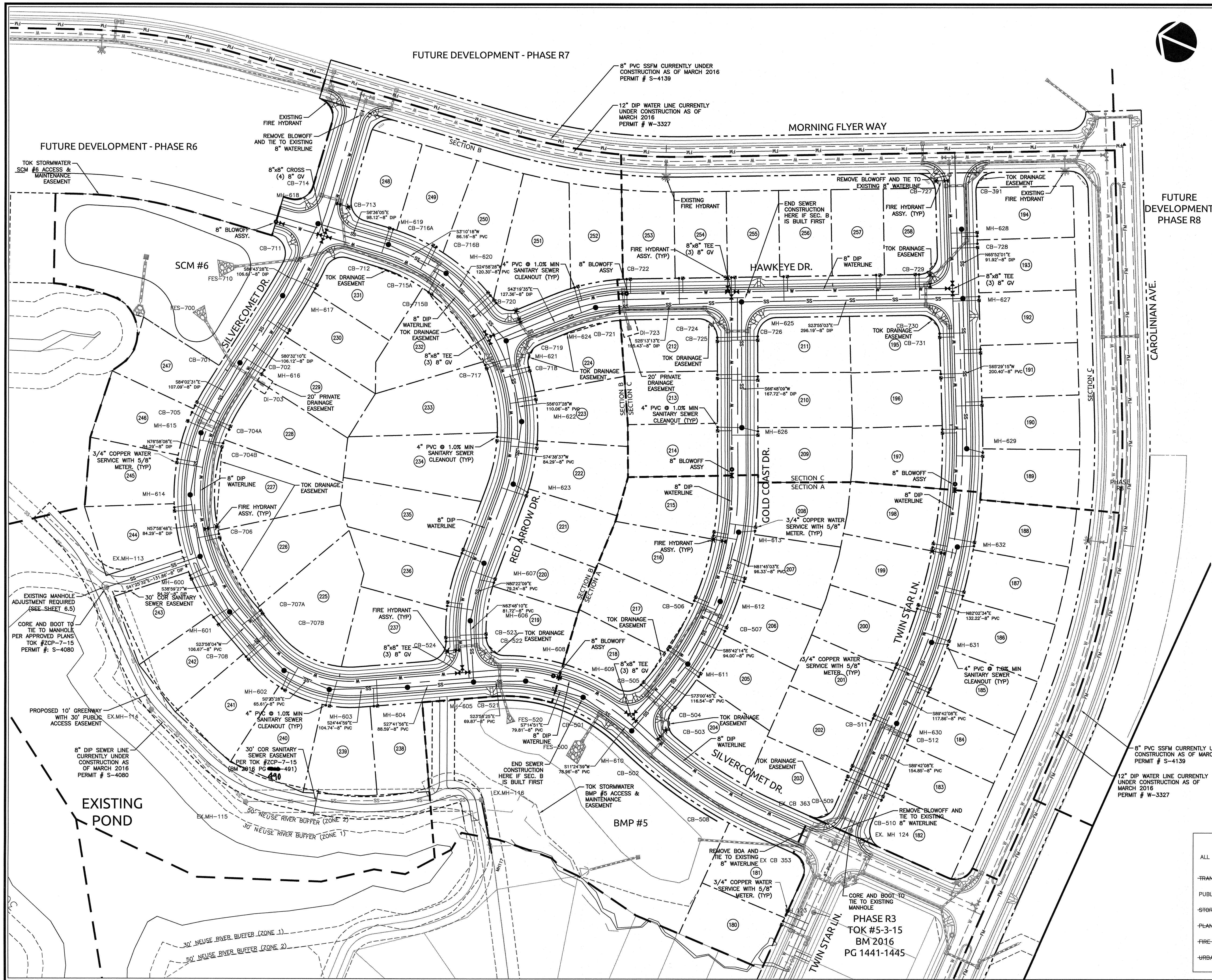
KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County
North Carolina

PAVEMENT MARKINGS & SIGNAGE PLAN

WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No.
2.2

K:\VAP\0250\090251.90-Knightdale Station - R6\0250\MASTER-CONSTRUCTION DRAWINGS\2.2 PAVEMENT MARKINGS & SIGNAGE PLAN.dwg - Wednesday, October 19, 2016 2:42:58 PM - STROUDLAND, GREG



- ### UTILITY NOTES
- ALL MATERIALS & CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH CITY OF RALEIGH DESIGN STANDARDS, DETAILS & SPECIFICATIONS (REFERENCE: CORPUD HANDBOOK, CURRENT EDITION).
 - UTILITY SEPARATION REQUIREMENTS:
 - A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE SUPPLY SOURCE SUCH AS AN IMPROVED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
 - WHEN INSTALLING WATER &/OR SEWER MAINS THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE PUBLIC UTILITIES DIRECTOR. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER.
 - WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASUREMENT TENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
 - 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
 - MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 24" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATIONS CANNOT BE ACHIEVED, SPECIFY DIP MATERIALS & A CONCRETE CRADLE HAVING 6" MIN. CLEARANCE (PER CORPUD DETAILS W-41 & S-49).
 - ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.
 - ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.
 - CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING RESIDENCES & BUSINESSES THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTIONS SHALL BE PRECEDED BY A 24 HOUR ADVANCE NOTICE TO THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT.
 - ALL WATER MAINS & SEWER FOREMANS. 4.0' MINIMUM COVER IS REQUIRED ON ALL REUSE MAINS.
 - IT IS THE DEVELOPER'S RESPONSIBILITY TO ABANDON OR REMOVE EXISTING WATER & SEWER SERVICES NOT BEING USED IN WATER SERVICE FOR EACH CONNECTION TO PROVIDE ADEQUATE FLOW & PRESSURE.
 - INSTALL 4" PVC SEWER SECTIONS @ 1.0% MINIMUM GRADE WITH CLEANOUTS LOCATED AT ROW OR EASEMENT LINE & SPACED EVERY 75' LINEAR FEET MAXIMUM.
 - PRESSURE REDUCING VALVES ARE REQUIRED ON ALL SANITARY SEWER SERVICES HAVING BUILDING DRAINS LOWER THAN 1.0' ABOVE THE NEXT UPSTREAM MANHOLE.
 - ALL ENVIRONMENTAL PERMITS APPLICABLE TO THE PROJECT MUST BE OBTAINED FROM NCDM, USACE &/OR FEMA FOR ANY REPAIRS TO EXISTING WETLAND &/OR FLOODPLAIN IMPACTS (RESPECTIVELY) PRIOR TO CONSTRUCTION.
 - NCDOT / RAILROAD ENCROACHMENT AGREEMENTS ARE REQUIRED FOR ANY UTILITY WORK (INCLUDING MAIN EXTENSIONS & SERVICE TAPS) WITHIN STATE OR RAILROAD ROW PRIOR TO CONSTRUCTION.
 - GREASE INTERCEPTOR / OIL WATER SEPARATOR SIZING CALCULATIONS & INSTALLATION SPECIFICATIONS SHALL BE APPROVED BY THE CORPUD FOG PROGRAM COORDINATOR PRIOR TO ISSUANCE OF A BUILDING PERMIT. CONTACT TIM BEASLEY AT (919) 996-2334 OR TIMOTHY.BEASLEY@RALEIGHNC.GOV FOR MORE INFORMATION.
 - CROSS-CONNECTION CONTROL PROTECTION DEVICES ARE REQUIRED BASED ON DEGREE OF HEALTH HAZARD INVOLVED AS LISTED IN APPENDIX-B OF THE RULES GOVERNING PUBLIC WATER SYSTEMS IN NORTH CAROLINA. THESE GUIDELINES ARE THE MINIMUM REQUIREMENTS. THE DEVICES SHALL MEET AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) STANDARDS OR BE ON THE SOUTHERN CALIFORNIA APPROVAL LIST. THE DEVICES SHALL BE INSTALLED AND TESTED (BOTH INITIAL AND PERIODIC TESTING THEREAFTER) IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS OR THE LOCAL CROSS-CONNECTION CONTROL PROGRAM, WHICHEVER IS MORE STRINGENT. CONTACT JOANIE HARTLEY AT (919) 996-5923 OR JOANIE.HARTLEY@RALEIGHNC.GOV FOR MORE INFORMATION.
 - ALL EXISTING WATERMANS AND DOWNSTREAM SEWER FACILITIES TO WHICH THIS PROJECT CONNECTS SHALL BE ACCEPTED BY THE CITY OF RALEIGH FOR MAINTENANCE PRIOR TO RELEASE OF 1ST CO IN KNIGHTDALE STATION, R-6 PHASE OF DEVELOPMENT (SECTION A, B OR C).

- ### UTILITY PHASING NOTES
- SHOULD SECTION A BE CONSTRUCTED INDEPENDENTLY OF SECTIONS B AND C, A 30' CITY OF RALEIGH SANITARY SEWER EASEMENT SHALL BE DEDICATED FROM THE EXISTING MANHOLE TO THE SECTION LINE BETWEEN MANHOLES 608-609.
 - SHOULD SECTION C BE CONSTRUCTED INDEPENDENTLY OF SECTIONS A AND B, A 30' CITY OF RALEIGH SANITARY SEWER EASEMENT SHALL BE DEDICATED FROM THE EXISTING MANHOLE TO THE SECTION LINE BETWEEN MANHOLES 624-625.

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # **W-3450**

AUTHORIZATION TO CONSTRUCT *Kath. A. Jew*

DATE **2/20/17**

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # **S-4264**

AUTHORIZATION TO CONSTRUCT *Kath. A. Jew*

DATE **2/20/17**

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *E. A. Hall* DATE: **3-2-2017**
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *J. W. ...* DATE: **3.10.17**
ADMINISTRATOR

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES: N/A

PUBLIC UTILITIES: *K.A. Jew* **2/20/17**

STORMWATER: N/A

PLANNING: N/A

FIRE: N/A

URBAN FORESTRY: N/A

GRAPHIC SCALE
1 inch = 60 ft.

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No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	CAS
2	REVISION PER TOK COMMENTS	05/27/16	CAS
3	REVISION PER TOK COMMENTS	06/30/2016	SY

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)

Wake County North Carolina

Scale: As Noted

Drawn By: WVR Date: 02/02/16

Checked By: LEG/GAS Job No.: 2090251.90

UTILITY PLAN

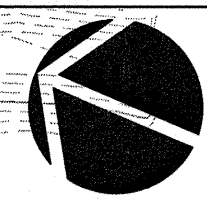
PHASE R3
TOK #5-3-15
BM 2016
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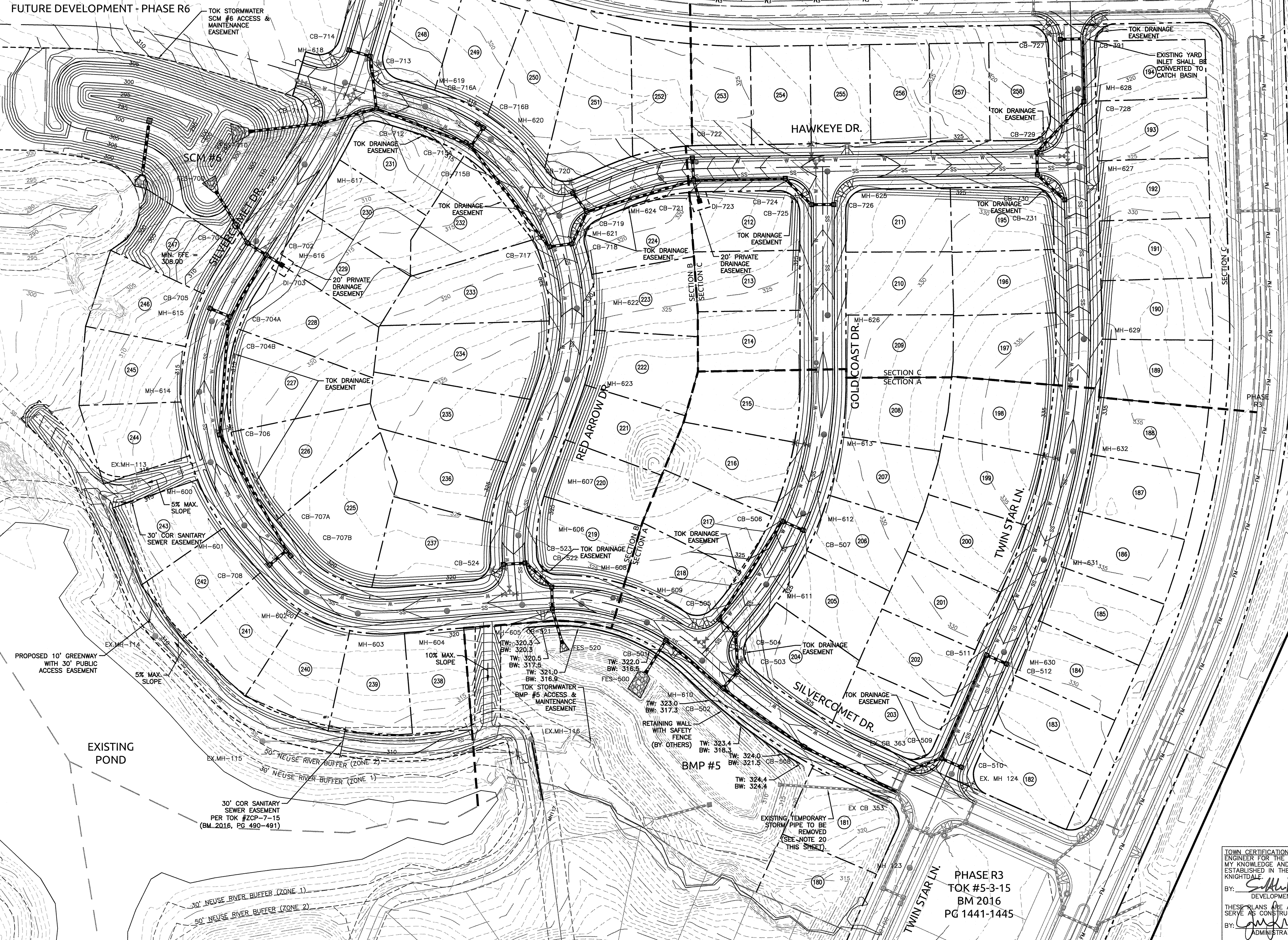
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CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES N/A
 PUBLIC UTILITIES *K.W. JW 2/20/17*
 STORMWATER N/A
 PLANNING N/A
 FIRE N/A
 URBAN FORESTRY N/A



- GRADING AND DRAINAGE NOTES:**
- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS & DETAILS.
 - BOUNDARY SURVEY PERFORMED BY WITHERS RAVENEL, INC.
 - WETLANDS AND STREAM BUFFERS DELINEATED AND SURVEYED BY WITHERS RAVENEL, INC.
 - THIS PROPERTY DOES NOT LIE WITHIN THE FEMA FLOODPLAIN PER MAP NUMBER 3720175400J AND 3720176400I, WITH AN EFFECTIVE DATE OF MAY 2, 2006.
 - RECEIVING WATERCOURSE: UNNAMED TRIBUTARY OF MARKS CREEK IN THE NEUSE RIVER BASIN.
 - THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION. THE LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS IS BASED ON THE BEST AVAILABLE INFORMATION, BUT CAN BE CONSIDERED ONLY AS APPROXIMATE.
 - ALL STORM DRAINAGE PIPE SHALL HAVE A MINIMUM COVER OF 2 FEET TO THE PIPE CROWN IN NON-TRAFFIC AREAS.
 - ALL STORM DRAINAGE PIPE SHALL HAVE A MINIMUM COVER OF 1 FOOT TO THE PIPE CROWN IN NON-TRAFFIC AREAS.
 - STORM SEWER PIPE ENDS SHALL BE FURNISHED WITH REINFORCED CONCRETE PIPE FLARED END SECTION UNLESS OTHERWISE SPECIFIED ON PLANS.
 - EACH DRAINAGE STRUCTURE SHALL HAVE A SHAPED INVERT CONSTRUCTED FROM CONCRETE, AND A BENCH WITH A MAXIMUM 5:1 SLOPE. THE BENCH SHALL BEGIN AT A HEIGHT OF ONE-HALF THE PIPE DIAMETER FOR 12 TO 24 INCH PIPE, ONE-THIRD THE PIPE DIAMETER FOR 30 - 48 INCH PIPE, AND ONE-FOURTH THE DIAMETER FOR PIPE GREATER THAN 48 INCHES.
 - ENERGY DISSIPATORS SHALL BE INSTALLED AT ALL STORM SEWER DISCHARGE POINTS. A FABRIC OR WASHED STONE BARRIER SHALL BE INSTALLED BETWEEN THE DISSIPATION PAD AND THE NATURAL GROUND.
 - STORM PIPE TRENCH EXCAVATION AND BACKFILLING SHALL BE PERFORMED IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS AND DETAILS. STORMWATER CALCULATIONS ARE BASED ON A MAXIMUM 4,000 SF OF IMPERVIOUS AREA PER LOT.
 - ALL STORM DRAINAGE PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED.
 - DISCHARGE BASED ON 10-YR STORM EVENT UNLESS OTHERWISE NOTED.
 - CB=CATCH BASIN; FES=FLARED END SECTION; JB=JUNCTION BOX; YI=YARD INLET WITH SLAB TOP; DI=DRAINAGE INLET WITH GRATE
 - RIM ELEVATION GIVEN IS FOR TOP OF CURB, YI OPENING INVERT FOR SLAB TOP OR TOP OF GRATE FOR GRATED INLET.
 - "TOK DRAINAGE EASEMENT" = PUBLIC EASEMENT.
 - RETAINING WALL BOTTOM OF WALL ELEVATIONS DEPICT EXPOSED WALL FACE ELEVATION.
 - THE TOWN OF KNIGHTDALE DOES NOT PERMIT THE USE OF WAFFLE DRAINAGE BOXES WITHIN THE PUBLIC RIGHTS OF WAY.
 - EXISTING STORM DRAINAGE EASEMENT SHALL BE ABANDONED ONCE FUTURE RIGHT OF WAY IS DEDICATED AND PIPE REMOVED.



STORM DRAINAGE DESIGN CHART

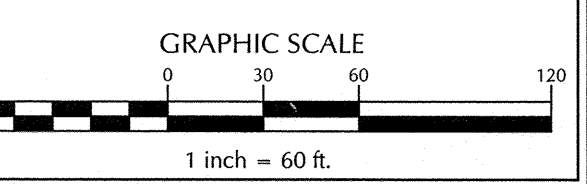
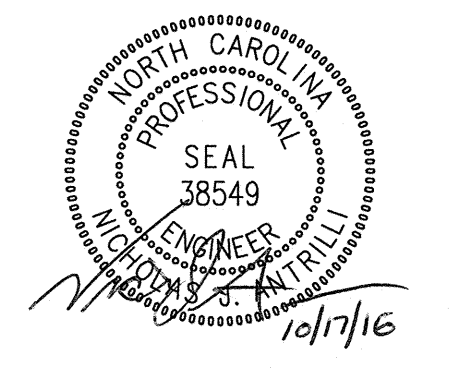
UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	UPSTREAM RIM ELEV.	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH [FT]	SLOPE [FT/FT]	INLET D.A. [AC]	IMP. D.A. [AC]	INLET C	FLOW Q10 [CFS]	SECTION SIZE	PIPE MATERIAL
SYSTEM 1												
CB-512	CB-511	328.72	323.85	323.55	27	0.0111	0.92	0.43	0.63	4.14	15	CL III
CB-511	CB-509	328.72	323.35	320.80	132	0.0193	0.47	0.25	0.67	6.36	15	CL III
CB-510	CB-509	325.67	321.45	321.15	27	0.0111	0.50	0.24	0.63	2.25	15	CL IV
CB-509	EX CB563	325.67	320.55	319.80	43	0.0174	0.25	0.15	0.70	9.74	18	CL III
EX CB363	EX CB353	324.71	319.26	318.99	27	0.0100	0.09	0.06	0.77	11.81	24	CL III
EX CB353	CB-508	324.71	314.36	313.60	122	0.0062	0.03	0.02	0.83	62.47	42	CL III
CB-508	CB-502	323.48	313.40	312.50	117	0.0077	0.11	0.05	0.63	62.36	42	CL III
CB-507	CB-506	325.93	319.35	319.05	27	0.0111	0.83	0.40	0.64	3.79	15	CL III
CB-506	CB-505	325.93	318.85	317.50	137	0.0099	0.51	0.26	0.65	6.14	15	CL III
CB-505	CB-504	322.37	317.10	316.80	27	0.0111	0.47	0.24	0.66	8.22	18	CL III
CB-504	CB-503	322.37	316.40	315.70	43	0.0163	0.99	0.47	0.64	12.62	18	CL III
CB-503	CB-502	322.33	315.20	314.90	27	0.0111	0.21	0.10	0.63	13.50	24	CL III
CB-502	CB-501	322.33	312.20	311.60	87	0.0069	0.08	0.05	0.71	75.32	42	CL III
CB-501	FES-500	321.44	311.10	310.80	45	0.0067	0.06	0.04	0.72	75.32	48	CL III - O-RING
SYSTEM 2												
CB-524	CB-523	319.95	315.10	314.80	27	0.0111	0.37	0.21	0.69	1.82	15	CL III
CB-523	CB-522	319.97	314.60	314.20	41	0.0098	0.46	0.25	0.68	4.04	15	CL III
CB-522	CB-521	319.95	314.00	313.70	27	0.0111	0.23	0.14	0.72	4.58	15	CL III
CB-521	FES-520	319.95	313.50	311.50	42	0.0476	0.10	0.06	0.70	5.06	18	CL III
SYSTEM 3												
CB-708	CB-707A	316.53	311.65	311.35	27	0.0111	0.36	0.15	0.60	1.54	15	CL III
CB-707B	CB-707A	316.61	311.75	311.55	8	0.0250	0.36	0.20	0.69	1.77	15	CL III
CB-707A	CB-706	316.53	311.15	309.70	157	0.0092	0.36	0.20	0.69	5.07	15	CL III
CB-706	CB-704B	314.86	309.40	307.90	132	0.0114	0.53	0.21	0.58	1.87	18	CL III
CB-704B	CB-704A	313.74	307.70	307.60	8	0.0125	0.27	0.12	0.61	4.12	18	CL III
CB-704A	CB-704	313.73	308.90	308.60	27	0.0111	0.46	0.17	0.57	8.15	15	CL III
CB-704	CB-702	313.73	307.10	306.30	84	0.0095	0.27	0.12	0.61	11.08	24	CL III
YI-703	CB-702	314.20	309.80	309.50	22	0.0136	0.60	0.18	0.53	2.27	15	CL III
CB-702	CB-701	314.24	306.10	305.80	27	0.0111	0.50	0.28	0.68	15.48	15	CL III
CB-701	FES-700	314.24	304.00	300.50	70	0.0500	0.11	0.07	0.74	16.00	24	CL III
SYSTEM 4												
CB-726	CB-725	325.71	320.85	320.55	27	0.0111	1.06	0.50	0.63	4.77	15	CL III
CB-725	CB-724	325.71	320.35	319.70	43	0.0151	0.44	0.23	0.66	6.82	15	CL III
CB-724	CB-721	324.87	319.50	316.40	108	0.0287	0.04	0.03	0.81	7.02	15	CL III
YI-723	CB-721	320.00	316.50	316.20	25	0.0120	0.43	0.14	0.54	1.66	15	CL III
CB-722	CB-721	321.63	316.80	316.50	27	0.0111	0.65	0.31	0.64	2.97	15	CL III
CB-721	CB-719	321.63	315.30	311.50	131	0.0290	0.68	0.05	0.70	11.92	18	CL III
CB-720	CB-719	316.82	311.95	311.75	28	0.0071	0.44	0.20	0.62	1.95	15	CL III
CB-719	CB-718	317.06	311.00	310.60	41	0.0098	0.17	0.10	0.72	14.58	24	CL III
CB-718	CB-717	317.71	310.40	310.10	28	0.0107	0.79	0.42	0.67	18.20	24	CL III
CB-717	CB-715B	317.52	309.90	307.50	149	0.0161	0.51	0.28	0.68	20.56	24	CL III
CB-716A	CB-716B	314.23	309.60	309.50	8	0.0125	0.56	0.25	0.62	4.95	15	CL III
CB-716B	CB-715B	314.23	309.30	309.00	27	0.0111	0.56	0.25	0.62	2.48	15	CL III
CB-715B	CB-715A	314.23	307.00	306.80	8	0.0250	0.35	0.15	0.60	35.56	30	CL III
CB-715A	CB-712	314.23	306.60	306.00	112	0.0054	0.35	0.15	0.60	27.99	30	CL III
CB-714	CB-713	317.04	312.15	311.85	27	0.0111	0.16	0.07	0.62	0.71	15	CL III
CB-713	CB-712	317.04	311.65	310.40	62	0.0202	0.13	0.08	0.72	1.37	15	CL III
CB-712	CB-711	315.77	305.80	305.10	68	0.0103	0.02	0.01	0.79	29.09	30	CL III
CB-711	FES-710	316.00	304.35	300.50	84	0.0458	0.02	0.02	0.87	29.09	30	CL III
SYSTEM 5												
CB-731	CB-730	324.39	319.50	318.30	43	0.0279	0.56	0.31	0.68	7.72	15	CL III
CB-730	CB-729	322.49	318.10	317.80	27	0.0111	0.25	0.12	0.64	3.84	15	CL IV
CB-729	CB-728	322.49	317.40	313.80	81	0.0444	0.47	0.37	0.62	6.56	15	CL III
CB-728	CB-391	318.68	313.50	311.00	74	0.0338	0.92	0.45	0.65	10.75	18	CL III
CB-727	CB-391	315.68	311.70	311.50	27	0.0074	0.20	0.11	0.70	1.00	15	CL IV
CB-391 (EX YI 391)	EX CB 384	315.68	310.53	309.18	43	0.0314	0.16	0.08	0.64	12.40	24	CL III

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3-2-2017
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3-6-17
 ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SYV

Designer	Scale
WR	As Noted
Drawn By	Date
LEG/GAS	02/02/16
Checked By	Job No.
NJA	2090251.90

KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Wake County
 Knightdale
 North Carolina

GRADING AND STORM DRAINAGE PLAN

BASIN REMOVAL SEQUENCE:

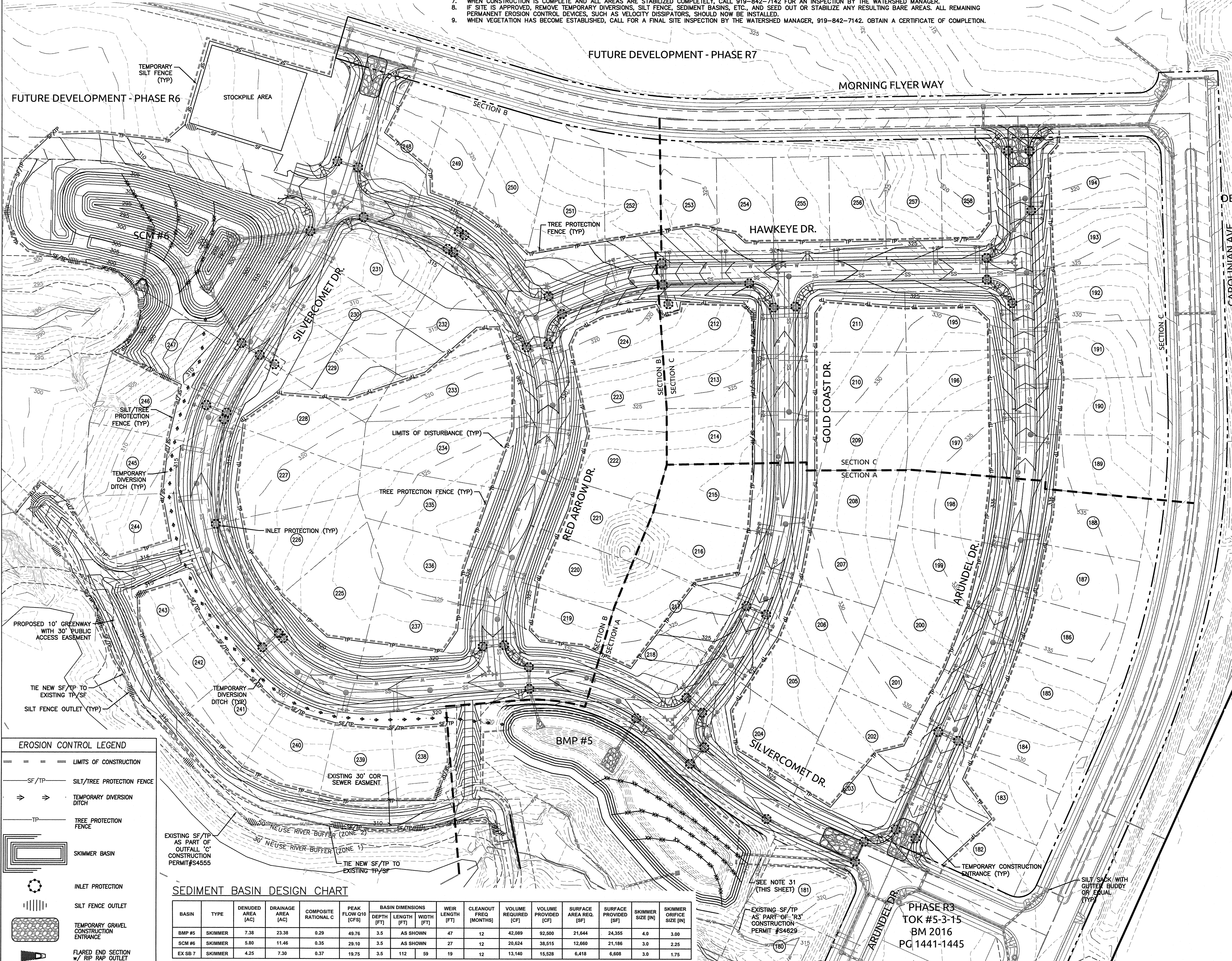
1. SCHEDULE A SITE MEETING WITH THE ENVIRONMENTAL ENGINEER/CONSULTANT TO DETERMINE IF A BASIN CAN BE REMOVED. INSTALL SILT FENCING OR OTHER TEMPORARY EROSION CONTROL MEASURES AS NEEDED PRIOR TO REMOVAL OF THE BASIN.
2. REMOVE BASIN(S) AND ASSOCIATED TEMPORARY DIVERSION DITCHES. IF CULVERT PIPES NEED TO BE EXTENDED, PERFORM THIS OPERATION AT THIS TIME. FINE GRADE AREA IN PREPARATION FOR SEEDING.
3. PERFORM SEEDBED PREPARATION, SEED, MULCH AND ASPHALT TACK ANY RESULTING BARE AREAS IMMEDIATELY.
4. INSTALL VELOCITY DISSIPATORS AND/OR LEVEL SPREADERS AS REQUIRED ON THE EROSION CONTROL PLAN.
5. WHEN SITE IS FULLY STABILIZED, CALL ENVIRONMENTAL ENGINEER/CONSULTANT FOR APPROVAL OF REMOVING REMAINING TEMPORARY EROSION CONTROL MEASURES AND ADVISE ON WHEN SITE CAN BE ISSUED A CERTIFICATE OF COMPLETION.

CONSTRUCTION SEQUENCE:

1. SCHEDULE A PRECONSTRUCTION CONFERENCE WITH THE WATERSHED MANGER, DEBRA TANNER, 919-842-7142. OBTAIN A LAND-DISTURBING PERMIT.
2. INSTALL GRAVEL CONSTRUCTION PAD, TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASIN OR OTHER MEASURES AS SHOWN ON THE APPROVED PLAN. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES. SEED TEMPORARY DIVERSIONS, BERMS AND BASINS IMMEDIATELY AFTER CONSTRUCTION.
3. CALL 919-842-7142 FOR AN ON SITE INSPECTION BY THE WATERSHED MANGER TO OBTAIN A CERTIFICATE OF COMPLIANCE.
4. BEGIN CLEARING AND GRUBBING. MAINTAIN DEVICES AS NEEDED. ROUGH GRADE SITE.
5. INSTALL STORM SEWER, IF SHOWN, AND PROTECT INLETS WITH BLOCK AND GRAVEL INLET CONTROLS, SEDIMENT TRAPS OR OTHER APPROVED MEASURES AS SHOWN ON THE PLAN. BEGIN CONSTRUCTION, BUILDING, ETC.
6. STABILIZE SITE AS AREAS ARE BROUGHT UP TO FINISH GRADE WITH VEGETATION, PAVING, DITCH LININGS, ETC. SEED AND MULCH DENUDED AREAS PER GROUND STABILIZATION TIME FRAMES.
7. WHEN CONSTRUCTION IS COMPLETE AND ALL AREAS ARE STABILIZED COMPLETELY, CALL 919-842-7142 FOR AN INSPECTION BY THE WATERSHED MANGER.
8. IF SITE IS APPROVED, REMOVE TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS, ETC., AND SEED OUT OR STABILIZE ANY RESULTING BARE AREAS. ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS VELOCITY DISSIPATORS, SHOULD NOW BE INSTALLED.
9. WHEN VEGETATION HAS BECOME ESTABLISHED, CALL FOR A FINAL SITE INSPECTION BY THE WATERSHED MANGER, 919-842-7142. OBTAIN A CERTIFICATE OF COMPLETION.

EROSION CONTROL AND STORM DRAINAGE NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS & DETAILS.
2. BOUNDARY SURVEY PERFORMED BY WITHERS RAVENEL, INC.
3. WETLANDS AND STREAM BUFFERS DELINEATED AND SURVEYED BY WITHERS RAVENEL, INC.
4. THIS PROPERTY DOES NOT LIE WITHIN THE FEMA FLOODPLAIN PER MAP NUMBER 3720175400J AND 3720176400J, WITH AN EFFECTIVE DATE OF MAY 2, 2006.
5. RECEIVING WATERCOURSE: UNNAMED TRIBUTARY OF MARKS CREEK IN THE NEUSE RIVER BASIN.
6. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION. THE LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS IS BASED ON THE BEST AVAILABLE INFORMATION, BUT CAN BE CONSIDERED ONLY AS APPROXIMATE.
7. ALL STORM DRAINAGE PIPE SHALL HAVE A MINIMUM COVER OF 2 FEET TO THE PIPE CROWN IN TRAFFIC, UNLESS APPROVED BY THE TOWN OF KNIGHTDALE.
8. ALL STORM DRAINAGE PIPE SHALL HAVE A MINIMUM COVER OF 1 FOOT TO THE PIPE CROWN IN NON-TRAFFIC AREAS.
9. STORM SEWER PIPE ENDS SHALL BE FURNISHED WITH REINFORCED CONCRETE PIPE FLARED END SECTION UNLESS OTHERWISE SPECIFIED ON PLANS.
10. EACH DRAINAGE STRUCTURE SHALL HAVE A SHAPED INVERT CONSTRUCTED FROM CONCRETE AND BEGINS WITH A MAXIMUM 5:1 SLOPE. THE BENCH SHALL BEGIN AT A HEIGHT OF ONE-HALF THE PIPE DIAMETER FOR 12 TO 24 INCH PIPE, ONE-THIRD THE PIPE DIAMETER FOR 30 TO 48 INCH PIPE, AND ONE-FOURTH THE DIAMETER FOR PIPE GREATER THAN 48 INCHES.
11. ENERGY DISSIPATORS SHALL BE INSTALLED AT ALL STORM SEWER DISCHARGE POINTS. FABRIC OR WASHED STONE BARRIER SHALL BE INSTALLED BETWEEN THE DISSIPATION PAD AND THE NATURAL GROUND.
12. STORM PIPE TRENCH EXCAVATION AND BACKFILLING SHALL BE PERFORMED IN ACCORDANCE WITH TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS AND DETAILS.
13. A PRECONSTRUCTION MEETING SHALL BE REQUIRED FOR THIS CONSTRUCTION.
14. GRAVEL CONSTRUCTION ENTRANCE PADS SHALL BE CONSTRUCTED AT EACH POINT OF CONSTRUCTION ACCESS TO EACH PROPERTY. NOTE: IT SHALL BE THE DEVELOPER'S RESPONSIBILITY TO SEE THAT THE CONSTRUCTION ENTRANCE PADS ARE PROPERLY MAINTAINED AND THAT THE CONSTRUCTION ENTRANCE PADS ARE NOT TRUCKED ONTO ADJACENT STREETS. IN THE EVENT THAT THE GRAVEL CONSTRUCTION ENTRANCE ARE NOT PROPERLY MAINTAINED, OR ARE OTHERWISE INEFFECTIVE, THE TOWN REPRESENTATIVE MAY ISSUE A STOP WORK ORDER OR ANY OTHER EQUITABLE REMEDY PROVIDED BY THE TOWN OF KNIGHTDALE UDD OR NC GENERAL STATUTES. THE STOP WORK ORDER SHALL REMAIN IN EFFECT UNTIL SUCH TIME AS THE PADS ARE RESTORED AND REPLENISHED AND UNTIL ANY RESULTING MUD AND DEBRIS HAS BEEN REMOVED FROM THE ADJACENT STREETS BY THE CONTRACTOR.
15. TO MINIMIZE DAMAGE TO EXISTING TREES NEAR THE INTERIOR EDGE OF BUFFERS AND STREETS, THE CONTRACTOR SHALL CUT MINIMUM 2' TRENCHES ALONG LIMITS OF DISTURBANCE, 30 AS TO CUT, RATHER THAN TEAR, ROOTS.
16. THE TREE PROTECTION FENCE SHALL BE MAINTAINED ON THE SITE UNTIL ALL SITE WORK IS COMPLETED AND THE FINAL SITE INSPECTION PRIOR TO THE CERTIFICATE OF OCCUPANCY (CO) IS SCHEDULED. THE FENCING SHALL BE REMOVED PRIOR TO FINAL SITE INSPECTION FOR THE CO.
17. THE PROJECT WILL MEET ALL THE REQUIREMENTS RELATIVE TO THE BEST MANAGEMENT PRACTICES AND ENGINEERED STORMWATER CONTROL STRUCTURES AS OUTLINED IN THE TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS AND DETAILS MANUAL (CHAPTER 6 SECTION 6.3).
18. GRADING OF INDIVIDUAL LOTS WITHIN THE MAJOR SUBDIVISION SHALL NOT BEGIN WITHOUT FIRST OBTAINING A BUILDING PERMIT FROM THE ADMINISTRATOR AND SHALL BE LIMITED TO THOSE AREAS COMPRISING THE BUILDING FOOTPRINT, DRIVEWAY AND A MINIMAL AREA SURROUNDING THEIR BUILDING FOOTPRINT TO ACCOMMODATE CONSTRUCTION EQUIPMENT PER UDO SECTION 6.2(g).
19. CONTRACTOR SHALL INSTALL PROPER EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENTATION DURING LOT CLEARING WILL BE MINIMIZED.
20. GRADING PERMIT WILL NOT BE ISSUED UNTIL A RECEIPT SHOWING PROOF OF PAYMENT FOR THE ENHANCED EROSION CONTROL PROGRAM OR AN APPROVED NUTRIENT OFFSET BANK IS PROVIDED TO THE TOWN OF KNIGHTDALE.
21. CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL STRUCTURES DURING THE LIFE OF THE PROJECT.
22. CONTRACTOR SHALL CONSTRUCT DIVERSION DITCHES AS NECESSARY TO ENSURE ALL SEDIMENT IS DIRECTED INTO EROSION CONTROL MEASURES.
23. CONTRACTOR SHALL INSTALL TEMPORARY SLOPE DRAINS PER DETAIL (SHEET 9.3) AT LOCATIONS WHERE TEMPORARY DIVERSION DITCHES DISCHARGE INTO A SKIMMER BASIN AS TO AVOID SLOPE EROSION.
24. TOPSOIL SHALL BE WASTED OFFSITE OR AT APPROVED STOCKPILE AREA ON SITE.
25. ALL STORM DRAINAGE PIPE SHALL BE PROTECTED DURING CONSTRUCTION IN ACCORDANCE WITH TOWN OF KNIGHTDALE DETAILS AND SPECIFICATIONS.
26. CONTRACTOR SHALL PROVIDE RIP RAP DISSIPATOR PADS AT STORM DRAINAGE PIPE DISCHARGE POINTS AS REQUIRED TO ENSURE POSITIVE DRAINAGE.
27. ALL CLEARING LIMITS SHALL BE CLEARLY IDENTIFIED AND STAKED PRIOR TO ANY CONSTRUCTION. THE TOWN SHALL BE GIVEN 24-HOUR NOTICE PRIOR TO BEGINNING CLEARING OPERATIONS.
28. ALL EARTHWORK SHALL BE COMPLETED IN ACCORDANCE WITH THE TOWN OF KNIGHTDALE STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS MANUAL (SECTION 2.05).
29. STABILIZATION SHALL BE IN ACCORDANCE WITH NPDES STORMWATER DISCHARGE PERMIT (SEE TABLE ON SHEET 9.3).
30. MASS GRADING IS NOT PERMITTED.
31. EXISTING STORM DRAINAGE EASEMENT SHALL BE ABANDONED ONCE FUTURE RIGHT OF WAY IS DEDICATED AND PIPE REMOVED.



EROSION CONTROL LEGEND

- LIMITS OF CONSTRUCTION
- SF/TP SILT/TREE PROTECTION FENCE
- ⇒⇒ TEMPORARY DIVERSION DITCH
- TP TREE PROTECTION FENCE
- SKIMMER BASIN
- INLET PROTECTION
- SILT FENCE OUTLET
- FLARED END SECTION w/ RIP RAP OUTLET PROTECTION

SEDIMENT BASIN DESIGN CHART

BASIN	TYPE	DENUDED AREA [AC]	DRAINAGE AREA [AC]	COMPOSITE RATIONAL C	PEAK FLOW [CFS]	BASIN DIMENSIONS			WEIR LENGTH [FT]	CLEANOUT FREQ [MONTHS]	VOLUME REQUIRED [CF]	VOLUME PROVIDED [CF]	SURFACE AREA REQ. [SF]	SURFACE PROVIDED [SF]	SKIMMER SIZE [IN]	SKIMMER ORIFICE SIZE [IN]
						DEPTH [FT]	LENGTH [FT]	WIDTH [FT]								
BMP #6	SKIMMER	7.38	23.38	0.29	49.76	3.5	AS SHOWN	27	12	42,089	92,500	21,644	24,355	4.0	3.00	
SCM #6	SKIMMER	5.80	11.46	0.35	29.10	3.5	AS SHOWN	47	12	20,624	38,515	12,660	21,186	3.0	2.25	
EX SB 7	SKIMMER	4.25	7.30	0.37	19.75	3.5	112	59	19	13,140	15,528	6,418	6,608	3.0	1.75	

EROSION CONTROL NOTE:
FOREBAY WILL NOT BE REQUIRED WHILE BMP IS ACTING AS AN EROSION CONTROL DEVICE.

CLEARING LIMITS NOTE:
PORTION OF PHASE R6(A,B & C) LOCATED WITHIN CLEARING LIMITS OF TOK #20P-7-15 SHALL BE USED FOR ACCESS TO BMP. INSTALLATION OF ALL UTILITIES INCLUDING STORM DRAINAGE SHALL BE IN ACCORDANCE WITH PHASE R6 PLANS.

DENUDED AREA = 13.0 AC

DISSIPATOR DESIGN CHART

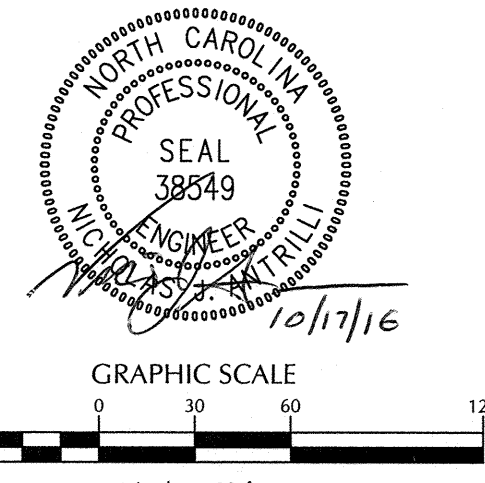
NAME	PIPE SIZE [IN]	VELOCITY [FT/S]	LENGTH [FT]	WIDTH AT BEGINNING [FT]	WIDTH AT END [FT]	AVG DIA [IN]	THICKNESS [IN]	STONE CLASS
FES 500	48	9.92	32	12	36	13	22	B
FES 520	18	10.41	9	5	11	6	22	B
FES 700	24	14.28	16	6	18	13	22	B
FES 710	30	16.06	20	8	23	13	22	B

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3/2/17
ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SJY

Designer	WR	Scale	As Noted
Drawn By	LEG/GAS	Date	02/02/16
Checked By	NJA	Job No.	2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)

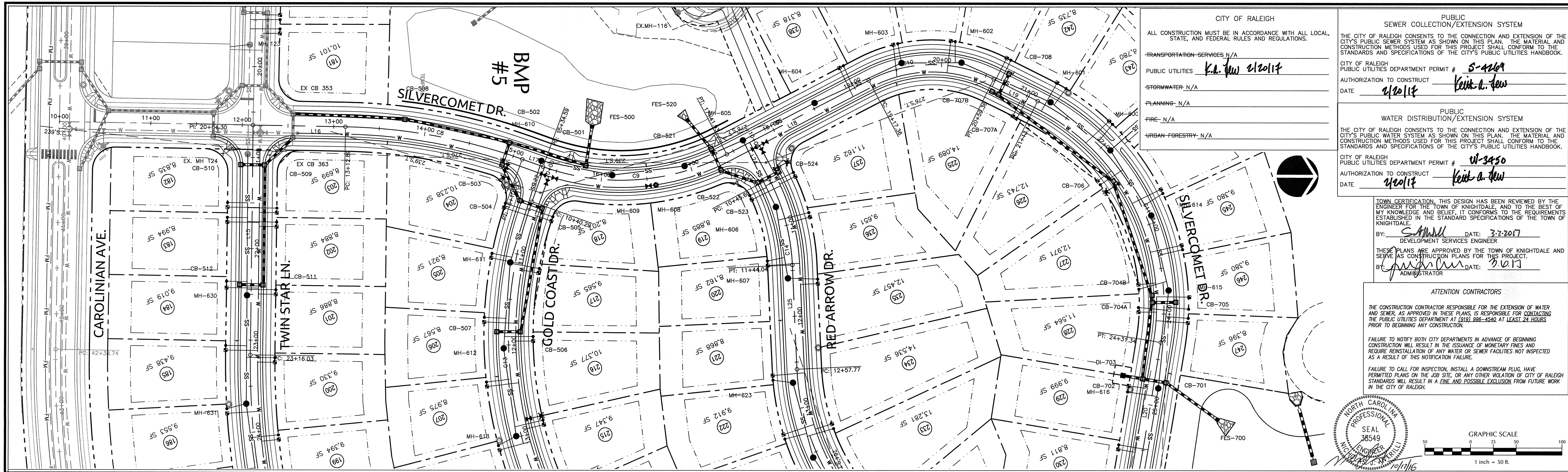
Wake County North Carolina

EROSION CONTROL PLAN

WithersRavenel
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Sheet No. **5.1**



CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES: N/A
 PUBLIC UTILITIES: *K.A. New 2/20/14*
 STORMWATER: N/A
 PLANNING: N/A
 FIRE: N/A
 URBAN FORESTRY: N/A

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM
 THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *W-3450*
 AUTHORIZATION TO CONSTRUCT: *K.A. New*
 DATE: *2/20/14*

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: *3-2-2017*
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

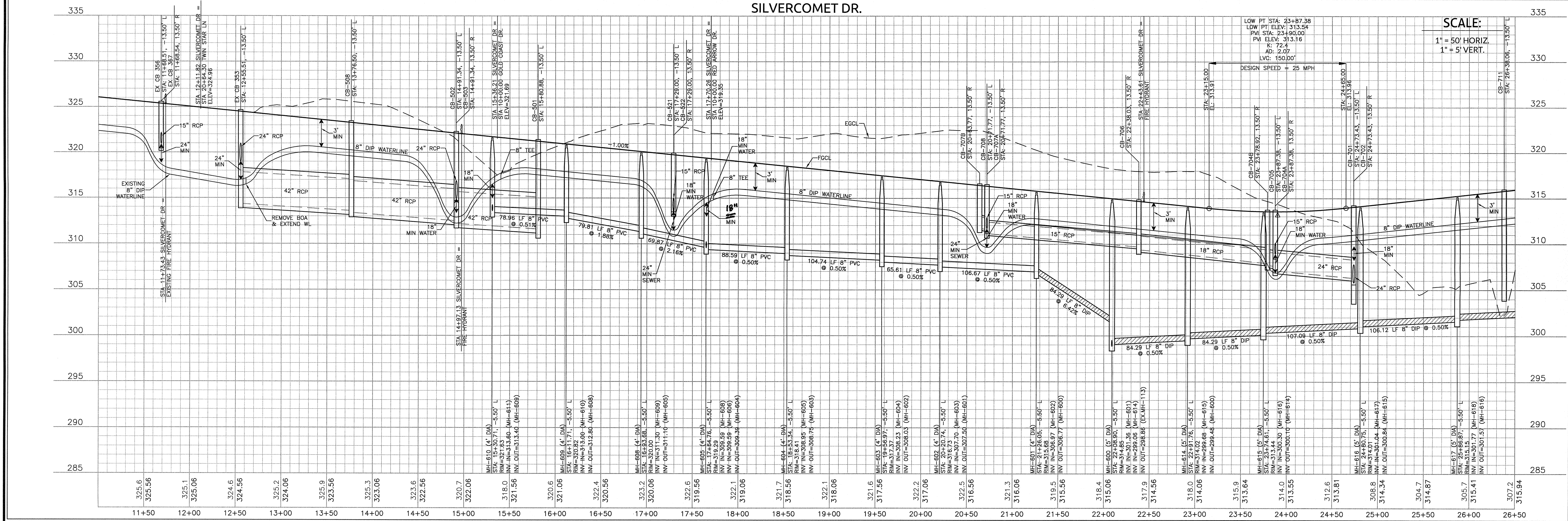
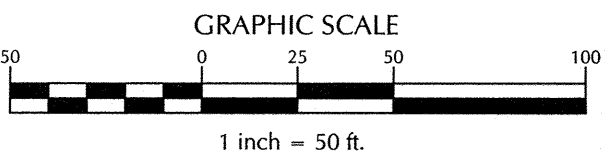
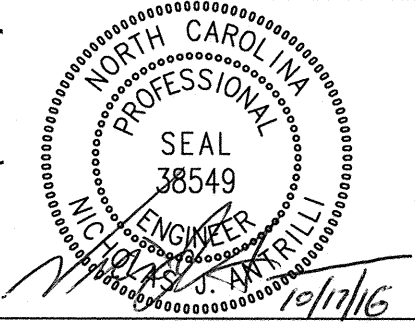
BY: *[Signature]* DATE: *3-2-2017*
 ADMINISTRATOR

ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER AS APPROVED IN THESE PLANS IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 566-6644 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.



No.	Revision	Date	By
1	REVISION PER TOX COMMENTS	03/28/16	GAS
2	REVISION PER TOX COMMENTS	05/27/16	GAS
3	REVISION PER TOX COMMENTS	06/30/2016	SIY

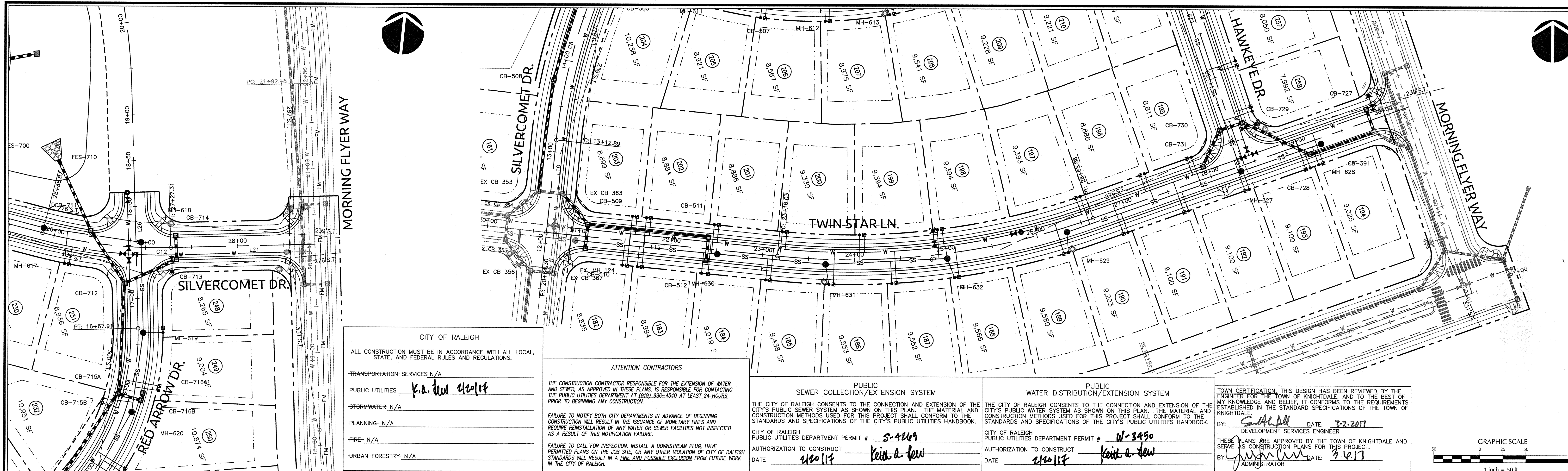
Designer	WR	Scale	As Noted
Drawn By	LEG/GAS	Date	02/02/16
Checked By	NJA	Job No.	2090251.90

KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Wake County
 North Carolina

SILVERCOMET DRIVE PLAN & PROFILE

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 Engineers | Planners | Surveyors
 115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

K:\03\03-0250\02501-9-orig\kda\station - REV CADD\MASTER-CONSTRUCTION DRAWINGS\01-8.5 PLAN & PROFILE.dwg - Wednesday, October 15, 2016 2:30:37 PM - SITEGROUND.dwg



CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES N/A
 PUBLIC UTILITIES *K.A. New 4/20/17*
 STORMWATER N/A
 PLANNING N/A
 FIRE N/A
 URBAN FORESTRY N/A

ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (312) 998-4340, AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUS, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *S-4269*
 AUTHORIZATION TO CONSTRUCT *Keith A. New*
 DATE *4/20/17*

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

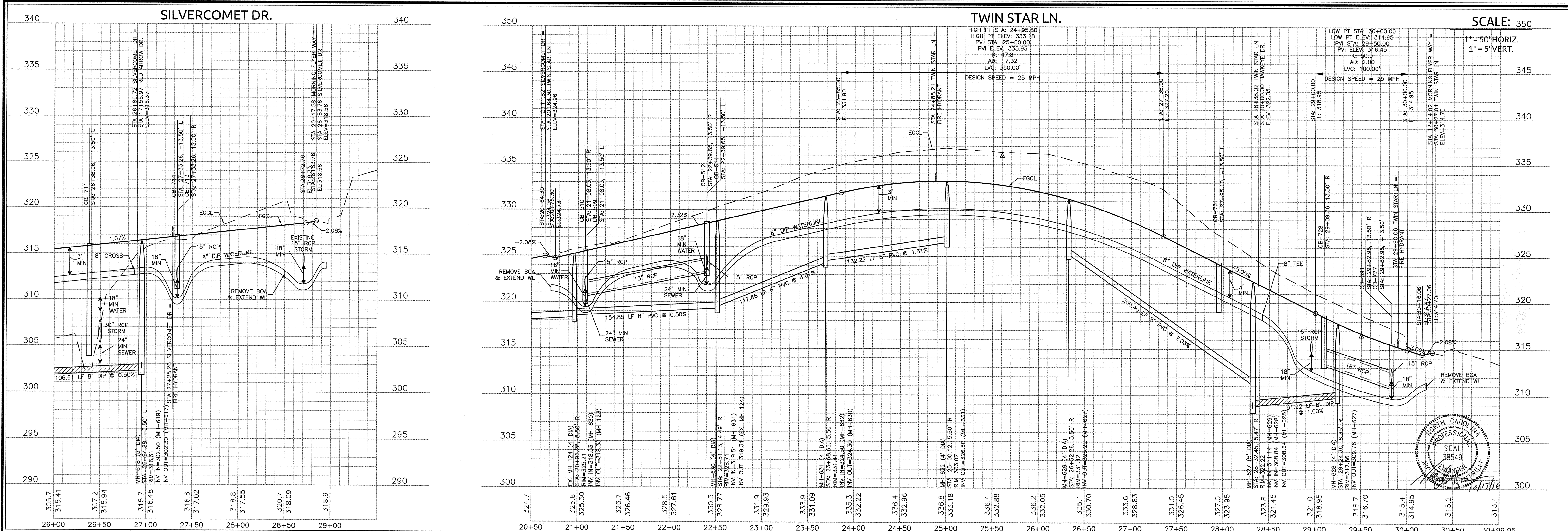
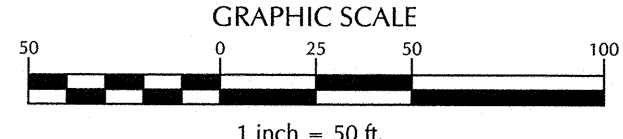
CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *W-3450*
 AUTHORIZATION TO CONSTRUCT *Keith A. New*
 DATE *4/20/17*

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *S. A. Hall* DATE: *3-2-2017*
 DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *J. W. Smith* DATE: *4.6.17*
 ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOR COMMENTS	03/29/16	GAS
2	REVISION PER TOR COMMENTS	05/27/16	GAS
3	REVISION PER TOR COMMENTS	06/30/2016	SJY

KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Wake County
 North Carolina

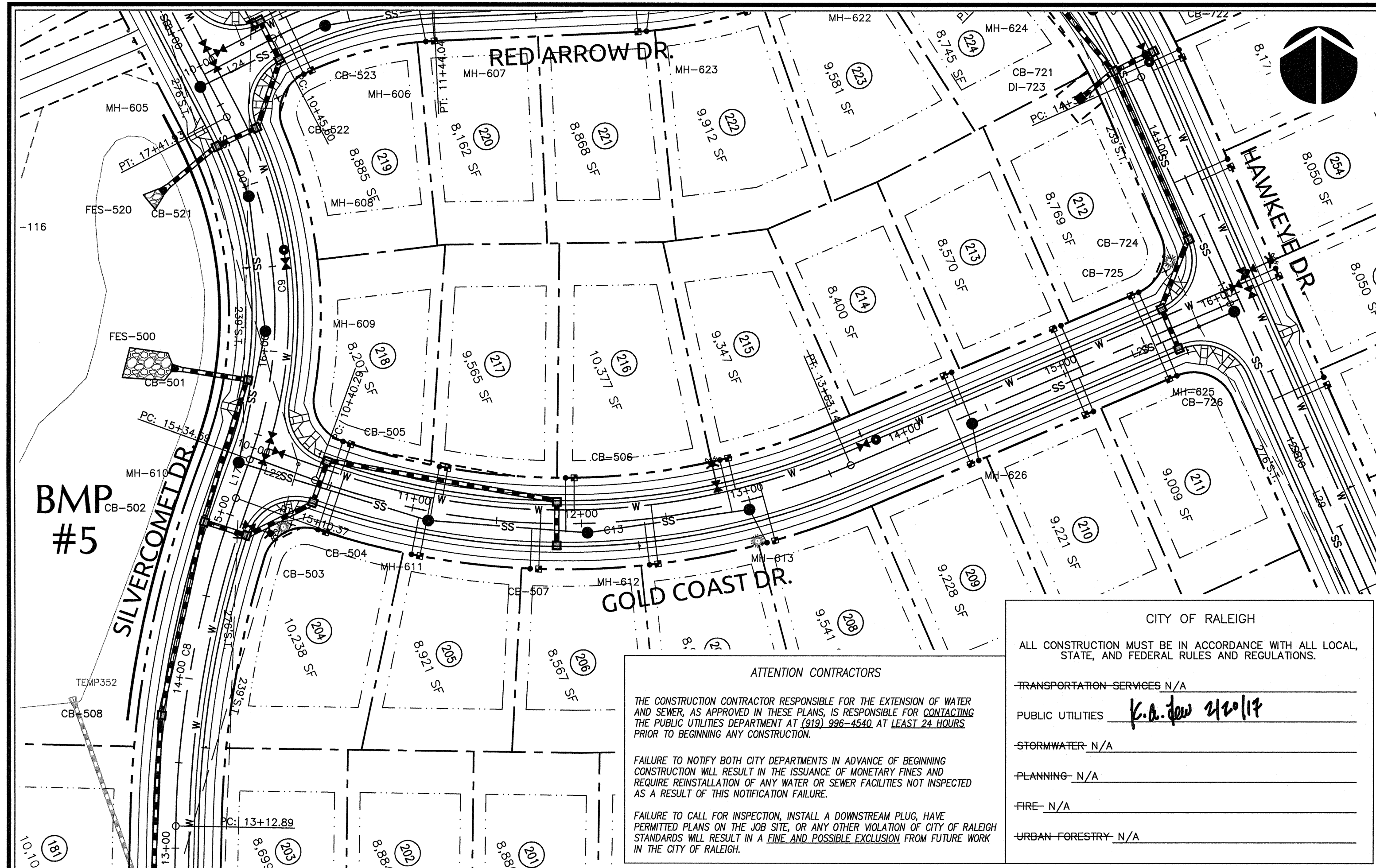
SILVERCOMET DR. AND TWIN STAR LN.
 PLAN & PROFILE

WithersRavenel
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Sheet No. **6.2**

K:\09\09-0250\090251.9-Knightdale Station - RW\CAD\MASTER-CONSTRUCTION DRAWINGS\1-16.5 PLAN & PROFILES.dwg - Wednesday, October 15, 2016 2:30:05 PM - STRONGBOX, GRS



ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (813) 396-4340 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

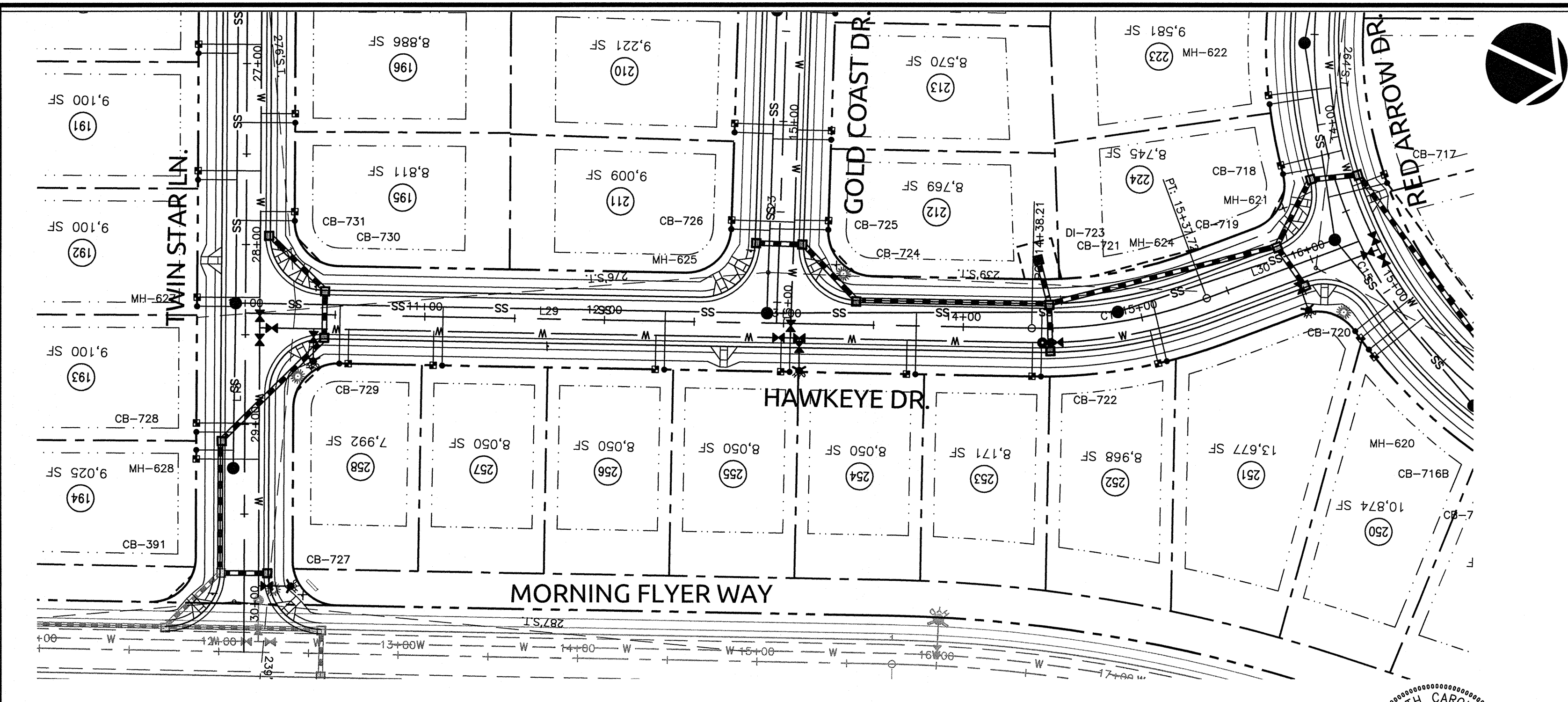
FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES	N/A
PUBLIC UTILITIES	<i>K.A. Dew 2/10/17</i>
STORMWATER	N/A
PLANNING	N/A
FIRE	N/A
URBAN FORESTRY	N/A



PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *S-421A*

AUTHORIZATION TO CONSTRUCT *Keith A. Dew*

DATE *2/10/17*

PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # *W-3450*

AUTHORIZATION TO CONSTRUCT *Keith A. Dew*

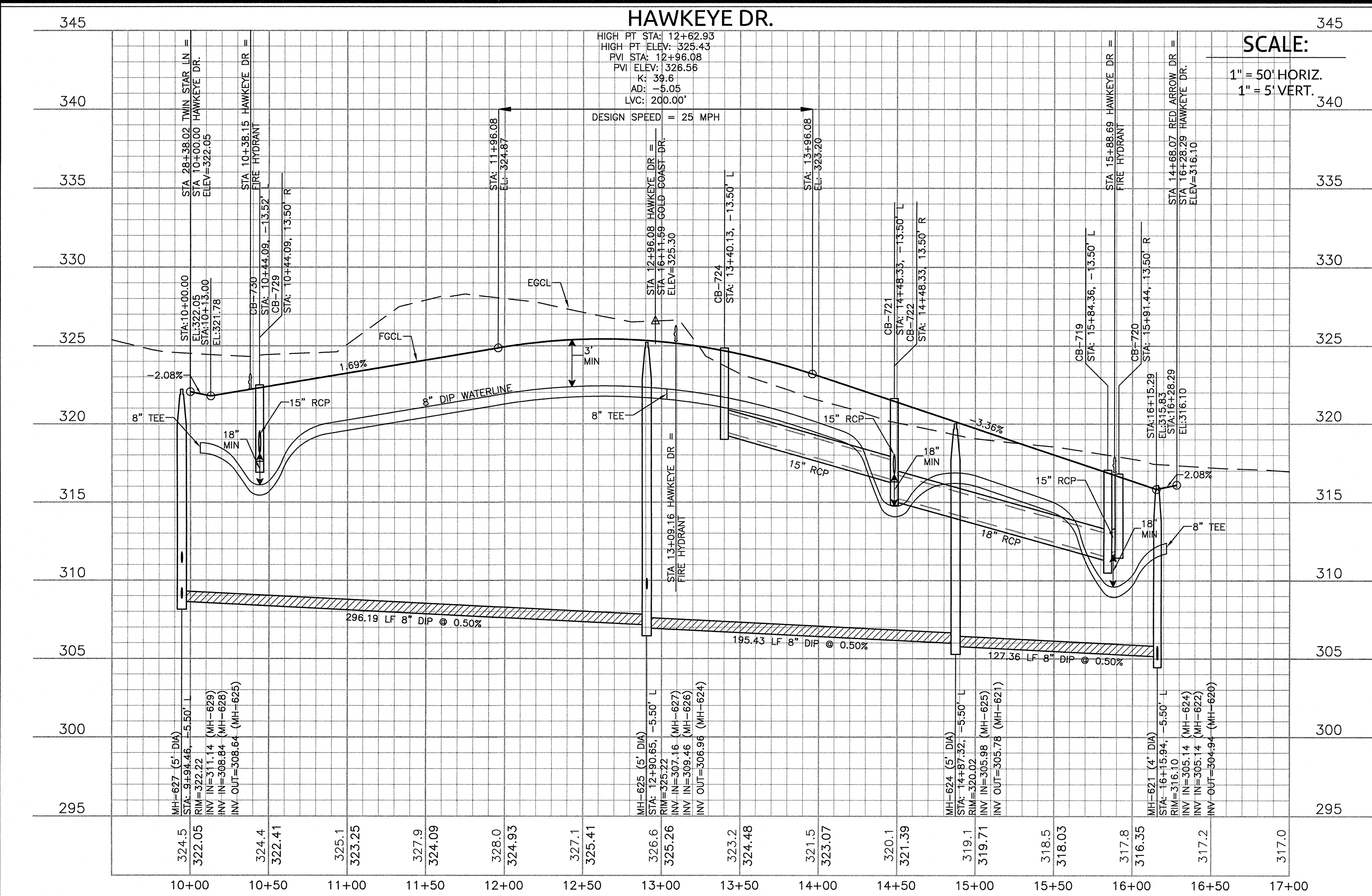
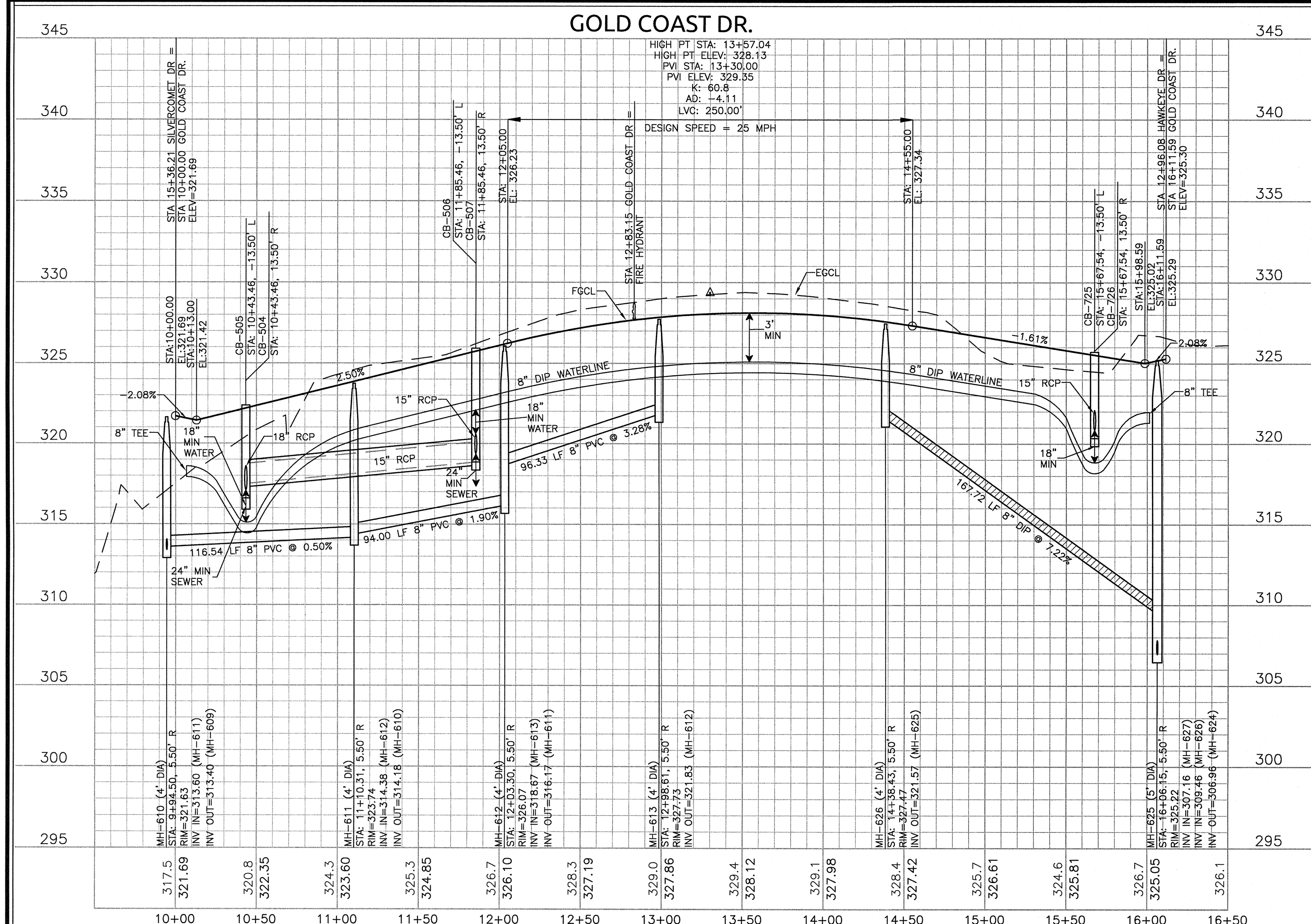
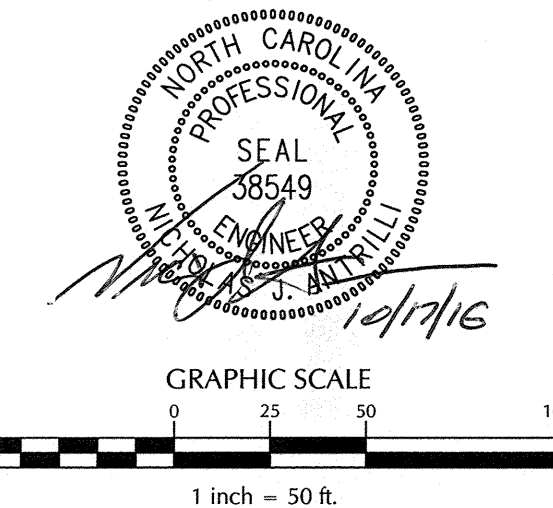
DATE *2/10/17*

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

DATE: *3-2-2017*

SEAL: *38549*

ADMINISTRATOR: *[Signature]*



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SYJ

Designer	WR	Scale	As Noted
Drawn By	LEG/GAS	Date	02/02/16
Checked By	NJA	Job No.	2090251.90

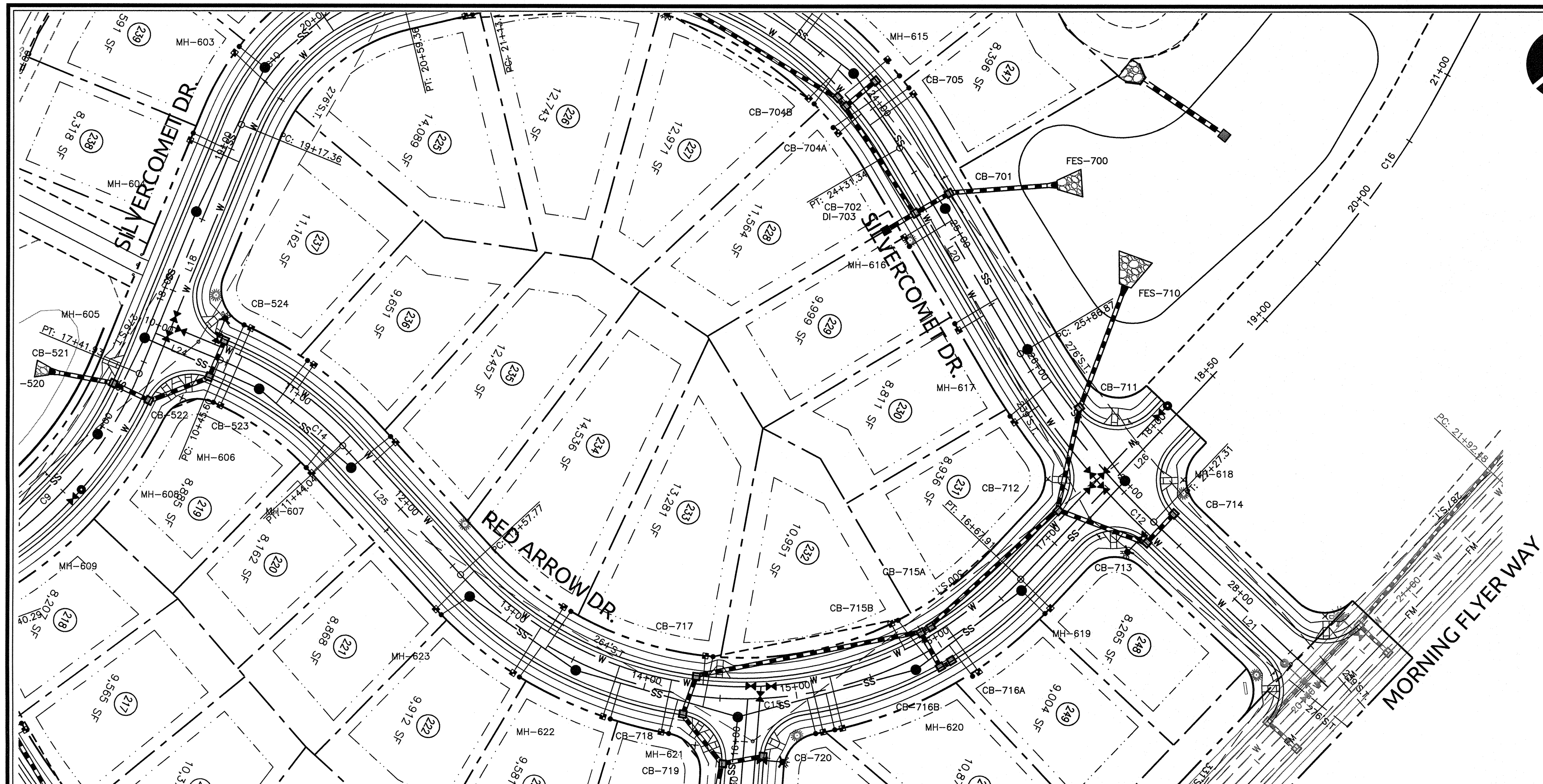
KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County North Carolina

GOLD COAST DR. AND HAWKEYE DR.
PLAN & PROFILE

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Sheet No. **6.3**

K:\09\09-0250\090251_P-Knightdale Station - RED ARROW/SEWER-CONSTRUCTION DRAWINGS\01-1-6.5_Plan & Profiles.dwg - Tuesday, October 18, 2016 2:56:46 PM - STROUDLAND, GREG



ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 998-6562 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3.6.17
ADMINISTRATOR

PUBLIC SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # S-4269

AUTHORIZATION TO CONSTRUCT Keith A. Jew

DATE 2/20/17

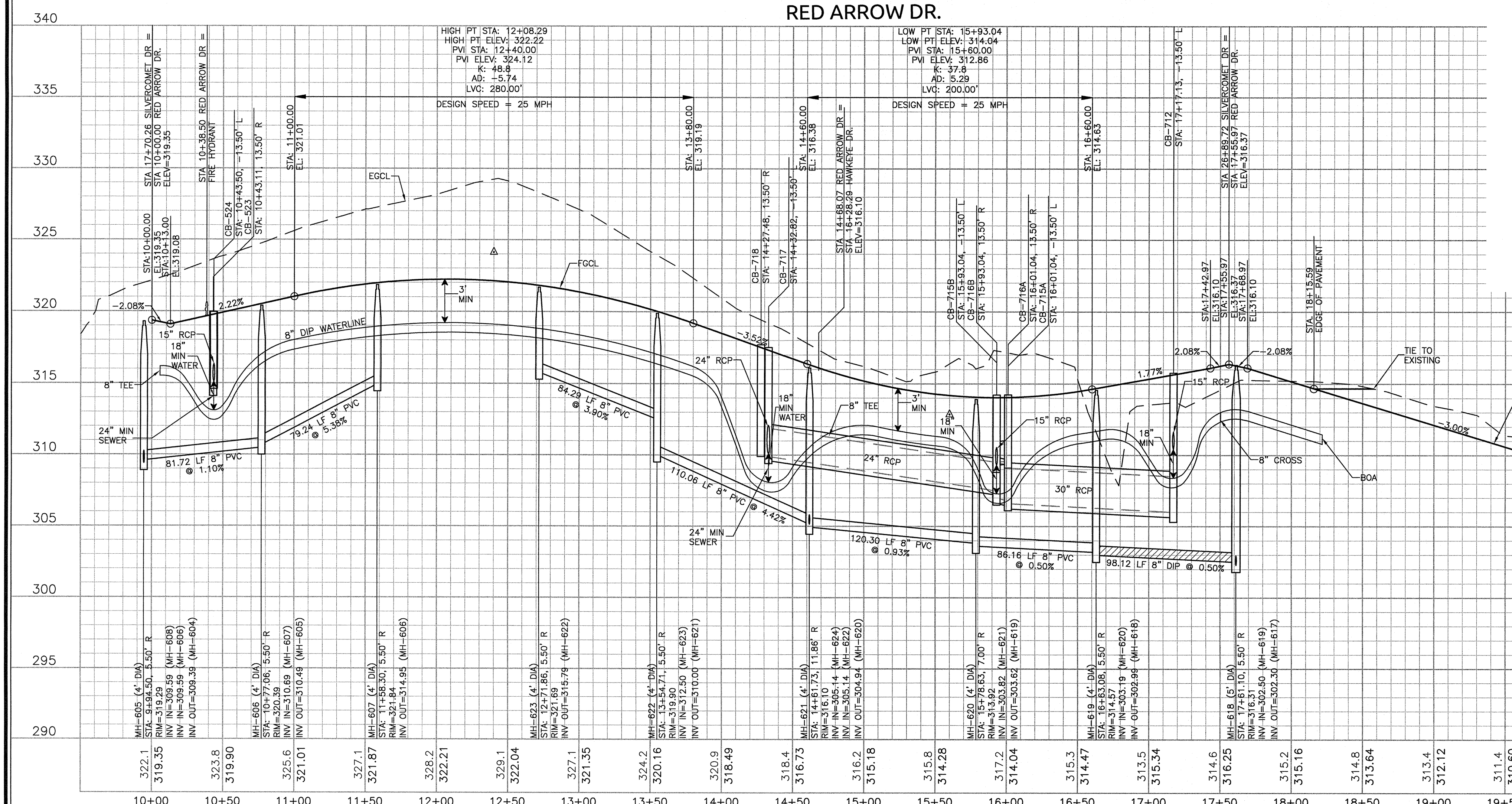
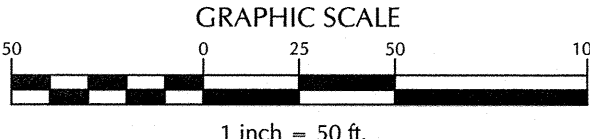
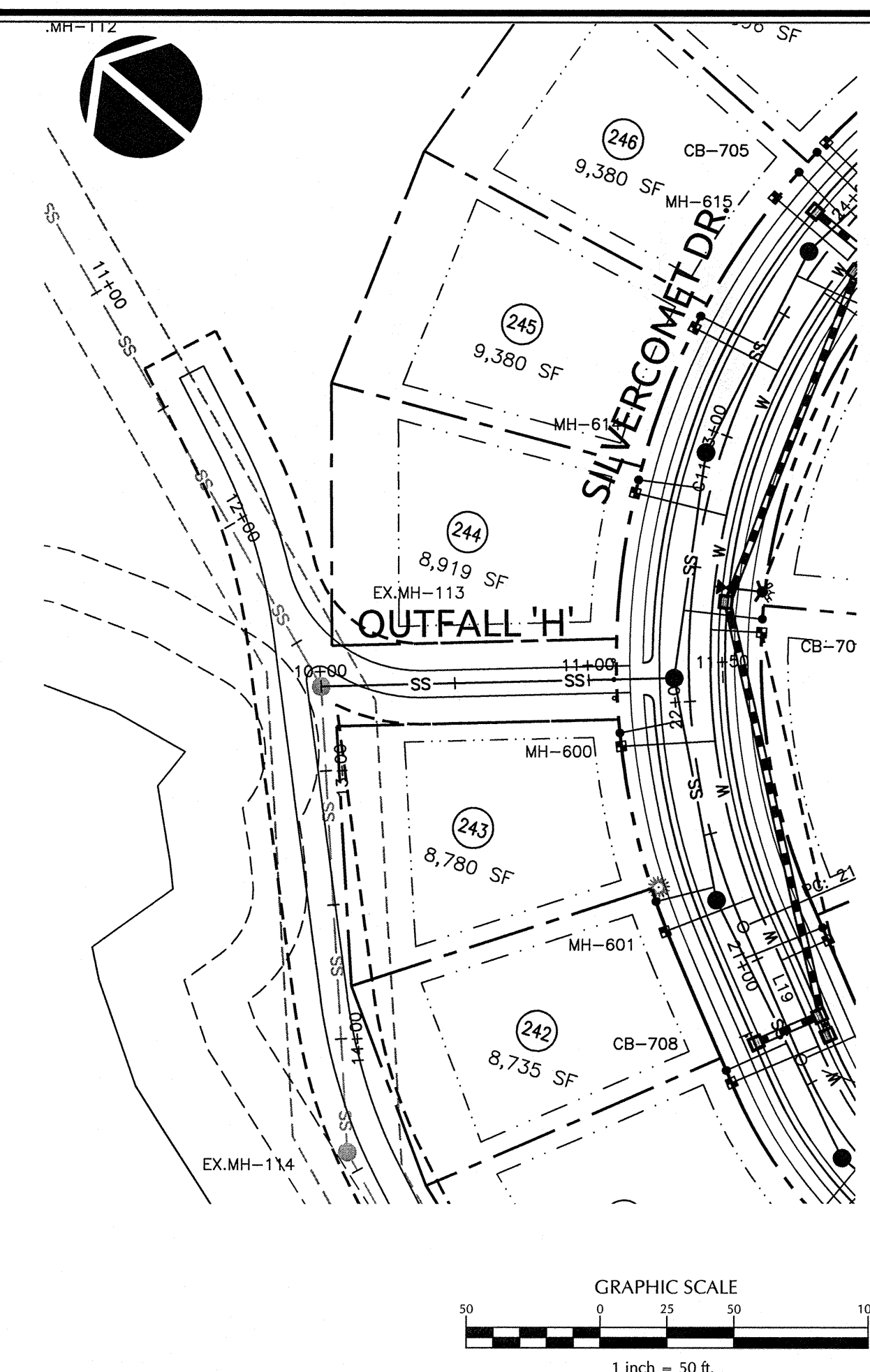
PUBLIC WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PERMIT # W-3450

AUTHORIZATION TO CONSTRUCT Keith A. Jew

DATE 2/20/17



CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES: N/A

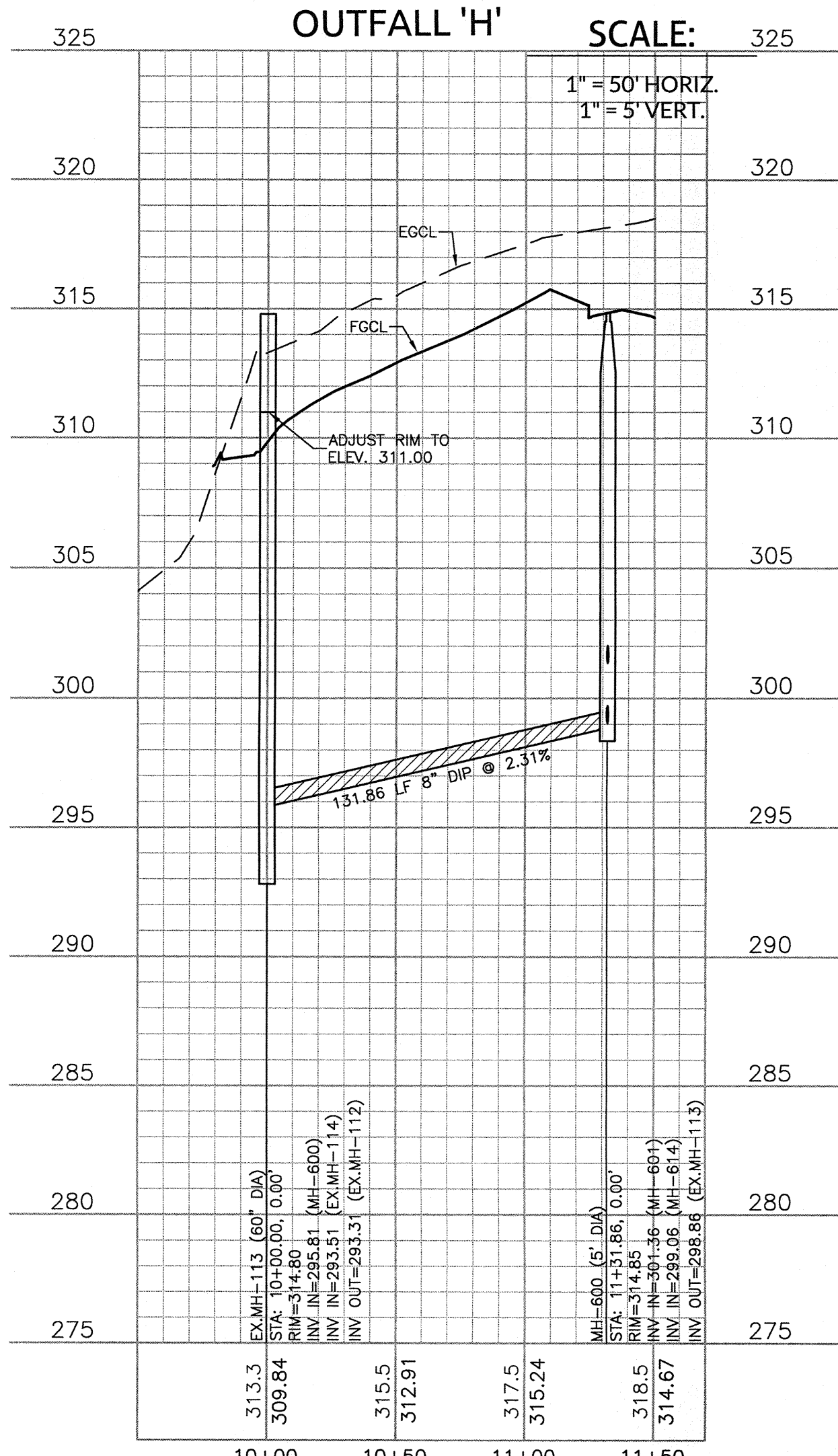
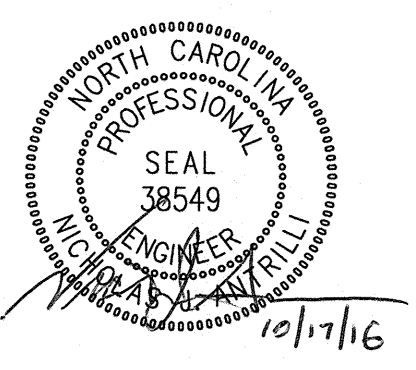
PUBLIC UTILITIES: Keith A. Jew 2/20/17

STORMWATER: N/A

PLANNING: N/A

FIRE: N/A

URBAN FORESTRY: N/A



No.	Revision	Date	By
1	REVISION PER TOX COMMENTS	03/28/16	GAS
2	REVISION PER TOX COMMENTS	05/27/16	GAS
3	REVISION PER TOX COMMENTS	06/30/2016	SIJ

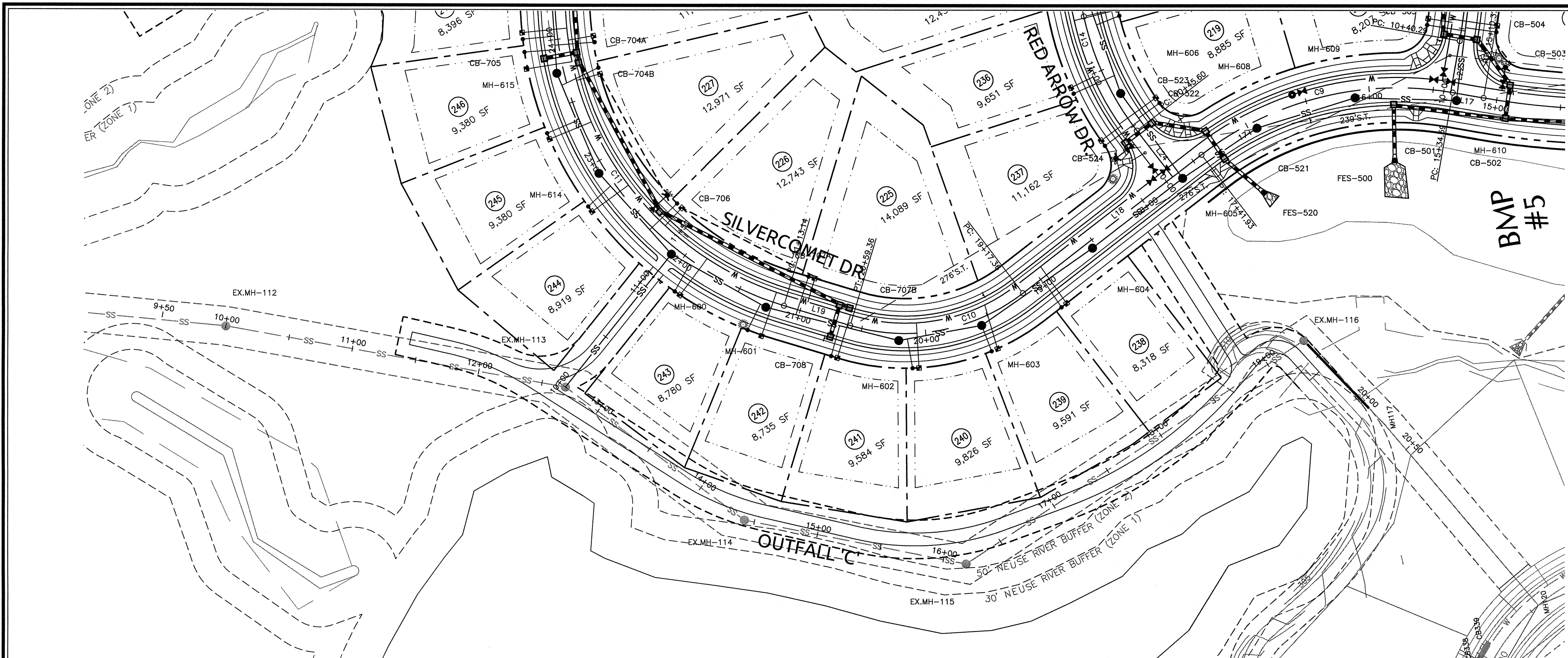
Designer	WR	Scale	As Noted
Drawn By	LEG/GAS	Date	02/02/16
Checked By	NJA	Job No.	2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County
North Carolina

RED ARROW DR. AND SEWER OUTFALL 'H'
PLAN & PROFILE

WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKenan Drive | Cary, NC 27511 | T: 919-469-3340 | License #: C-0832 | www.withersravenel.com
 Sheet No. **6.4**

K:\00\00-0000\000001-1-4.5 PLAN & PROFILE.dwg - Wednesday, October 19, 2016 2:38:21 PM - STROUDMAN, GREG



PUBLIC
SEWER COLLECTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC SEWER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # **S-4269**

AUTHORIZATION TO CONSTRUCT **K.A. Jew**

DATE **2/20/17**

PUBLIC
WATER DISTRIBUTION/EXTENSION SYSTEM

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION AND EXTENSION OF THE CITY'S PUBLIC WATER SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTION METHODS USED FOR THIS PROJECT SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE CITY'S PUBLIC UTILITIES HANDBOOK.

CITY OF RALEIGH
PUBLIC UTILITIES DEPARTMENT PERMIT # **W-3450**

AUTHORIZATION TO CONSTRUCT **K.A. Jew**

DATE **2/20/17**

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: **C.M. M** DATE: **3-2-2017**
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

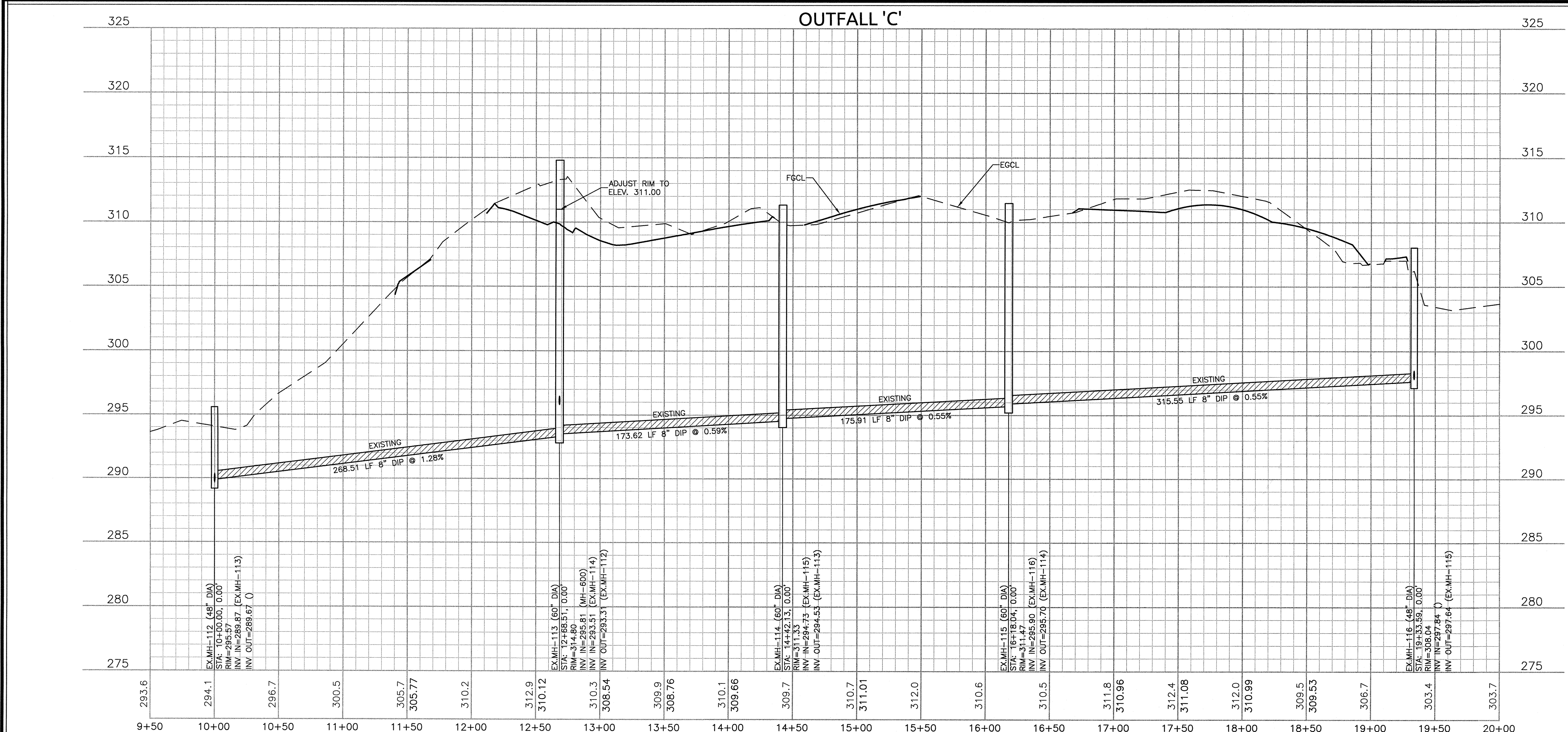
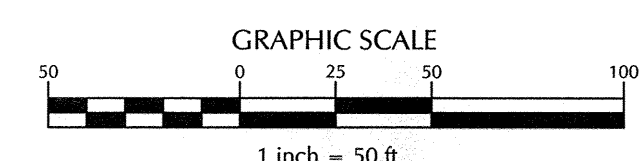
BY: **[Signature]** DATE: **3.0.17**
ADMINISTRATOR

ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER AND SEWER, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT (919) 996-4542 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOB SITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.



SCALE:
1" = 50' HORIZ.
1" = 5' VERT.

CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION SERVICES N/A

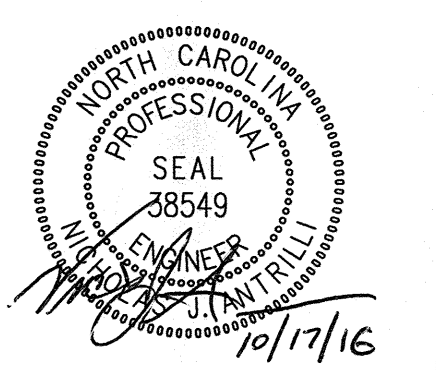
PUBLIC UTILITIES **K.A. Jew 2/20/17**

STORMWATER N/A

PLANNING N/A

FIRE N/A

URBAN FORESTRY N/A



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	02/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SYI

Designer: WR
Scale: As Noted

Drawn By: LEG/GAS
Date: 02/02/16

Checked By: NJA
Job No.: 2090251.90

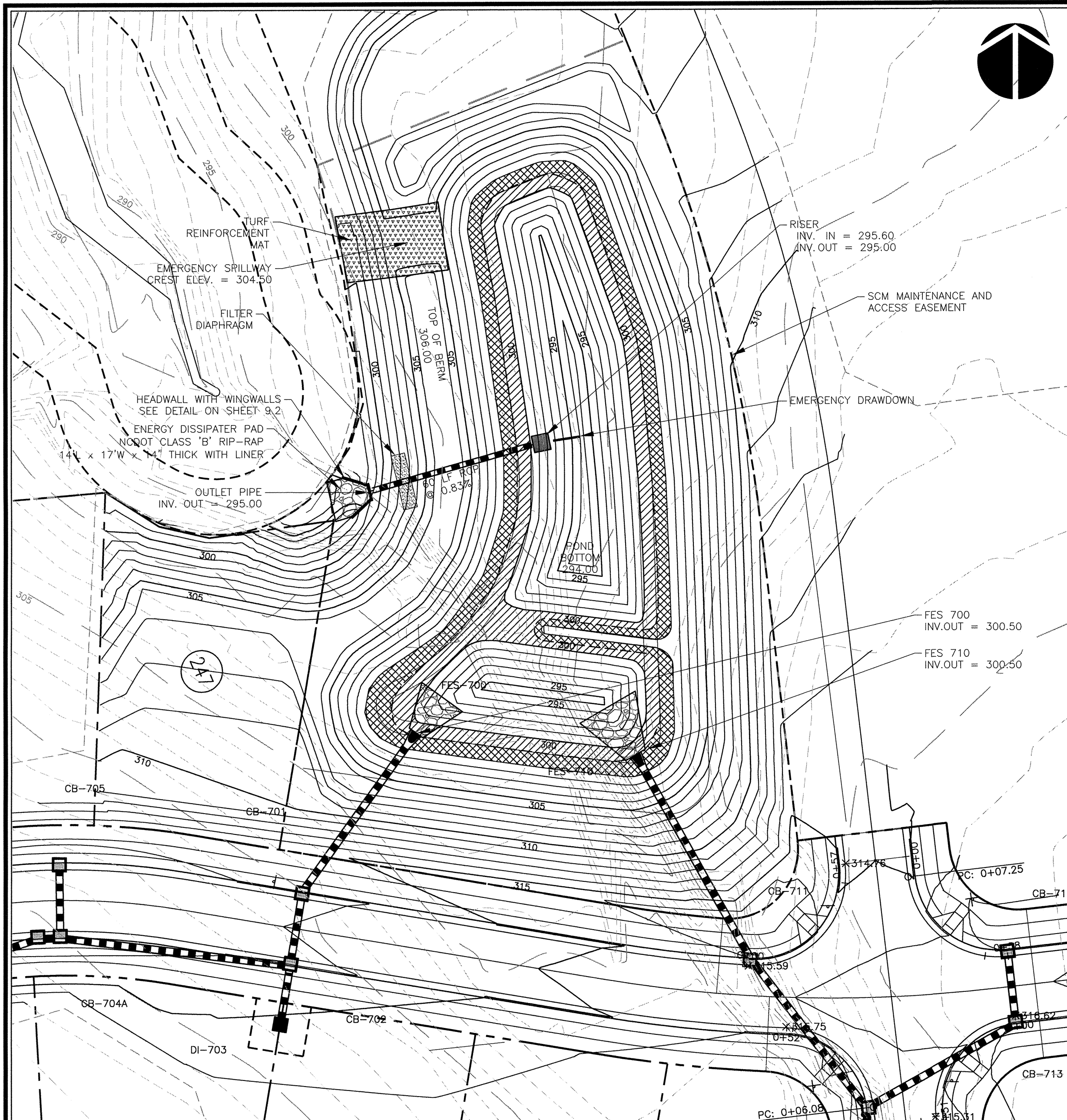
KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Knightdale Wake County North Carolina

SEWER OUTFALL 'C' PLAN & PROFILE

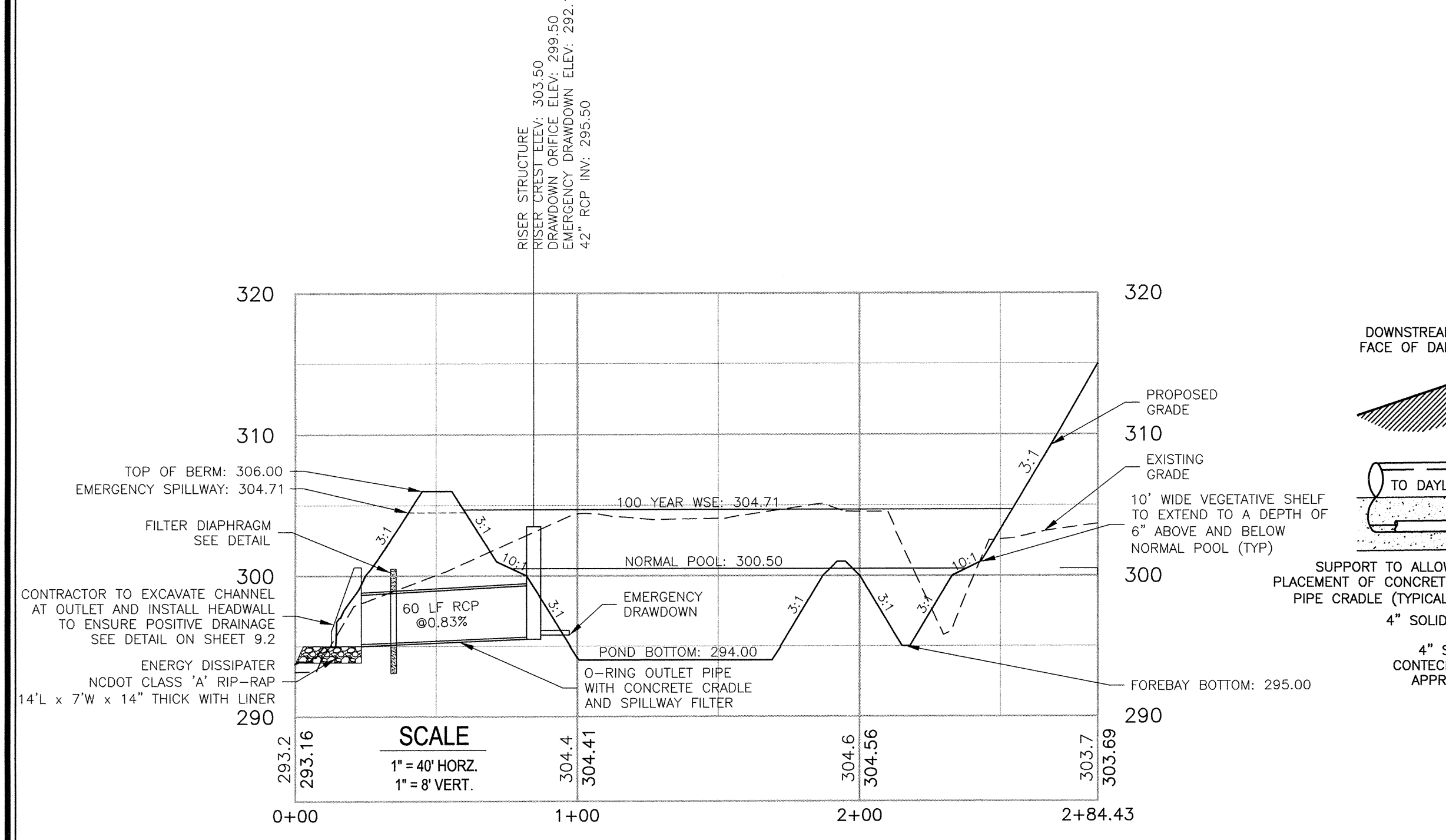
WithersRavenel
Engineers | Planners | Surveyors
115 MacKenan Drive | Cary, NC 27511 | t: 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No.
6.5

K:\09\09-0259\02591.dwg - Knightdale Station - 16.00\DWG\MASTER-CONSTRUCTION - DRAWINGS\A-1-6.5 PLAN & PROFILE.dwg - Tuesday, October 16, 2016 2:54:28 PM - STRICKLAND, DREG



SCM #6 - WETPOND

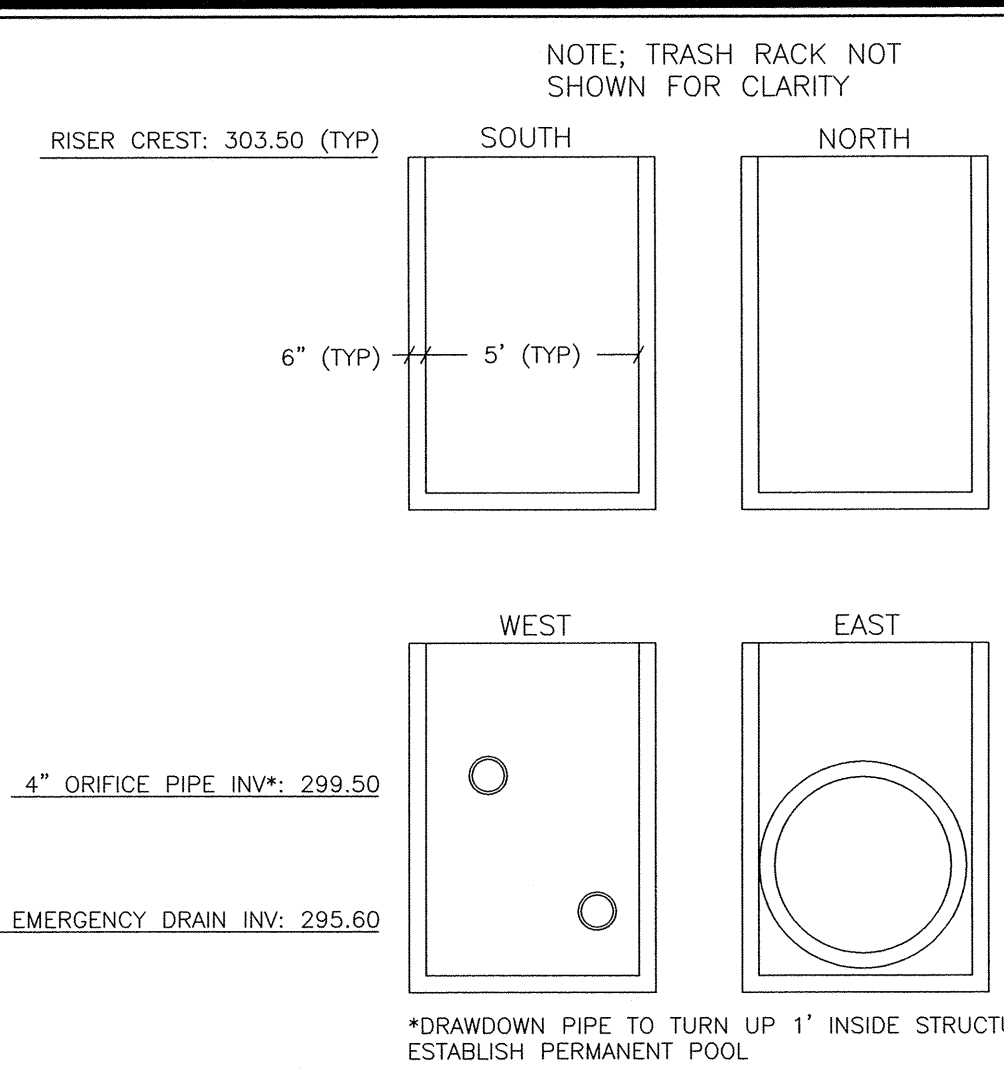


SCALE
1" = 40' HORZ.
1" = 8' VERT.

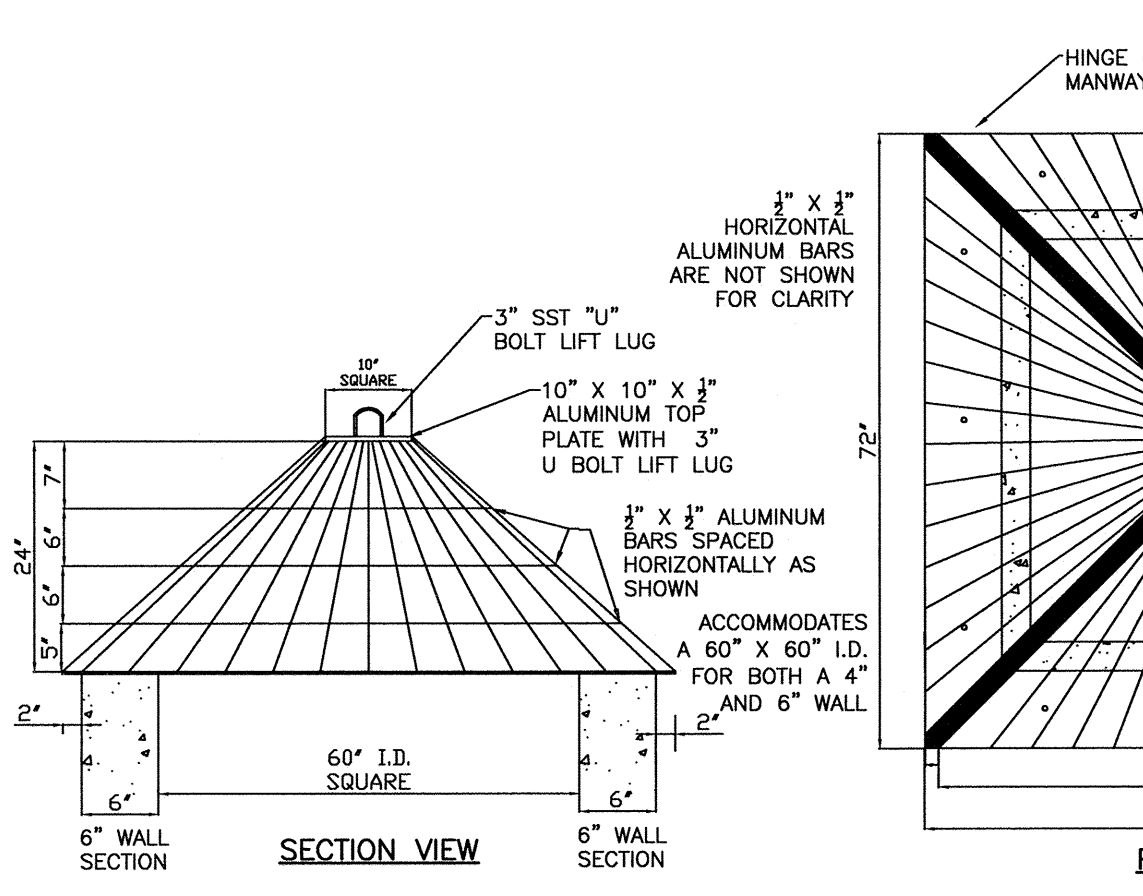
No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SIY

Designer	Scale
WR	As Noted
Checked By	Date
LEG/GAS	02/02/16
Checked By	Job No.
NJA	2090251.90

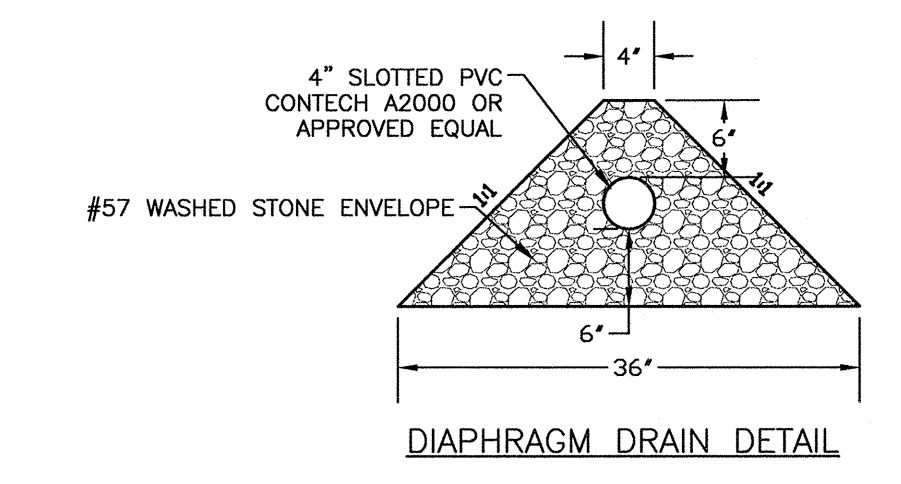
KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County



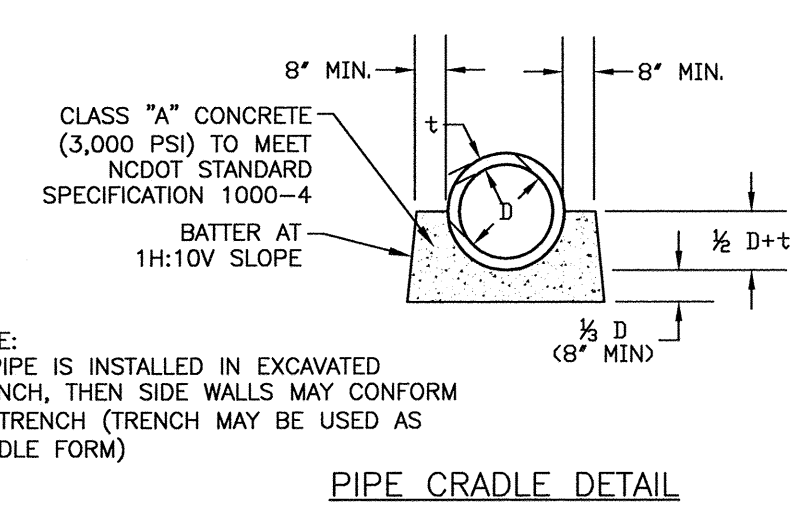
RISER #6 DETAILS
NTS



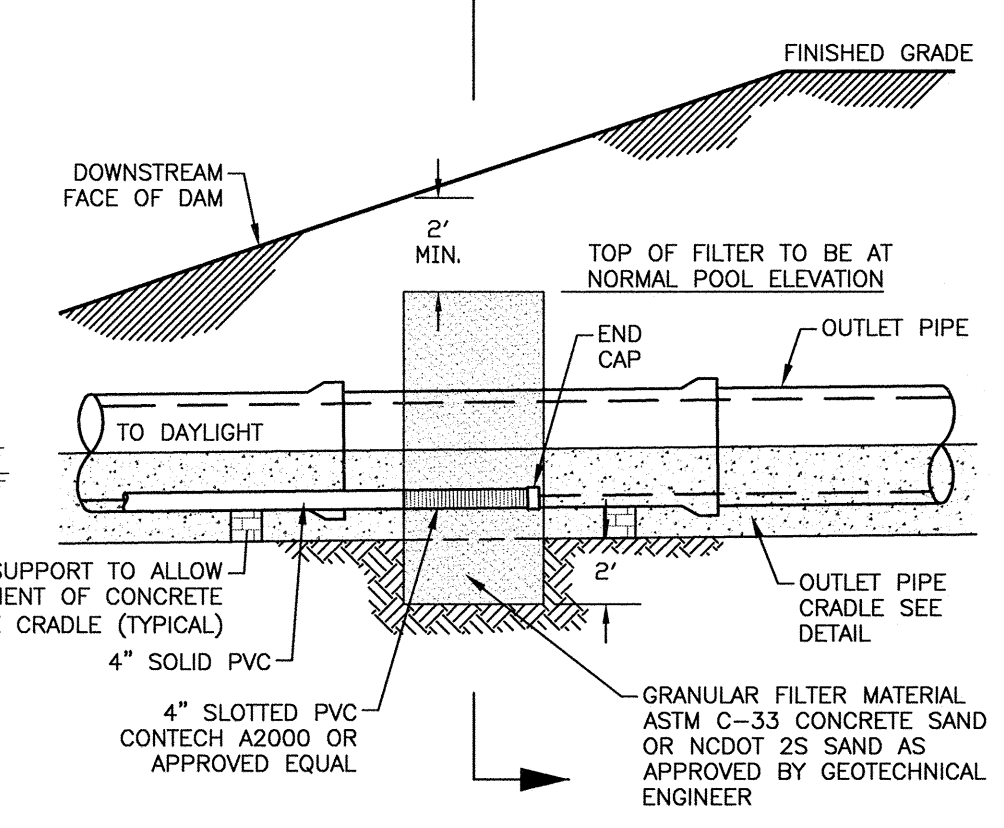
TRASH RACK DETAIL
NTS



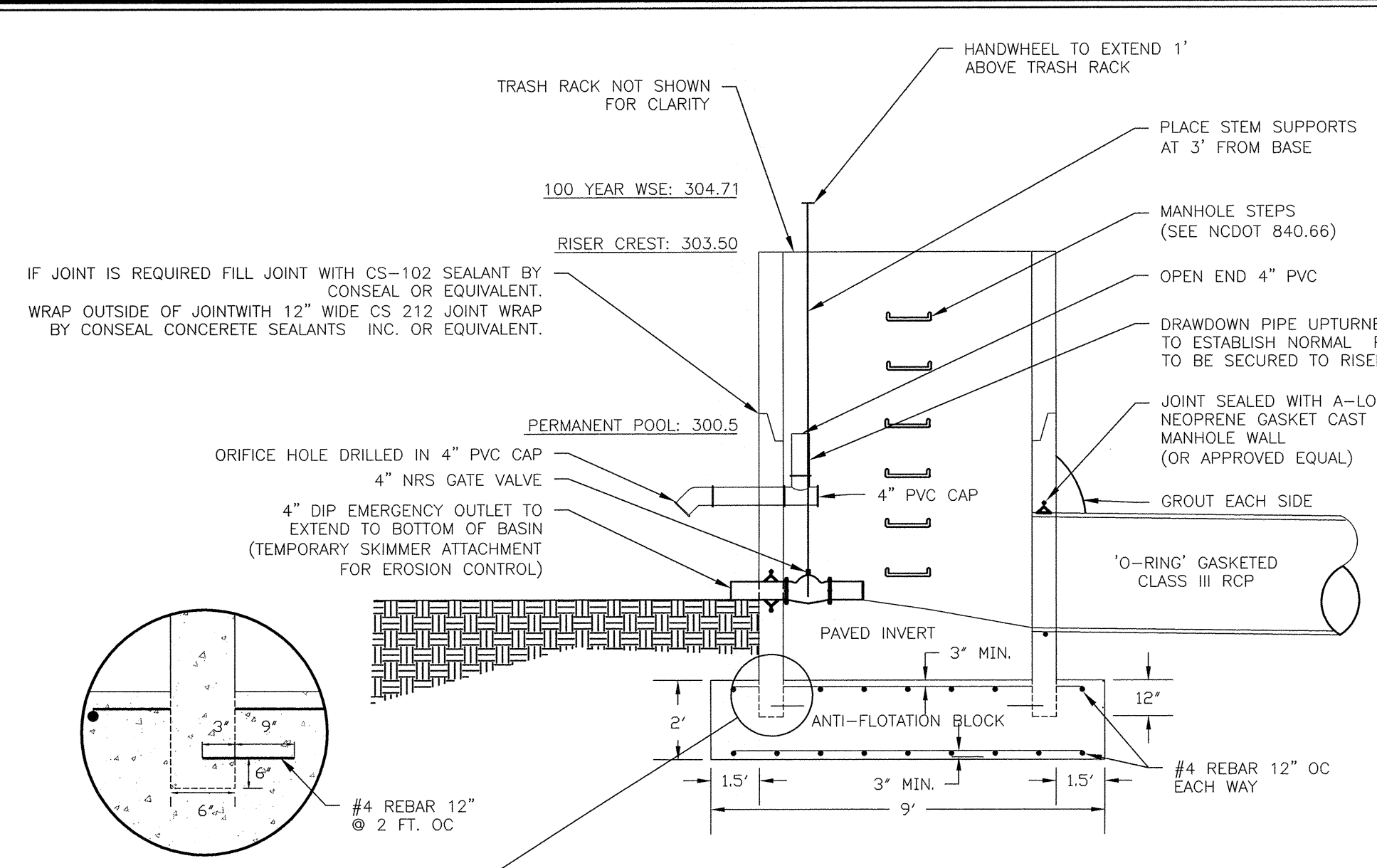
DIAPHRAGM DRAIN DETAIL



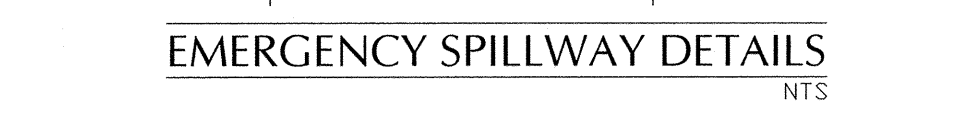
PIPE CRADLE DETAIL



OUTLET PIPE FILTER DIAPHRAGM & CONCRETE CRADLE DETAIL
NTS



SCM RISER & DRAWDOWN DEVICE DETAIL
NTS



EMERGENCY SPILLWAY DETAILS
NTS

SCM# 6 DESIGN DATA		
DIMENSIONS		ELEV.
TOP OF BERM	10' WIDE	306.00
100 YEAR WSE		304.71
RISER CREST ELEVATION	5' ID x 5' ID RCP BOX	303.50
NORMAL POOL	11,340 SQFT	300.50
DRAWDOWN ORIFICE *	2.5'	299.50
POND BOTTOM	249 SQFT	294.00
HIGH FLOW BYPASS	OUTLET PIPE INVERT UP OUTLET PIPE INVERT DOWN	295.50 295.00

CLAY LINER SPECIFICATIONS

- THE CLAY LINER FOR THE WET POND SHALL BE AT LEAST 8" THICK AND MEET THE FOLLOWING SPECIFICATIONS:
- UNIFIED SOIL CLASSIFICATION SYSTEM DESIGNATION OF CL, CH, ML, SC
 - MINIMUM OF 40% PASSING #200 SIEVE
 - MINIMUM PLASTICITY INDEX OF 12
 - MAXIMUM INFILTRATION RATE OF 0.01 IN/HR.
 - A MINIMUM OF 2 TESTS OF EACH ABOVE PARAMETER SHALL BE COMPLETED BY THE CONTRACTOR ON THE LINER MATERIAL AND PRESENTED TO THE ENGINEER FOR APPROVAL.
 - COMPACTION TO A MINIMUM OF 93% PER ASTM D698, AND WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT (1 COMPACTION DENSITY TEST PER 2500 SQ. FT.)
- THE CLAY LINER SHALL BE PLACED UNDER THE BOTTOM OF THE BMP PERMANENT POOL TO A THICKNESS OF 8 INCHES. A MINIMUM OF 4 INCHES OF TOPSOIL SHALL BE THE FINISHED GRADE AS SHOWN ON THE DRAWINGS AND/OR DETAILS. CARE SHALL BE TAKEN WHEN TRACKING IN THE TOPSOIL TO NOT PUNCTURE OR DAMAGE THE CLAY. A CLAY/SOIL MIXTURE MAY BE USED IF THE ABOVE SPECIFICATIONS ARE SATISFIED AND WITH WRITTEN APPROVAL BY THE ENGINEER.

STORMWATER SCM NOTES:

- PRIOR TO CONSTRUCTION, ANY DISCREPANCIES IN THE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER FOR RESOLUTION.
- ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF KNIGHTDALE STANDARDS AND SPECIFICATIONS
- GEOTECHNICAL ENGINEER SHALL EVALUATE SOILS ONSITE FOR SUITABILITY OF DAM CONSTRUCTION AND SLOPE STABILITY. PROFESSIONAL CERTIFICATION OF EMBANKMENT CONSTRUCTION IS REQUIRED FOR AS-BUILT CERTIFICATION.
- DAM TO BE CONSTRUCTED PER THE FOLLOWING SPECIFICATIONS UNLESS SUPERSEDED BY GEOTECHNICAL ENGINEER'S RECOMMENDATIONS:
 - BORROW MATERIALS FOR USE AS EMBANKMENT FILL SHALL BE FREE OF ORGANICS, ROOTS AND OTHER WOODY VEGETATION OR ORGANIC DEBRIS. MATERIALS SHALL CONSIST OF SOILS WHICH CLASSIFY AS SC, SM, CL, CL-CH AND ML IN ACCORDANCE WITH THE UNIFIED CLASSIFICATION SYSTEM OR AS APPROVED BY THE GEOTECHNICAL ENGINEER WITH A MAXIMUM PARTICLE SIZE SHALL OF 3" OR LESS IN MEAN DIAMETER.
 - FILL SHALL BE PLACED IN 8" (MAXIMUM) LIFTS UNDER THE SUPERVISION OF THE GEOTECHNICAL ENGINEER. FILL SHALL BE BROUGHT UP BY BENCHING INTO THE EXISTING SLOPE. THE MAXIMUM HEIGHT OF 2FT SHALL BE USED FOR EACH BENCH LIFT TAKING CARE TO REMOVE ROOT STRUCTURES AS THE FILL PROCEEDS. SURFACE OF EACH LIFT SHALL BE SCARIFIED PRIOR TO PLACEMENT OF THE NEXT LIFT IN ORDER TO EFFECTIVELY TIE THE FILL LIFTS TOGETHER.
 - ALL COMPACTION SHALL BE TESTED BY THE SAND CONE METHOD (ASTM D-1586) OR NUCLEAR METHOD AT A RATE OF AT LEAST ONE TEST PER 5,000 SF PER ONE FOOT OF COMPACTED FILL THICKNESS IN GENERAL AREA FILLS AND ONE TEST PER 50 LINEAL FEET PER LIFT ALONG THE BARREL. THE MINIMUM COMPACTION SHOULD BE 95% OF THE MAXIMUM STANDARD PROCTOR DENSITY (ASTM D-698) AT MOISTURE CONTENTS VARYING FROM 2 PERCENT BELOW TO 3 PERCENT ABOVE OPTIMUM MOISTURE CONTENT TO WITHIN 3FT OF THE FINAL GRADE.
- STOCKPILED TOPSOILS USED IN PLANTING AREAS SHALL CONTAIN AT LEAST 10% ORGANIC MATERIAL. PROFESSIONAL CERTIFICATION OF PLANTING SOIL MATERIALS IS REQUIRED.
- DURING CONSTRUCTION, THE SCM IS TO BE USED AS AN EROSION CONTROL DEVICE. THE FOREBAY WILL NOT BE REQUIRED WHILE SCM IS ACTING AS AN EROSION CONTROL DEVICE.
- ALL PERMANENT STRUCTURES (I.E. RISER BOX, OUTLET PIPES, CONCRETE CRADLES, SPILLWAY FILTER, ETC.) ARE TO BE INSTALLED WITH THE INITIAL DAM CONSTRUCTION.
- CONTRACTOR TO PROVIDE SHOP DRAWINGS TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING STRUCTURES.
- ONCE THE SITE HAS BEEN STABILIZED, CONTRACTOR SHALL OBTAIN APPROVAL BY EROSION CONTROL INSPECTOR IN ORDER TO REMOVE EROSION CONTROL DEVICES.
- ONCE ALL SEDIMENT AND EROSION CONTROL DEVICES HAVE BEEN REMOVED, THE SCM SHALL BE CONVERTED TO A PERMANENT SCM.
 - ALL SEDIMENT SHALL BE REMOVED AND DISPOSED OF PROPERLY.
 - FOREBAY AND VEGETATED SHELF SHALL BE CONSTRUCTED PER THIS PLAN.
 - VEGETATED SHELF SHALL BE PLANTED PER PLANT SCHEDULE ON LANDSCAPING PLAN SHEET.
 - TOWN OF KNIGHTDALE REQUIRES FINAL CERTIFICATION OF SCM BY PROFESSIONAL ENGINEER.
- FOLLOWING SCM CONVERSION TO A PERMANENT SCM, THE TOWN OF KNIGHTDALE WILL BE PROVIDED AS-BUILT PLANS OF THE SCM. CONTACT TOWN OF KNIGHTDALE FOR FINAL CERTIFICATION OF SCM ONCE CONSTRUCTION HAS BEEN COMPLETED.

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: *[Signature]* DATE: 3-0-17
ADMINISTRATOR

PROFESSIONAL SEAL
10.21.16
GRAPHIC SCALE
1 inch = 30 ft.



- ### GENERAL LANDSCAPE NOTES
- TREE PROTECTION FENCE SHALL SURROUND ALL EXISTING PLANTINGS AND EXISTING BUFFER AREAS WHERE APPLICABLE AND SHALL BE MAINTAINED UNTIL ALL SITE WORK IS COMPLETE. THE FENCE SHALL BE REMOVED PRIOR TO THE FINAL SITE INSPECTION FOR THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
 - WHERE EXISTING OR PROPOSED VEGETATION FAILS TO FUNCTION ADEQUATELY AS REQUIRED, THE TOWN OF KNIGHTDALE SITE INSPECTOR RESERVES THE RIGHT TO REQUIRE SUPPLEMENTAL PLANTINGS IN ADDITION TO THOSE SHOWN ON THE LANDSCAPE PLAN BASED ON ACTUAL FIELD CONDITIONS.
 - NO CHANGES TO ANY ASPECT OF THIS SITE PLAN, INCLUDING BUT NOT LIMITED TO LANDSCAPING, GRADING, BUILDING ELEVATIONS (ESPECIALLY COLOR), LIGHTING, OR UTILITIES WILL BE MADE WITHOUT THE APPROVAL OF THE TECHNICAL REVIEW COMMITTEE OF THE TOWN OF KNIGHTDALE.
 - ALL EXTERIOR SITE LIGHTING WILL BE DESIGNED TO PREVENT OFF-SITE GLARE.
 - THE SITE SHALL BE STABILIZED AND SEEDING PRIOR TO THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY (CO).
 - ALL ABOVE GROUND UTILITY EQUIPMENT (AND FACILITIES ASSOCIATED WITH ON-SITE ELECTRIC, TELEPHONE, GAS, CABLE, OR OTHER SIMILAR UTILITY) AND ENCLOSED TRASH CONTAINMENT SHALL BE SCREENED BY THE ELEMENTS OF A TYPE B (SEMI-OPAQUE) BUFFER YARD TO A SIX (6) FEET IN HEIGHT OR THE HEIGHT OF THE UTILITY OR ENCLOSURE, WHICHEVER IS LESS.
 - ALL RIP RAP PADS, DETENTION PONDS, AND OTHER STORMWATER RELATED DEVICES SHALL BE SCREENED WITH EVERGREEN PLANTINGS TO REDUCE VISUAL IMPACT FROM OFF-SITE.
 - NO TREE SHALL BE LOCATED WITHIN TEN FEET OF A LIGHT POLE OR 12 FEET FROM ELECTRICAL TRANSFORMERS.
 - THIS PLAN IS FOR PLANTING PURPOSES ONLY. FOR INFORMATION REGARDING ROAD WORK GEOMETRY, GRADING, WALLS, UTILITIES, ETC., REFER TO THE CIVIL DRAWINGS.
 - ALL PLANTS AND PLANTING PROCEDURES SHALL MEET OR EXCEED A N.L.A. STANDARDS AS SET FORTH IN 'AMERICAN STANDARD FOR NURSERY STOCK', 2004 OR LATER EDITION.
 - ALL TREES AND SHRUBS SHALL BE FULL, WELL-BRANCHED PLANTS WHICH ARE CHARACTERISTIC TO THE SPECIES.
 - ALL CANOPY TREES TO BE A MINIMUM OF 2" CALIPER AND 8' HEIGHT, ALL UNDERSTORY TREES 1 1/2" CALIPER, 6' HEIGHT AND SHRUBS 18", 3 GAL. CONTAINER AT TIME OF INSTALLATION.
 - NO FENCING SHALL BE PLACED WITHIN BUFFER AREAS UNLESS INSTALLED AT ONE TIME FOR THE ENTIRE LENGTH OF THE BUFFER OR STREETScape. NEITHER INDIVIDUAL LOT OWNERS NOR THE H.O.A. SHALL INSTALL FENCES IN A PIECEMEAL FASHION. PRIOR TO PLACING A FENCE IN A BUFFER OR STREETScape, THE FENCE SHALL BE SUBMITTED TO AND APPROVED BY THE TOWN OF KNIGHTDALE.
 - PLANT MATERIAL LOCATED WITHIN A REQUIRED SIGHT DISTANCE MAINTENANCE EASEMENT SHALL BE MAINTAINED AT A HEIGHT LESS THAN 24 INCHES OR LIMBED UP TO A MINIMUM HEIGHT OF SIX FEET.
 - ALL PLANT BEDS TO BE MULCHED WITH A MINIMUM OF 3" OF CLEAN PINE STRAW OR SHREDDED HARDWOOD BARK AT THE DISCRETION OF THE DEVELOPER. ALL PLANT GROUPINGS SHALL BE MULCHED AS ONE BED.
 - RESIDENTIAL LANDSCAPING:
 - EACH SINGLE-FAMILY OR DUPLEX LOT SHALL CONTAIN A MINIMUM OF ONE (1) CANOPY TREE FOR EACH TWO THOUSAND (2,000) SQUARE FEET OF LOT AREA OR FRACTION THEREOF UP TO 20,000 SQUARE FEET IN LOT AREA. ANY PORTION OF THE RESIDENTIAL LOT OCCUPIED BY A RECORDED UTILITY EASEMENT SHALL NOT BE INCLUDED AS PART OF THE TOTAL LOT AREA. THE LOCATION OF PLANTING TO ACCOUNT FOR PHYSICAL CONDITIONS MAY BE ADJUSTED BY THE ADMINISTRATOR.
 - THE USE OF EXISTING TREES MEETING THE FOLLOWING STANDARDS TO SATISFY THIS REQUIREMENT IS ENCOURAGED. EXISTING LARGE SHADE TREES OVER SIX (6) INCHES IN CALIPER AS MEASURED AT DBH (DIAMETER BREAST HEIGHT) MAY BE COUNTED TOWARDS FULFILLING THIS REQUIREMENT.
 - REQUIRED STREET TREES MAY NOT BE COUNTED TOWARDS THE FULFILLMENT OF THIS RESIDENTIAL LANDSCAPING REQUIREMENT. APART FROM REQUIRED STREET TREES, ALL OTHER TREES REQUIRED UNDER THIS CHAPTER SHALL BE PLANTED WITHIN THE PRIVATE LOT.
 - A LIGHTING PLAN SHALL BE SUBMITTED BY THE UTILITY PROVIDER TO KNIGHTDALE DEVELOPMENT SERVICES FOR APPROVAL PRIOR TO THE INSTALLATION OF ALL REQUIRED LIGHTING. THE LIGHTING PLAN SHALL DESIGNATE THE PROPOSED LOCATION OF ALL LIGHT POLES AND SHALL BE IN COMPLIANCE WITH SECTIONS 8.10 AND 16.8B AS WELL AS CHAPTER 11 OF THE TOWN OF KNIGHTDALE UDO. IF A PROPOSED LIGHT POLE LOCATION SHOULD PRESENT A CONFLICT WITH EXISTING OR PROPOSED VEGETATION ACCORDING TO THE APPROVED CONSTRUCTION DRAWINGS, THE LANDSCAPING PLAN SHALL BE REVISED TO COMPLY WITH THE TOWN OF KNIGHTDALE UDO REQUIREMENTS. ALL REVISIONS ARE SUBJECT TO TOWN OF KNIGHTDALE APPROVAL.

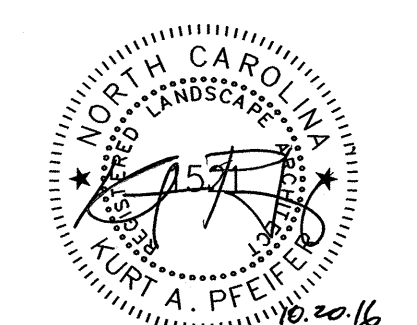
- ### KNIGHTDALE UDO REQUIREMENTS
- STREET TREE PLANTINGS
- CANOPY TREES SHALL BE INSTALLED AT A MINIMUM AVERAGE DISTANCE OF 40 FEET ON CENTER IN A PLANTING STRIP MINIMUM OF FIVE FEET IN WIDTH. WHERE OVERHEAD UTILITIES EXIST PRIOR TO DEVELOPMENT, AND ARE IN CONFLICT WITH PROPOSED CANOPY TREES, UNDERSTORY TREES MAY BE SUBSTITUTED WITH APPROVAL.
 - IF UNDERSTORY TREES SUBSTITUTED, THEY HAVE TO BE PLANTED 20 FEET ON CENTER AND SPECIES SHALL BE APPROVED BY THE TOWN OF KNIGHTDALE PRIOR TO INSTALLATION.
 - STREET TREES SHALL BE PLACED AT LEAST 10 FEET FROM LIGHT POLES AND 12 FEET FROM ELECTRICAL TRANSFORMERS.
 - STREET TREES SHALL BE DECIDUOUS HARDWOODS.

PLANT TYPE	QTY	KEY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	HEIGHT	NOTES
CANOPY STREET TREES	21	GBA	Ginkgo biloba 'Autumn Gold'	Autumn Ginkgo	B&B	2"	8'	MATCHED; 40' O.C.
	43	PCH	Pistacia chinensis	Chinese Pistache	B&B	2"	8'	MATCHED; 40' O.C.
	66	UPA	Ulmus parvifolia 'Allen'	Allen Lacebark Elm	B&B	2"	8'	MATCHED; 40' O.C.
	27	QUA	Quercus acutissima	Sawtooth Oak	B&B	2"	8'	MATCHED; 40' O.C.
	37	ZSM	Zelkova serrata 'ZSFKF'	Myriam Japanese Zelkova	B&B	2"	8'	MATCHED; 40' O.C.

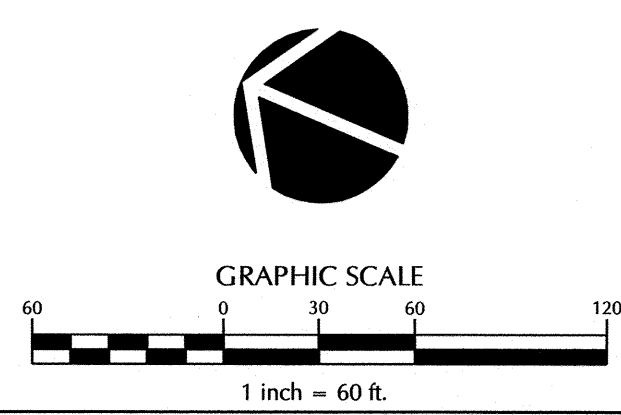
PLANT TYPE	QTY	KEY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	HEIGHT	NOTES
CANOPY TREES	19	CDO	Cedrus deodara	Deodar Cedar	B&B	2"	8-10'	MATCHED
	19	PTD	Pinus taeda	Loblolly Pine	B&B	2 1/2"	12-14'	MATCHED
	14	AOM	Acer rubrum 'October Glory'	October Glory Maple	B&B	2 1/2"	12-14'	MATCHED
	13	LSR	Liquidambar styraciflua 'Rotundiloba'	Frutless Sweetgum	B&B	2 1/2"	12-14'	MATCHED
	14	QUS	Quercus shumardii	Shumard Oak	B&B	2 1/2"	12-14'	MATCHED
	13	LTU	Liriodendron tulipifera	Tulip Poplar	B&B	2 1/2"	12-14'	MATCHED
	124	IGS	Ilex glabra	Inkberry	CONT.	3 Gal.	18"-24"	MATCHED; 3' O.C.
	124	LCR	Loropetalum chinense 'Ruby'	Ruby Chinese Witchhazel	CONT.	3 Gal.	18"-24"	MATCHED; 3' O.C.
	124	JSG	Juniperus chinensis 'Sea Green'	Sea Green Juniper	CONT.	3 Gal.	18"-24"	MATCHED; 3' O.C.

CITY OF RALEIGH
 ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.
 TRANSPORTATION SERVICES N/A
 PUBLIC UTILITIES *K.A. Jan 2/20/17*
 STORMWATER N/A
 PLANNING N/A
 FIRE N/A
 URBAN FORESTRY N/A

PHASE R3
 TOK #5-3-15
 BM 2016
 PG 1441-1445



TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: *[Signature]* DATE: 7-2-2017
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: *[Signature]* DATE: 3-6-17
 ADMINISTRATOR



No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SY

Designer	Scale
WR	As Noted
LEG/GAS	02/02/16
NJA	2090251.90

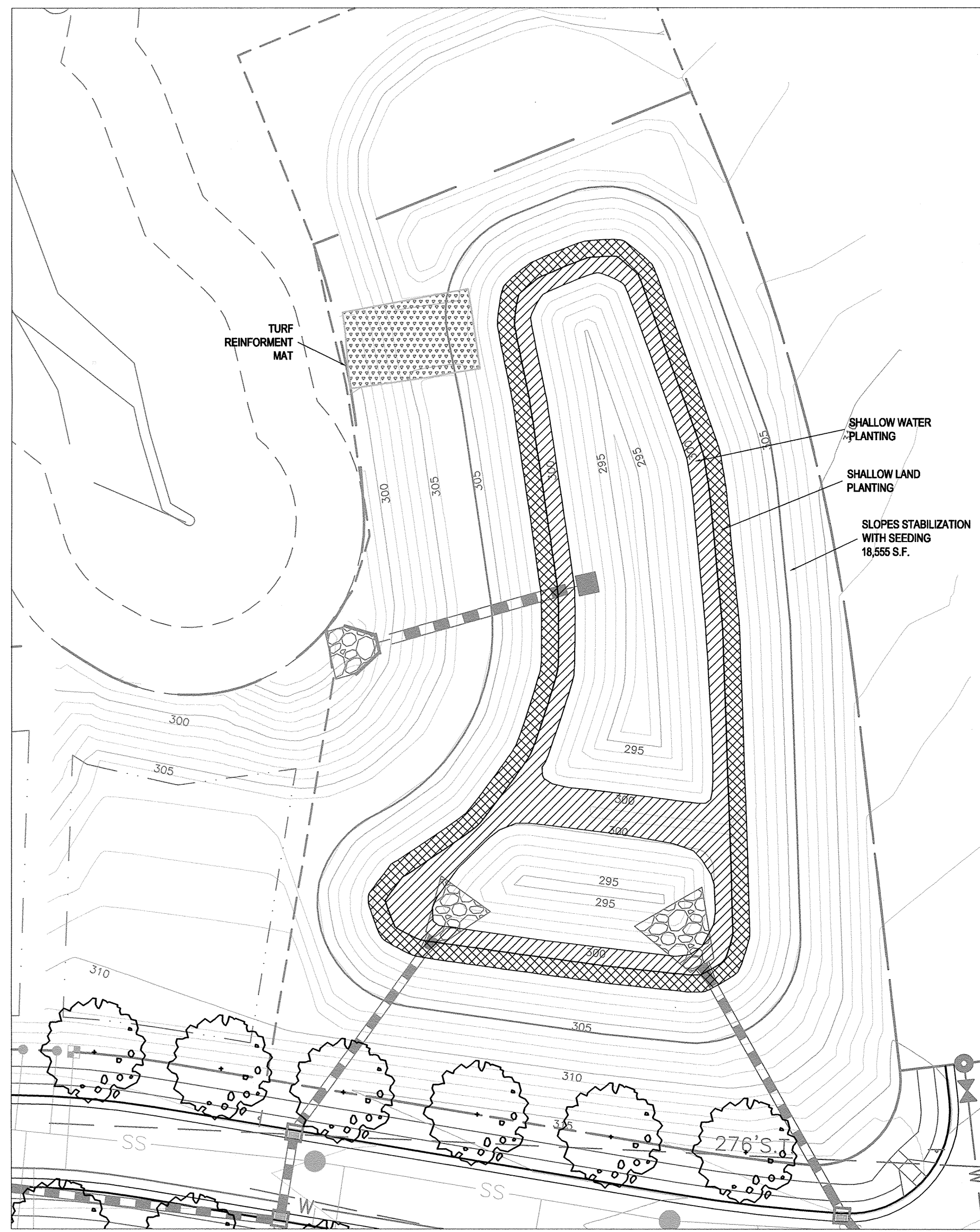
KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Wake County
 North Carolina

LANDSCAPE PLAN

WithersRavenel
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 115 MacKenan Drive | Cary, NC 27511 | 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No. **8.1**

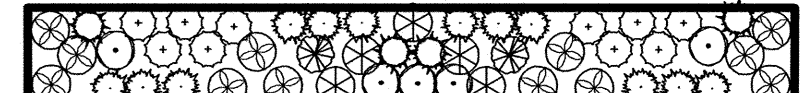
K:\0109-0000\080201_9-Knightdale Station - R6\CDM MASTER-CONSTRUCTION DRAWINGS\LANDSCAPE PLAN-2016.rvt Thursday, October 20, 2016 10:45:05 AM - MANICAR, SHREYA



SCM #6 LANDSCAPE PLAN
SCALE 1" = 30'

PLANTING REQUIREMENTS

PLANT TYPE	QTY	BOTANICAL NAME	COMMON NAME	ROOT	CALIPER	NOTES
SHALLOW WATER (NORMAL POOL TO 6" BELOW) = 3,308 SF						
HERBACEOUS	201	<i>Acotus calanmus</i>	Sweet Flag	CONT.	1 Gal.	24" O.C.
	43	<i>Acotus calanmus</i> 'Variegatus'	Variegated Sweet Flag	CONT.	1 Gal.	24" O.C.
	45	<i>Peltandra virginica</i>	Arrow arum	CONT.	1 Gal.	24" O.C.
	239	<i>Polygonum orientale</i>	Polygonum	CONT.	4" Pot.	24" O.C.
	73	<i>Sagittaria latifolia</i>	Broadleaf Arrowweed	CONT.	1 Gal.	24" O.C.
	75	<i>Saururus cernuus</i>	Lizard's tail	CONT.	4" Pot.	24" O.C.
	151	<i>Scheuchzeria palustris</i>	Softstem Bulrush	CONT.	4" Pot.	24" O.C.
SHALLOW LAND (NORMAL POOL TO 6" ABOVE) = 2,852 SF						
HERBACEOUS	143	<i>Carex stricta</i>	Tussock Sedge	CONT.	4" Pot.	24" O.C.
	72	<i>Iris versicolor</i>	Northern Blue Flag Iris	CONT.	4" Pot.	24" O.C.
	72	<i>Iris virginica</i>	Southern Blue Flag Iris	CONT.	4" Pot.	24" O.C.
	212	<i>Juncus effusus</i>	Soft Rush	CONT.	4" Pot.	24" O.C.
	143	<i>Lobelia cardinalis</i>	Cardinal Flower	CONT.	4" Pot.	24" O.C.
	72	<i>Scirpus cyperinus</i>	Woolgrass	CONT.	1 Gal.	24" O.C.

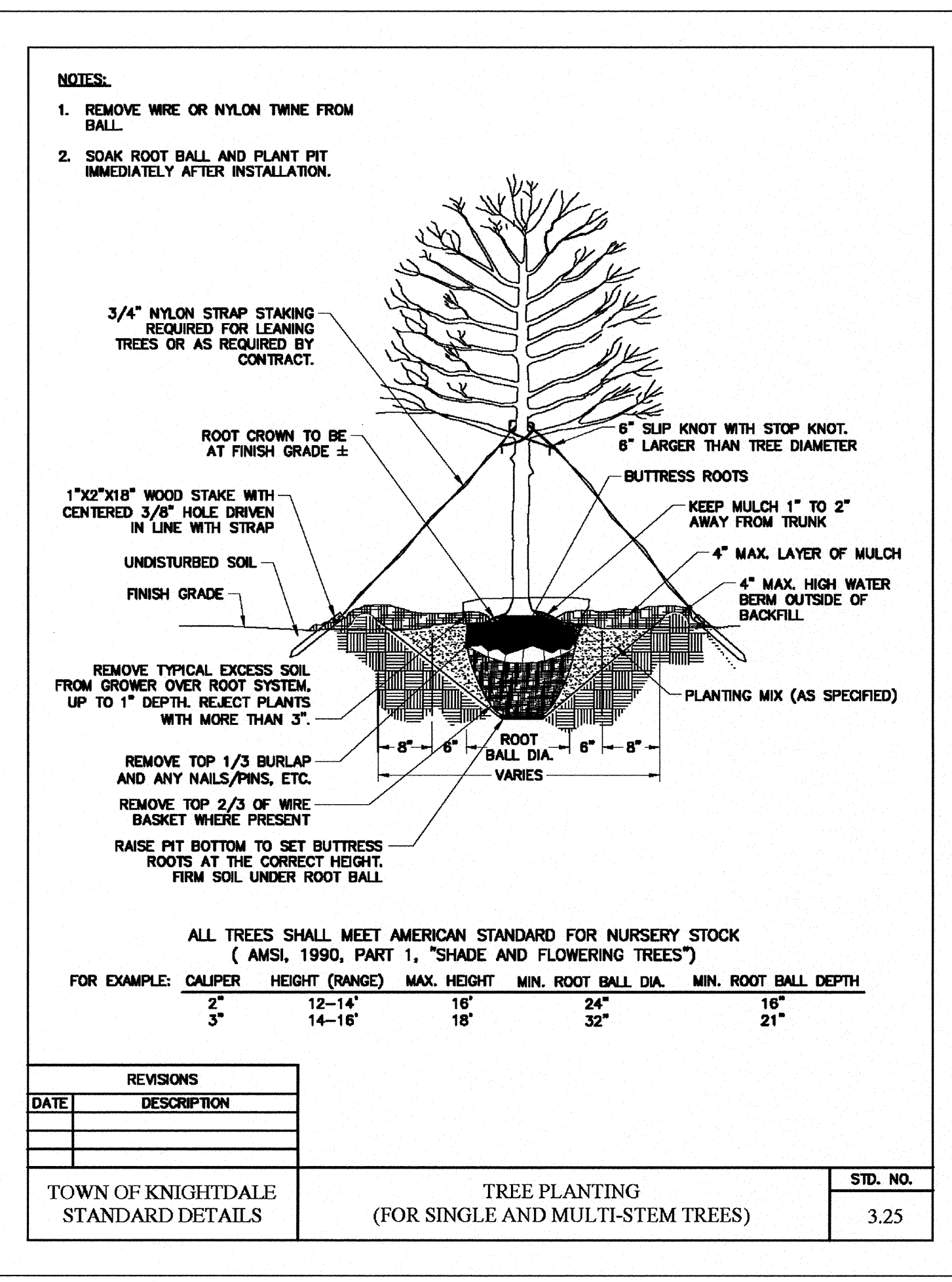


TYPICAL WETLAND SHALLOW WATER HERBACEOUS PLANTING DETAIL (SCM #6)
NTS
(+/- 200 S.F.)

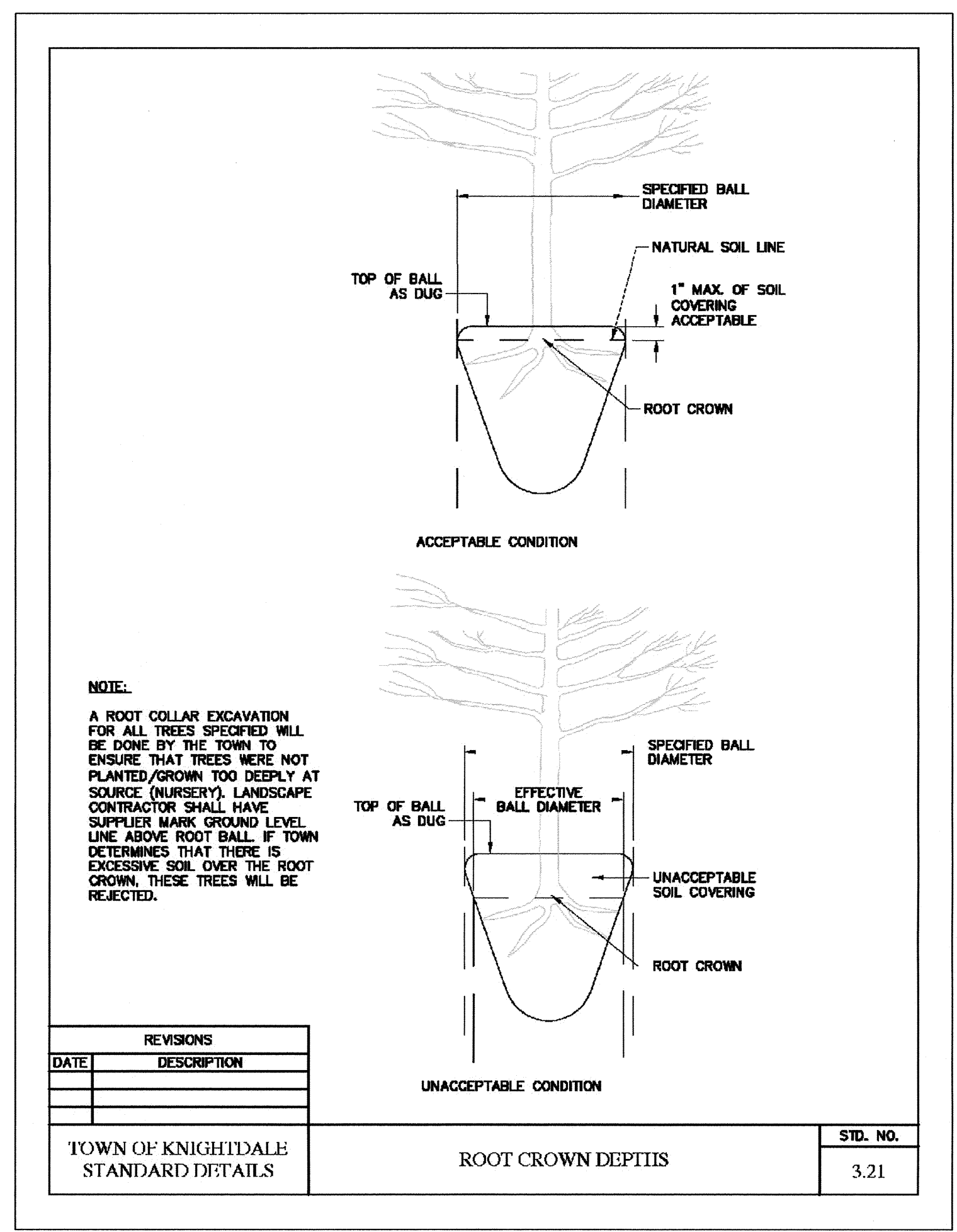


TYPICAL WETLAND SHALLOW LAND HERBACEOUS PLANTING DETAIL (SCM #6)
NTS
(+/- 200 S.F.)

NC DWM BMP MANUAL SECTION 6.6.2 (2007) - PLANTING AND AFTER CARE IN GENERAL, FALL AND WINTER ARE OPTIMAL FOR PLANTING IN NORTH CAROLINA. THERE ARE SOME EXCEPTIONS. SHALLOW WATER PLANTS SHOULD BE INSTALLED BETWEEN APRIL 1 AND JULY 15 IN NORTH CAROLINA. WINTER PLANTING IS DIFFICULT WITH SHALLOW WATER PLANTS.



REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE STANDARD DETAILS		TREE PLANTING (FOR SINGLE AND MULTI-STEM TREES)	3.25



REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE STANDARD DETAILS		ROOT CROWN DEPTHS	3.21

SEEDING SCHEDULE		
MAXIMUM SLOPE 3:1		
SEEDING PERIOD	SEEDING TYPE	APPLICATION RATE (LBS/ACRE)
AUGUST 15 - NOVEMBER 01	TALL FESCUE	300
NOVEMBER 01 - MARCH 01	TALL FESCUE AND ABRUZZI RYE	300
MARCH 01 - APRIL 15	TALL FESCUE	25
APRIL 15 - JUNE 30	HULLED COMMON BERMUDAGRASS	300
JULY 01 - AUGUST 15	TALL FESCUE AND *BROWNTOP MILLET OR *SORGHUM-SUDAN HYBRIDS	120
		35
		30
SLOPES 2:1 TO 3:1		
MARCH 01 - JUNE 01	SERICA LESPEDEZA (SCARIFIED) AND	50
MARCH 01 - APRIL 15	TALL FESCUE OR	120
MARCH 01 - JUNE 30	WEeping LOVEGRASS OR HULLED COMMON BERMUDAGRASS	10
		25
JUNE 01 - SEPTEMBER 01	*TALL FESCUE AND *BROWNTOP MILLET OR *SORGHUM-SUDAN HYBRIDS	120
		35
		30
SEPTEMBER 01 - MARCH 01	SERICA LESPEDEZA (UNHULLED, USCARIFIED) AND TALL FESCUE OR	70
		120
NOVEMBER 01 - MARCH 01	ABRUZZI RYE	25

*TEMPORARY - RESEED ACCORDING TO OPTIMUM SEASON FOR DESIRED PERMANENT VEGETATION. DO NOT ALLOW TEMPORARY COVER TO GROW OVER 12" IN HEIGHT BEFORE MOWING, OTHERWISE FESCUE MAY BE SHADED OUT. CONSULT CONSERVATION ENGINEER OR SOIL CONSERVATION SERVICE FOR ADDITIONAL INFORMATION CONCERNING OTHER ALTERNATIVES FOR VEGETATION OF DEWELD AREAS. THE ABOVE VEGETATION RATES ARE THOSE WHICH DO WELL UNDER LOCAL CONDITIONS; OTHER SEEDING RATE COMBINATIONS ARE POSSIBLE.

GROUND COVER - WHEREVER LAND DISTURBING ACTIVITY IS UNDERTAKEN ON A TRACT COMPRISING MORE THAN ONE (1) ACRE, A GROUND COVER SUFFICIENT TO RESTRAIN EROSION MUST BE PLANTED OR PROVIDED WITHIN 15 WORKING DAYS OR 30 CALENDAR DAYS.

GRADED SLOPES AND FILLS - WITHIN 15 WORKING DAYS OR 30 CALENDAR DAYS, OR COMPLETION OF ANY PHASE OF GRADING, WHICHEVER PERIOD IS SHORTER, SLOPES SHALL BE PLANTED OR OTHERWISE PROVIDED WITH GROUND COVER, DEVICES, OR STRUCTURES SUFFICIENT TO RESTRAIN EROSION.

REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE STANDARD DETAILS		SEEDING SCHEDULE	2.01

LANDSCAPE MAINTENANCE

THE OWNERS OF THE PROPERTY AND THEIR AGENTS, HEIRS OR ASSIGNS SHALL BE RESPONSIBLE FOR THE INSTALLATION, PRESERVATION AND MAINTENANCE OF ALL PLANTINGS AND PHYSICAL FEATURES SHOWN ON THIS PLAN. REGULAR MAINTENANCE FOR SEEDED AREAS OTHER THAN SEEDED AREAS AROUND STORMWATER PONDS SHALL BE PERFORMED AS DESCRIBED BELOW. THE OWNERS SHALL BE RESPONSIBLE FOR ANNUAL MAINTENANCE OF THE VEGETATION TO INCLUDE BUT NOT BE LIMITED TO:

LAWN AREA (EXCEPT SEEDED STORMWATER POND AREAS)

- THE LAWN AREA WILL BE MOWED AS NEEDED TO PROVIDE A NEAT AND UNIFORMLY FINISHED LAWN.
- FOR AREAS INACCESSIBLE TO MOWERS, A STRING TRIMMER WILL BE USED TO CUT GRASS TO SAME HEIGHT AS MOWER.
- CURB, SIDEWALK, AND BED EDGES WILL BE MECHANICALLY EDGED AS NEEDED TO PROVIDE A NEAT AND UNIFORM APPEARANCE.
- ALL DEBRIS WILL BE REMOVED FROM TURF PRIOR TO MOWING AND FROM TURF AND PAVEMENT AREAS FOLLOWING EDGING.
- THE ENTIRE LAWN WILL BE CORE AERIFIED IN THE FALL.
- SEEDING AND FERTILIZATION WILL BE PERFORMED IN CONJUNCTION WITH AERIFICATION.
- THE LAWN AREA WILL BE OVERSEED WITH A HYBRID FESCUE BLEND (IF DEVELOPER CHOOSES A FESCUE VARIETY TURF DURING INITIAL INSTALLATION) AT A RATE OF 75 POUNDS PER ACRE.
- THE TURF WILL BE FERTILIZED THREE TIMES DURING THE YEAR (MARCH, SEPTEMBER, AND NOVEMBER). A SLOW RELEASE NITROGEN PRODUCT WILL BE USED AT A RATE OF 1-2 POUNDS OF NITROGEN PER 100 SQUARE FEET.
- A PRE-EMERGENT CRABGRASS CONTROL WILL BE APPLIED TO THE LAWN WHEN SOIL TEMPERATURES REACH 48 DEGREES.

PLANT BEDS AND SMALL ORNAMENTAL TREES

- ALL PLANT BEDS WILL BE SPRAYED AND WEEDED BY HAND TO MAINTAIN THEM FREE OF WEEDS AT ALL TIMES.
- TREE AND SHRUB FERTILIZERS SHALL ONLY BE APPLIED AS RECOMMENDED BY A SOIL SAMPLE ANALYSIS.
- PRUNE ONLY DEAD, DAMAGED AND/OR BROKEN BRANCHES AT INSTALLATION. PRUNING AFTER THE FIRST YEAR SHALL FOLLOW ANSI A-300 STANDARDS.
- MULCH SHALL BE APPLIED TO A DEPTH OF 2"-3" AND SHALL NOT BE PLACED WITHIN 3" FROM ANY TREE OR SHRUB ROOT CROWN. MULCH TYPES TO BE SELECTED BY OWNER, HOWEVER SHREDDED BARK OR HARDWOOD MULCH SHALL BE USED AGAINST ALL BUILDING FOUNDATIONS. ALL PLANT BEDS AND TREE SAUCERS SHALL BE REFRESHED WITH NEW MULCH ANNUALLY.
- FORMAL HEDGES WILL BE TRIMMED TO AN INVERT 'V' SHAPE TO ENCOURAGE LOW LIMB STRUCTURE AND DENSE GROWTH.
- PRE-EMERGENT WEED CONTROL SHALL BE APPLIED (IF NECESSARY) IN FEBRUARY. CHEMICALS FOR INSECT & DISEASE MAY BE APPLIED FOR SPECIFIC PROBLEMS ONLY.

LEAVES AND NATURAL AREAS

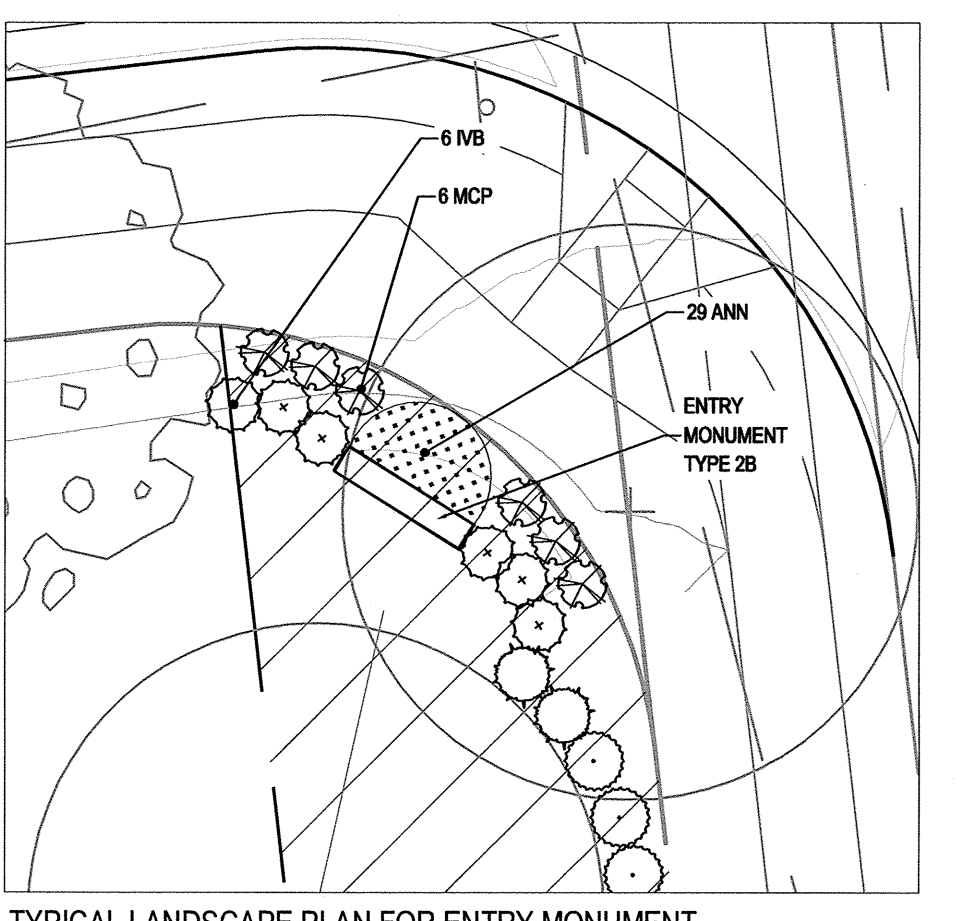
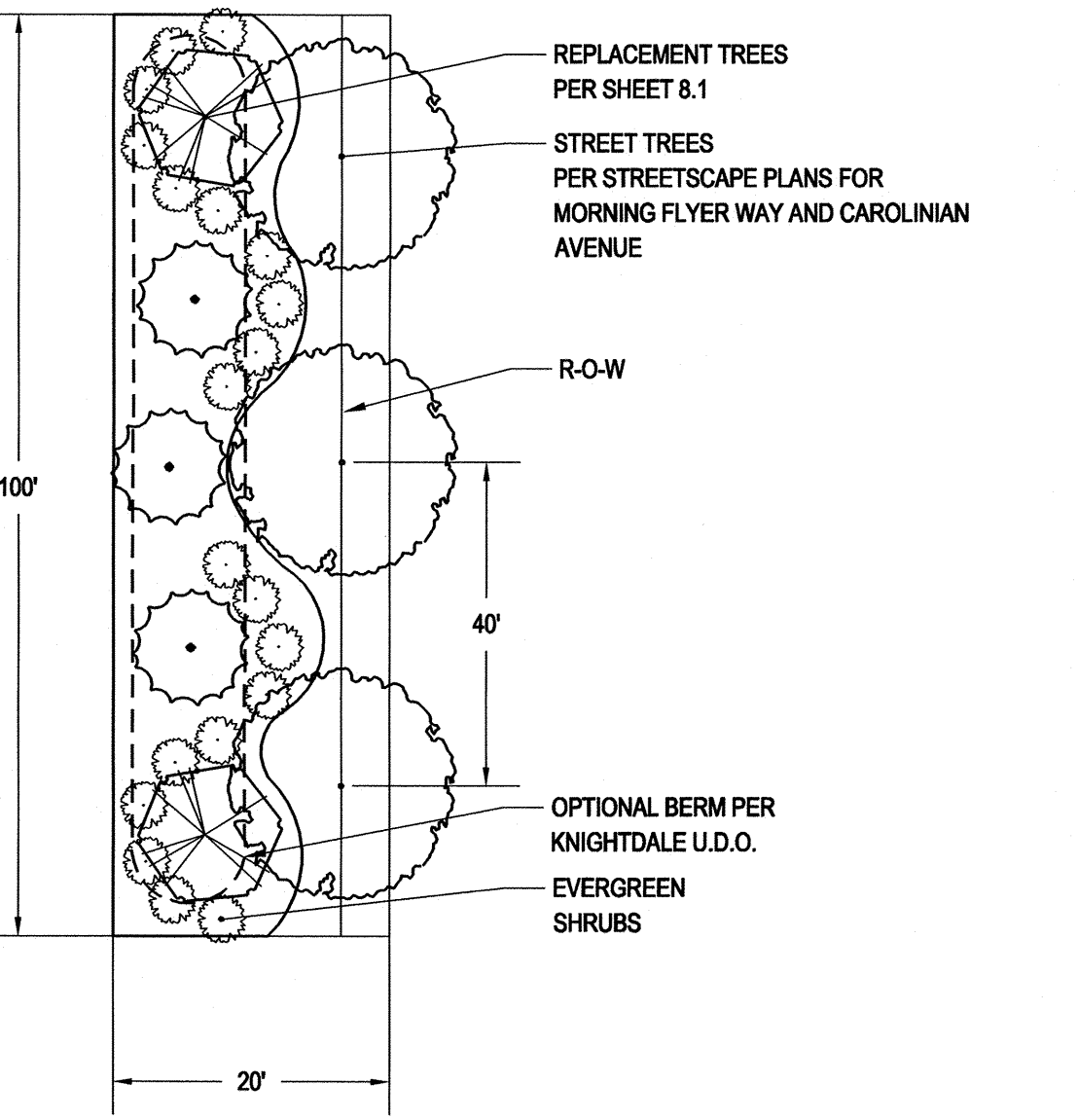
- ALL LEAVES WILL BE REMOVED FROM THE LAWN AREAS WEEKLY AND FOUR TIMES A YEAR FROM THE PLANT BEDS.
- NATURAL AREAS WILL BE MAINTAINED FREE OF BRUSH AND WEEDS WITHIN THE FIRST 10 FEET OF ANY NATURAL AREA.

ALL BERMS SHALL NOT EXCEED:
 • A SLOPE WITH MAXIMUM RISE OF ONE (1) FOOT TO A RUN OF THREE (3) FEET,
 • A MAXIMUM HEIGHT OF FOUR (4) FEET AND
 • A MINIMUM TOP OF BERM WIDTH OF TWO (2) FEET
 • BERMS SHALL BE STABILIZED WITH A GROUND COVER OR OTHER SUITABLE VEGETATION OR PERMANENT SLOPE RETENTION DEVICE.
 • BERMS TALLER THAN FOUR (4) FEET SHALL BE APPROVED BY THE ADMINISTRATOR ON A CASE BY CASE BASIS, BUT SHALL CONFORM TO THE SLOPE AND WIDTH RESTRICTIONS AS PREVIOUSLY DETAILED.

MINIMUM PLANTING REQUIREMENTS
 TOTAL LENGTH OF BUFFER ALONG MORNING FLYER WAY & CAROLINIAN AVE = 1,881 L.F.

SHRUBS (20 PER 100 L.F.)
 80% OF ALL NEW SHRUBS SHALL BE EVERGREEN
 MATURE HEIGHT = 6 FT.
 INSTALLED SIZE = 18" HT.
 TOTAL SHRUBS PROVIDED = 372

TREE REPLACEMENT QUANTITY CALCULATIONS
 REFER TO SHEET 2.1 SITE PLAN FOR TREE REPLACEMENT CALCULATIONS.
 TOTAL TREE REPLACEMENT REQUIRED = 92
 40% EVERGREEN PROVIDED = 38
 60% DECIDUOUS PROVIDED = 54



TYPICAL LANDSCAPE PLAN FOR ENTRY MONUMENT
SCALE 1" = 10'

(STYLE 2B, TOTAL NUMBER OF MONUMENTS - 3)

PLANT TYPE	QTY	KEY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	HEIGHT	NOTES
SHRUBS	18	IVB	<i>Ilex vomitoria</i> 'Bordeaux'	Bordeaux Dwarf Yaupon Holly	CONT.	3 Gal.	18"-24"	36" O.C.
A GROUND COVER	87		Seasonal Color	Annual Plantings	CONT.	Flat	12" O.C. (*1.15)	
GRASSES	18	MCP	<i>Muhlenbergia capillaris</i>	Pink Muly Grass	CONT.	3 Gal.	18"-24"	MATCHED; 3" O.C.

05.26.16

No.	Revision	Date	By	Designer	Scale
1	REVISION PER TOK COMMENTS	03/28/16	GAS	WR	As Noted
2	REVISION PER TOK COMMENTS	05/27/16	GAS	WR	As Noted
3	REVISION PER TOK COMMENTS	06/30/2016	SY	WR	As Noted

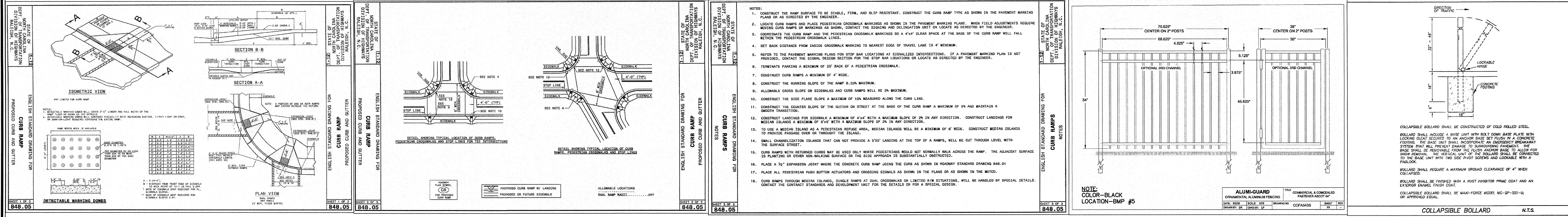
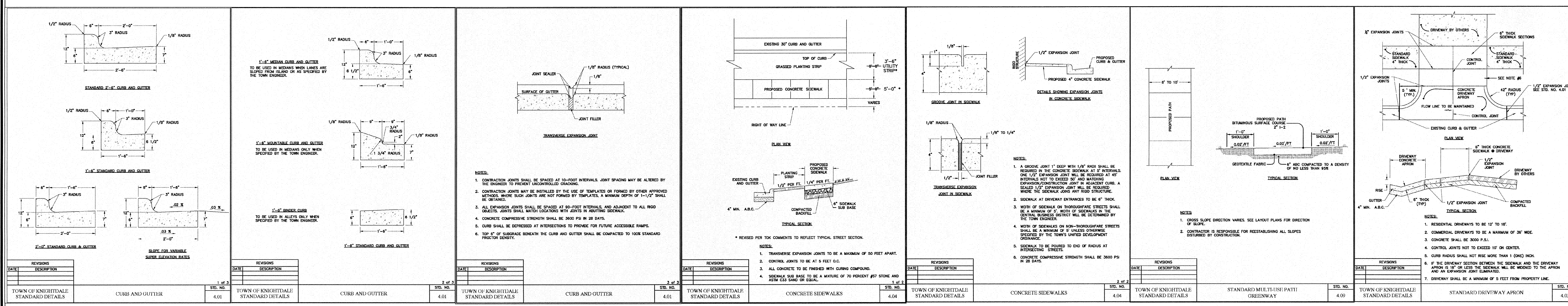
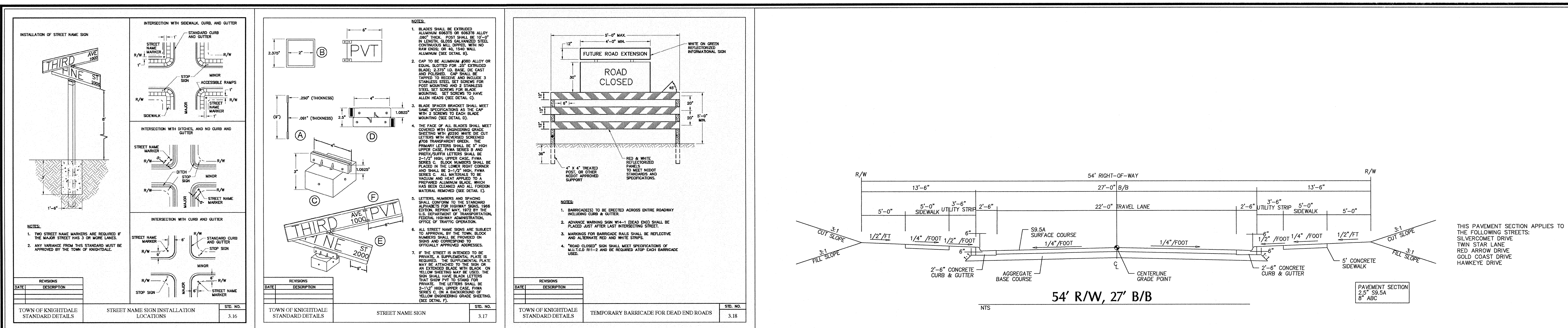
Drawn By	Date	Checked By	Job No.
LEG/GAS	02/02/16	NJA	2090251.90

KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Wake County
 North Carolina

LANDSCAPE DETAILS

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Sheet No. **8.2**



No.	Revision	Date	By	Designer	Scale
1	REVISION PER TOK COMMENTS	03/28/16	GAS	WR	As Noted
2	REVISION PER TOK COMMENTS	05/27/16	GAS	WR	As Noted
3	REVISION PER TOK COMMENTS	06/30/2016	SJY	WR	As Noted

NOTES:

- A MINIMUM OF 24" FROM OUTSIDE DIAMETER OF PIPE TO SIDE OF TRENCH MUST BE ALLOWED FOR COMPACTION OF FILL MATERIAL. BACKFILLING OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER THE LAYING OF THE PIPE. THE FILL AROUND THE PIPE SHALL BE PLACED IN LAYERS NOT TO EXCEED 4" UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO RISE IN UNCOMPACTED TRENCHES AFTER THE PIPE HAS BEEN PLACED. COMPACTION REQUIREMENTS SHALL BE ATTAINED BY THE USE OF MECHANICAL TAMPS ONLY. EACH AND EVERY LAYER OF BACKFILL SHALL BE PLACED LOOSE AND THOROUGHLY COMPACTED INTO PLACE.
- ALL BACKFILL MATERIAL SHALL HAVE AN IN PLACE COMPACTED DENSITY OF AT LEAST 90% OF THE STANDARD PROCTOR MAXIMUM DENSITY.
- THE FINAL 24" OF BACKFILL MATERIAL SHALL BE COMPACTED TO 100% OF THE STANDARD PROCTOR MAXIMUM DENSITY.
- ALL TRENCHING OPERATIONS SHALL MEET OSHA STANDARDS.
- BACKFILL MATERIAL BENEATH ROADWAY SHALL BE SELECT BACKFILL MATERIAL.

PIPE SHALL BE PLACED ON SUTURITE MATERIAL

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		TRENCH FOR STORM DRAIN PIPES

STD. NO. 5.02

NOTES:

- EITHER SOLID BRICK, SOLID BLOCK OR PRECAST CONCRETE MAY BE USED.
- PRECAST CONCRETE WALLS SHALL BE 6" THICK MINIMUM.
- ALL CONCRETE SHALL BE 3000 P.S.I.
- FOR 24" PIPE AND LARGER USE PIPE DIA. PLUS 1/2" AS INSIDE DIMENSIONS.

■ TWO COURSE INSTEAD OF ONE COURSE

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD YARD INLET WITH CONCRETE SLAB

STD. NO. 5.03

NOTES:

- EITHER SOLID BRICK, SOLID BLOCK OR PRECAST CONCRETE MAY BE USED.
- PRECAST CONCRETE WALLS SHALL BE 6" THICK MINIMUM.
- ALL CONCRETE SHALL BE 3000 P.S.I.
- FOR 24" PIPE AND LARGER USE PIPE DIA. PLUS 1/2" AS INSIDE DIMENSIONS.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD DROP INLET WITH GRATE AND FRAME

STD. NO. 5.04

NOTES:

- MORTAR JOINTS SHALL BE 1/2" THICK.
- ALL CONCRETE SHALL BE 3000 P.S.I.
- BASE SLABS SHALL BE FORMED PRIOR TO PLACING OF CONCRETE.
- USE TYPE "A" GRATE AT 3/4" SPACING OTHERWISE USE TYPE "B" OR "C" FOR THE APPROPRIATE FLOW DIRECTION.
- MASSPORT UNITS MAY BE SANDY BRICK CONCRETE BRICK OR SOLID CONCRETE BLOCK.
- ALL WALLS GREATER THAN 6" IN DEPTH SHALL BE CONSTRUCTED 12" THICK.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD CURB INLET

1 of 2
STD. NO. 5.05

NOTES:

- ALL WALLS GREATER THAN 6" IN DEPTH SHALL BE CONSTRUCTED 12" THICK.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD CURB INLET

2 of 2
STD. NO. 5.05

NOTES:

- SEE STANDARD DETAIL 5.09 FOR DIMENSIONS.
- PLACE 1 CUBIC FOOT OF WASHED STONE BEHIND EACH WEEP HOLE.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD MANHOLE RING & COVER

MINIMUM AVERAGE WEIGHT
RING COVER 120
TOTAL 310

1 of 2
STD. NO. 5.10

NOTES:

- SEE STANDARD DETAIL 5.09 FOR DIMENSIONS.
- PLACE 1 CUBIC FOOT OF WASHED STONE BEHIND EACH WEEP HOLE.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD REINFORCED CONCRETE HEADWALL WITH WINGWALLS

1 of 2
STD. NO. 5.06

NOTES:

- SEE STANDARD DETAIL 5.09 FOR DIMENSIONS.
- PLACE 1 CUBIC FOOT OF WASHED STONE BEHIND EACH WEEP HOLE.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		STANDARD REINFORCED CONCRETE HEADWALL WITH WINGWALLS

2 of 2
STD. NO. 5.06

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		DIMENSIONS FOR HEADWALL WITH WINGWALLS

1 of 2
STD. NO. 5.09

NOTES:

- SEE STANDARD DETAIL 5.09 FOR DIMENSIONS.
- PLACE 1 CUBIC FOOT OF WASHED STONE BEHIND EACH WEEP HOLE.

REVISIONS	DATE	DESCRIPTION
TOWN OF KNIGHTDALE STANDARD DETAILS		DIMENSIONS FOR HEADWALL WITH WINGWALLS

2 of 2
STD. NO. 5.09

No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	GAS
3	REVISION PER TOK COMMENTS	06/30/2016	SJV

Designer	Scale
WR	As Noted

Drawn By	Date
LEG/GAS	02/02/16

Checked By	Job No.
NJA	2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County North Carolina

STORM DRAINAGE DETAILS

TOWN CERTIFICATION, THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

THIS PLAN IS APPROVED BY THE TOWN OF KNIGHTDALE AND SERVES AS CONSTRUCTION PLANS FOR THIS PROJECT.

BY: DATE: 3.0.17
ADMINISTRATOR

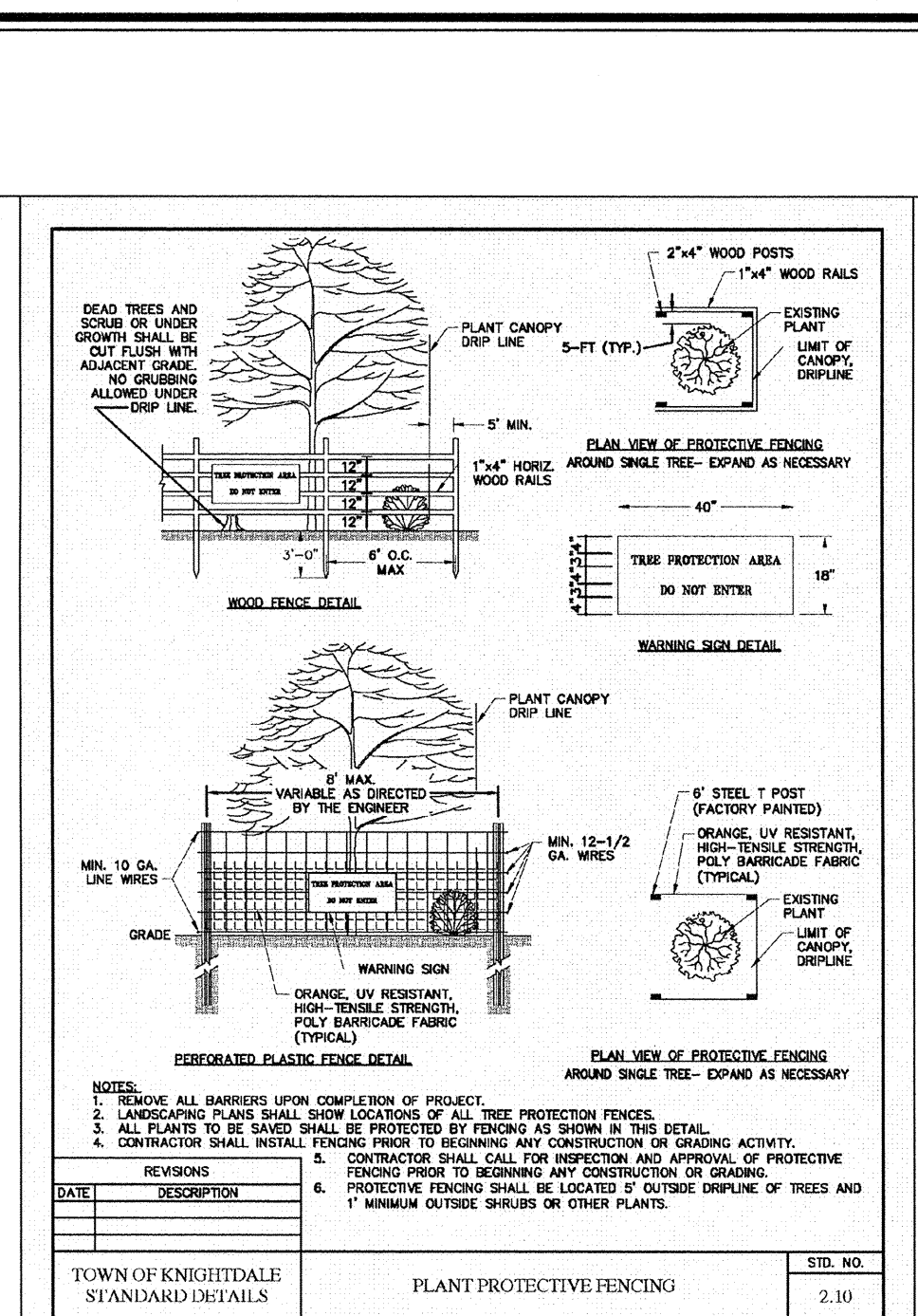
10/17/16

SEEDING PERIOD	SEEDING TYPE	AFFILIATION RATE (LBS/ACRE)
AUGUST 15 - NOVEMBER 01	TALL FESCUE	300
NOVEMBER 01 - MARCH 01	TALL FESCUE AND HORIZZ RYE	250
MARCH 01 - APRIL 15	TALL FESCUE	300
APRIL 15 - JUNE 30	HILLED COMMON BERNARDGRASS	25
JULY 01 - AUGUST 15	HORIZZ MULLET OR HORIZZ-SLEAM HYBRIDS	30
MARCH 01 - JUNE 01	BENESA LEOPOLDAE (SOWFEST) AND TALL FESCUE OR	50
MARCH 01 - APRIL 15	TALL FESCUE OR	150
MARCH 01 - JUNE 30	HILLED COMMON BERNARDGRASS	25
JUNE 01 - SEPTEMBER 01	HORIZZ MULLET OR HORIZZ-SLEAM HYBRIDS	30
SEPTEMBER 01 - MARCH 01	TALL FESCUE OR	150
NOVEMBER 01 - MARCH 01	HORIZZ RYE	25

REVISIONS

DATE	DESCRIPTION	BY

TOWN OF KNIGHTDALE
STANDARD DETAILS



Environmental Services

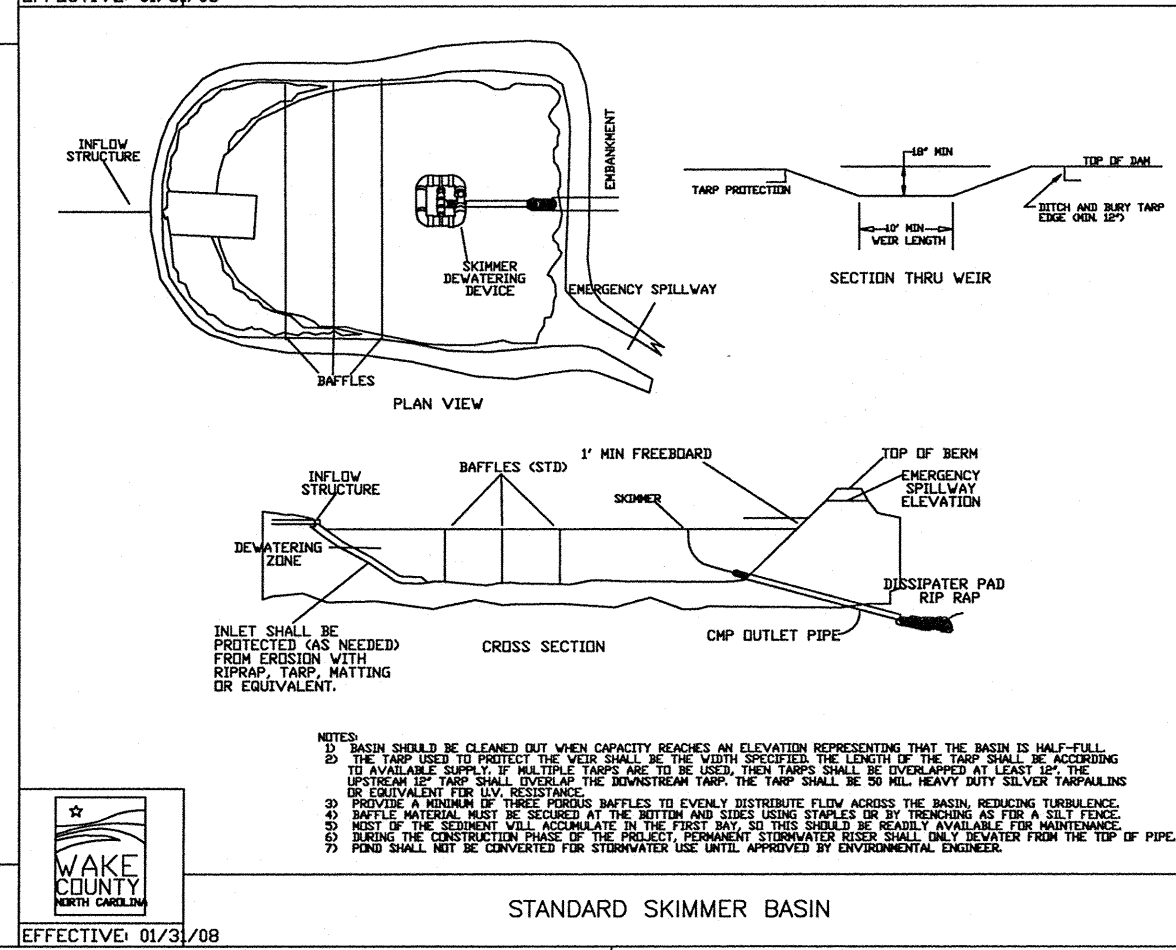
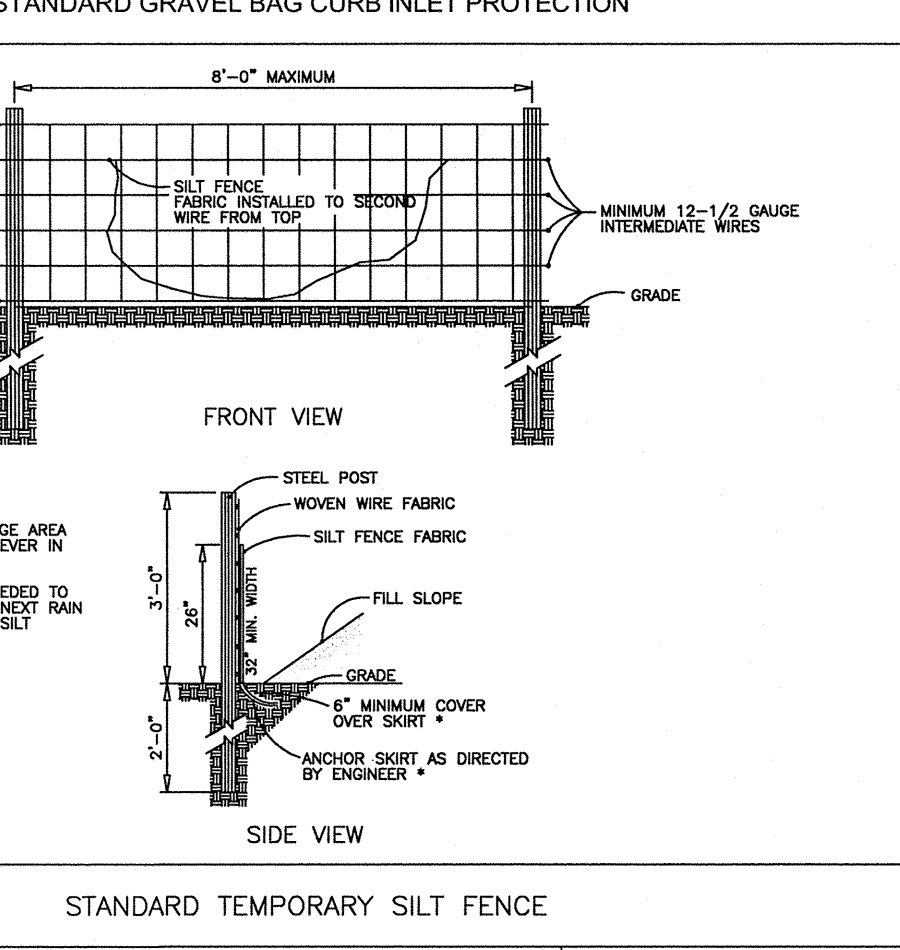
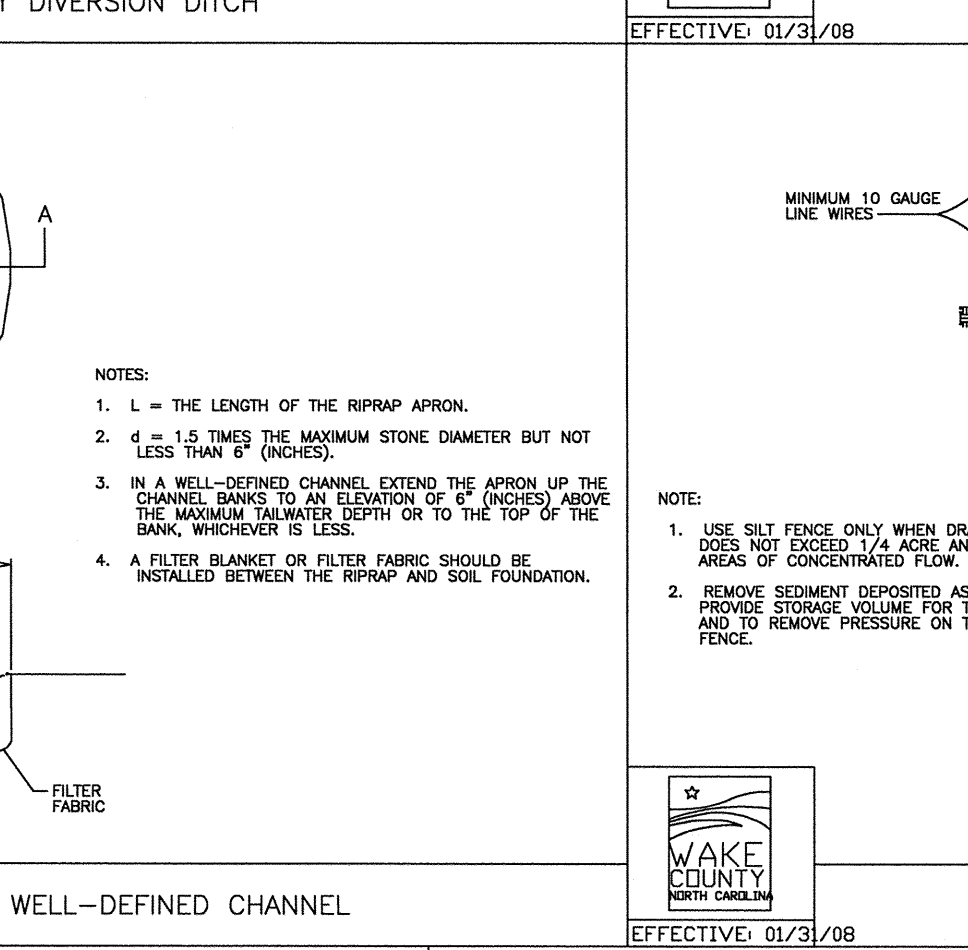
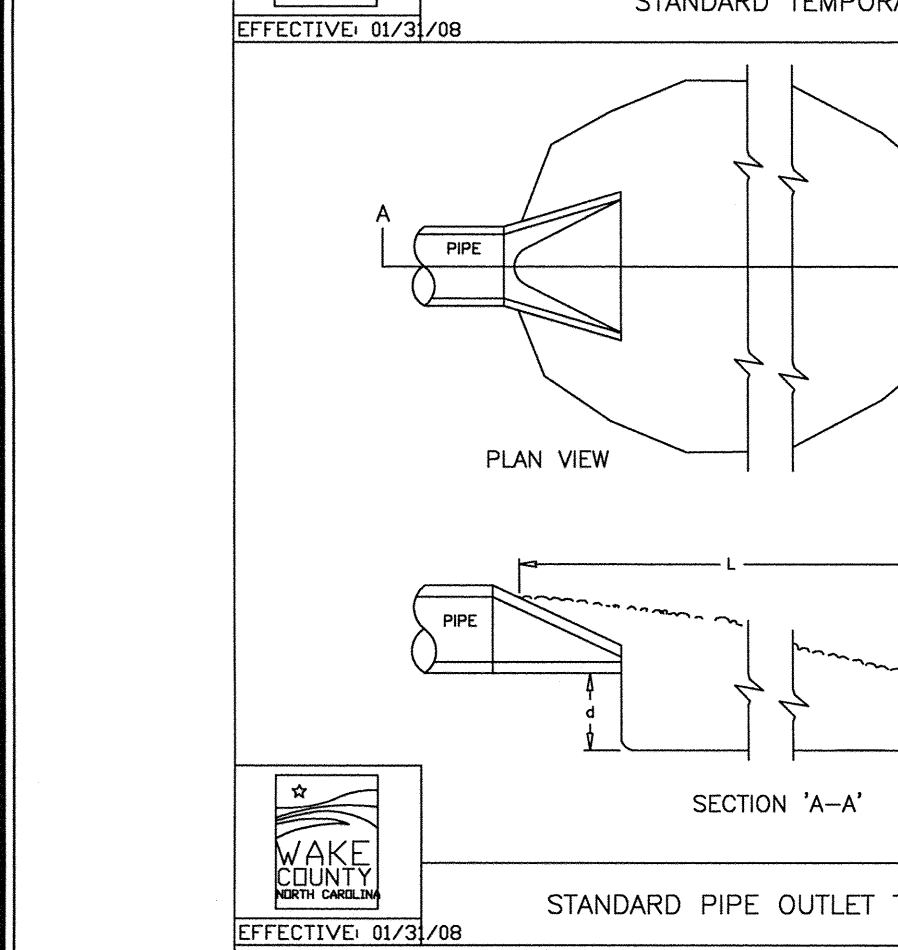
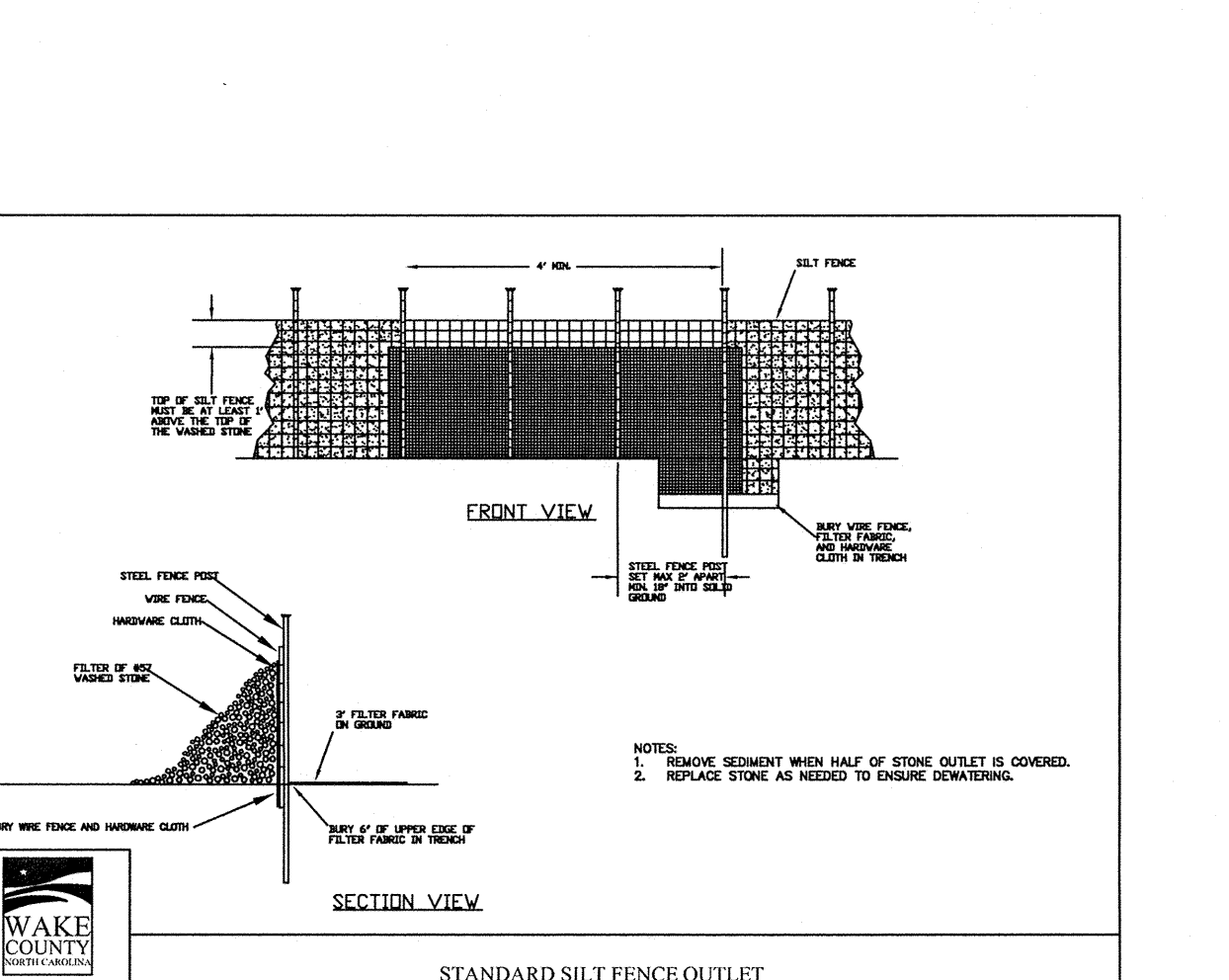
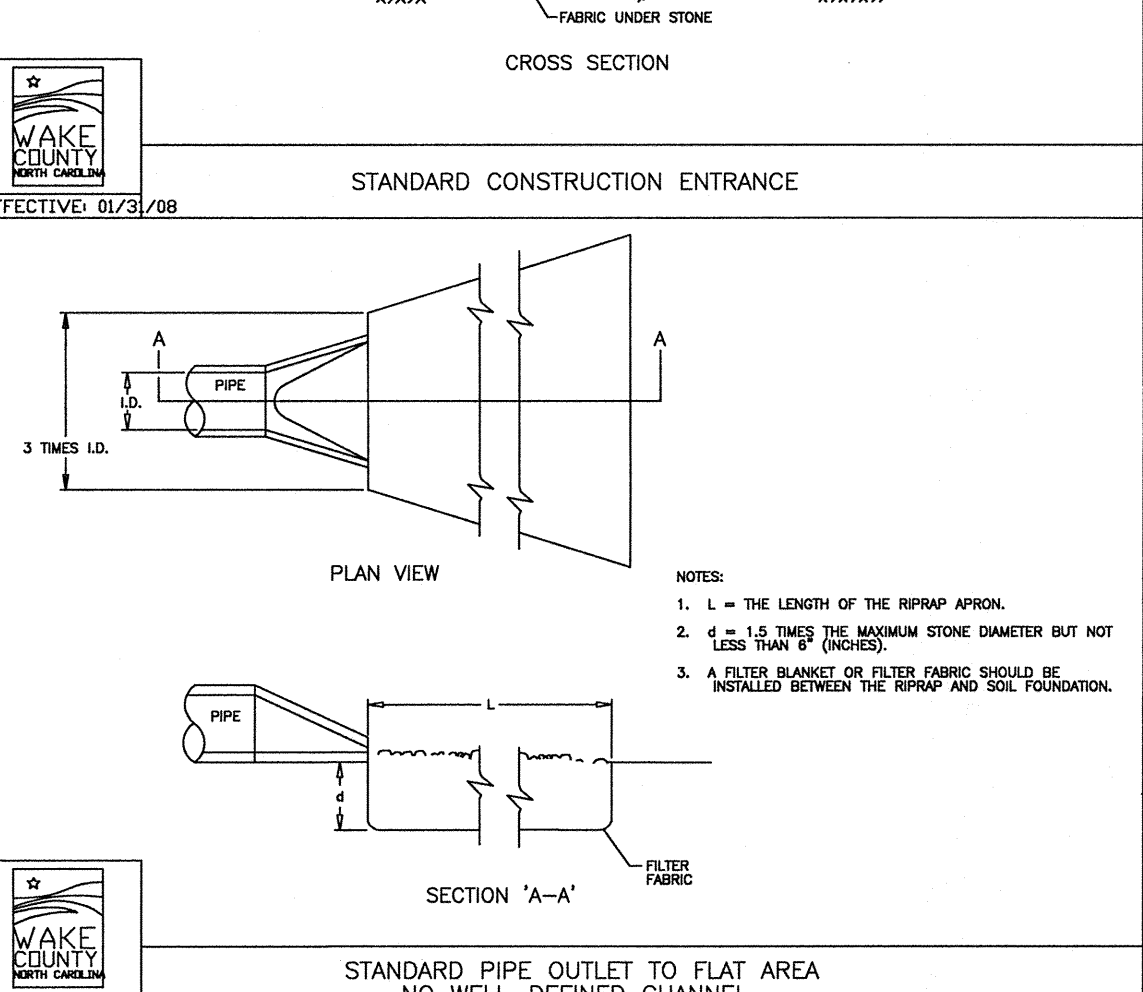
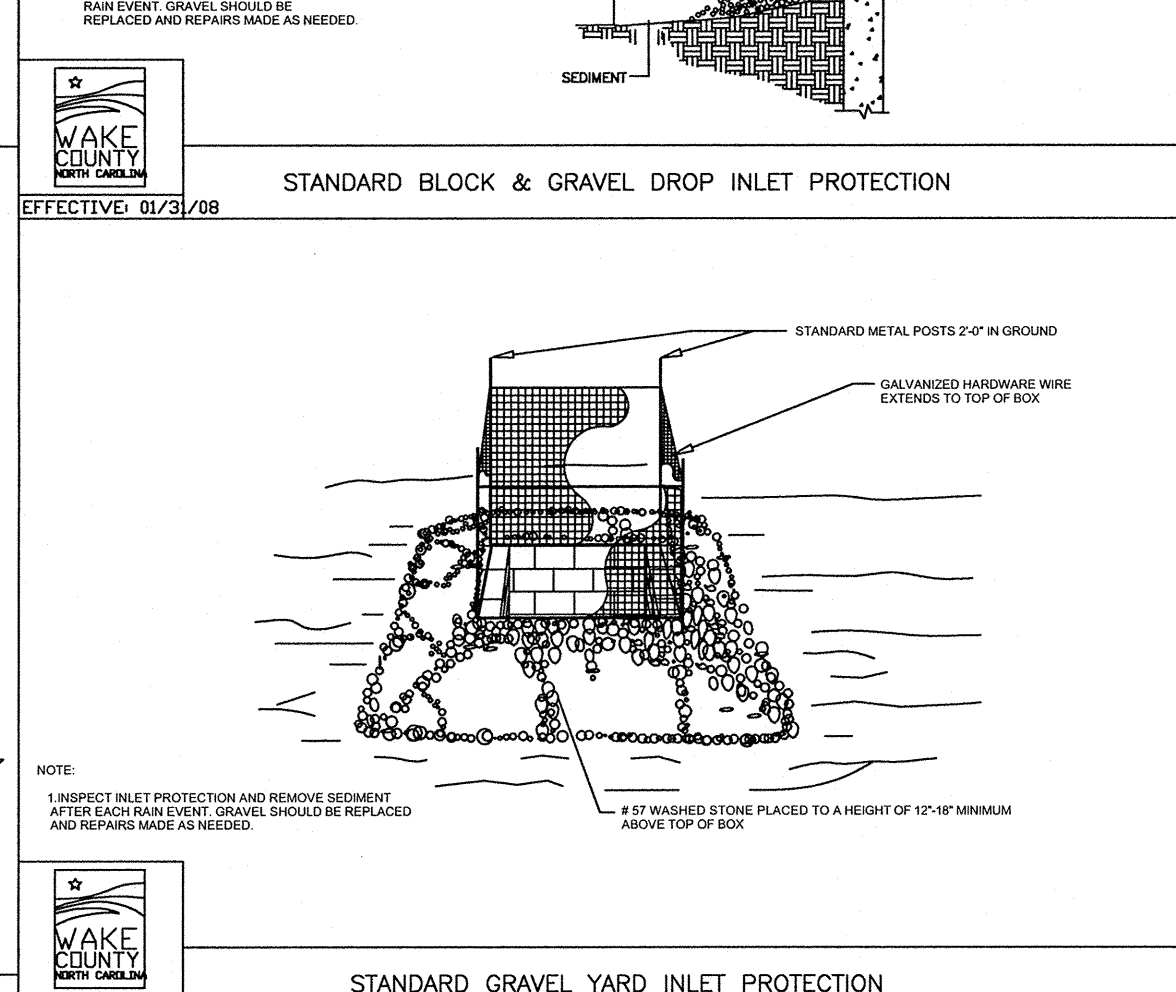
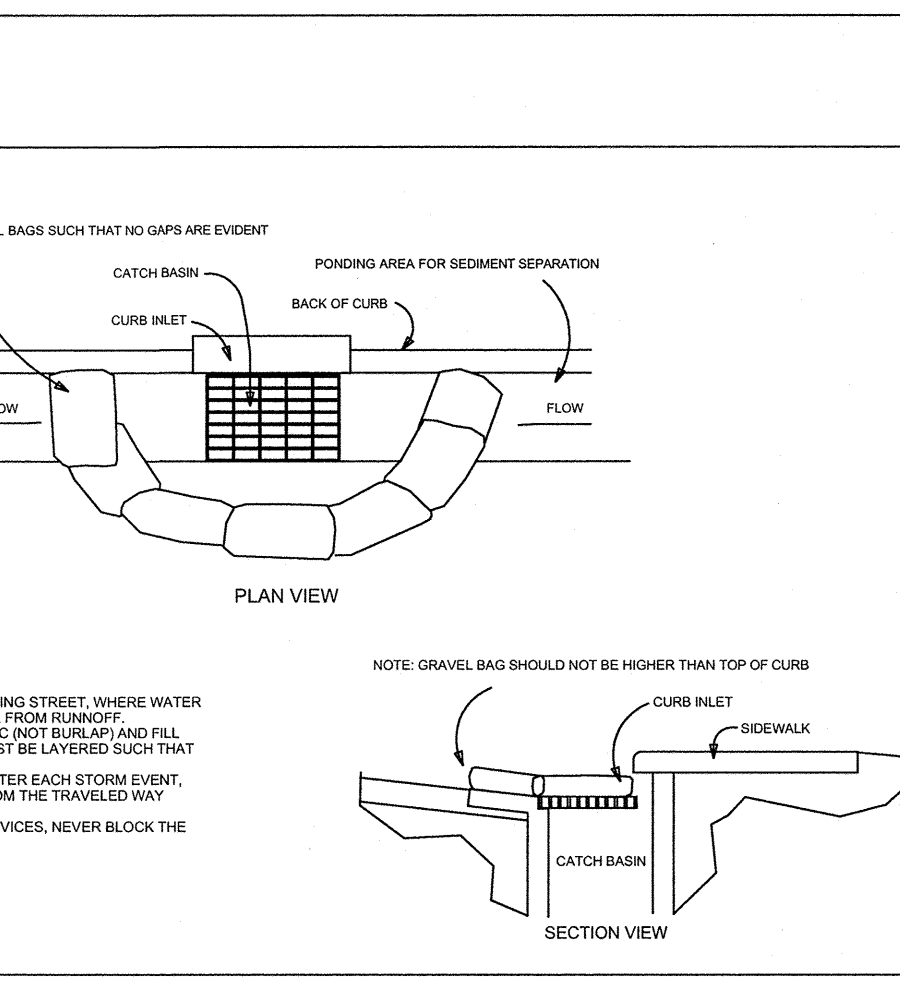
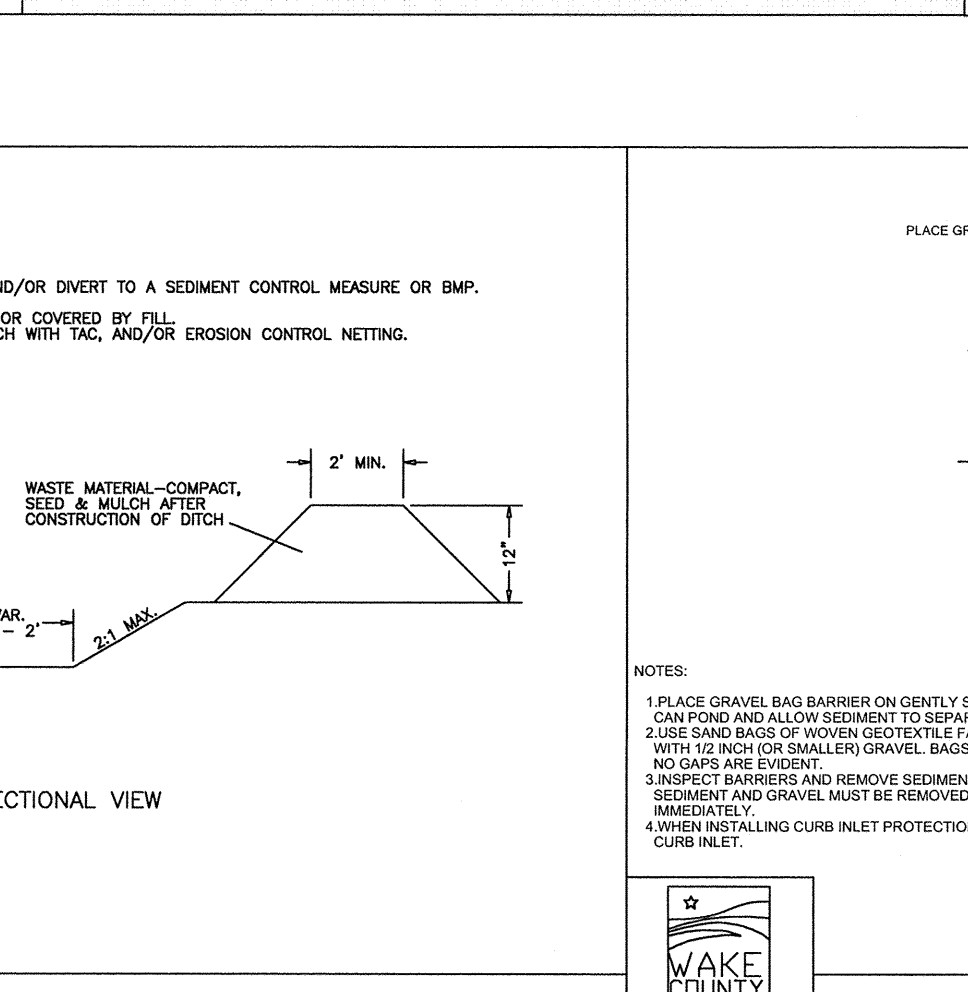
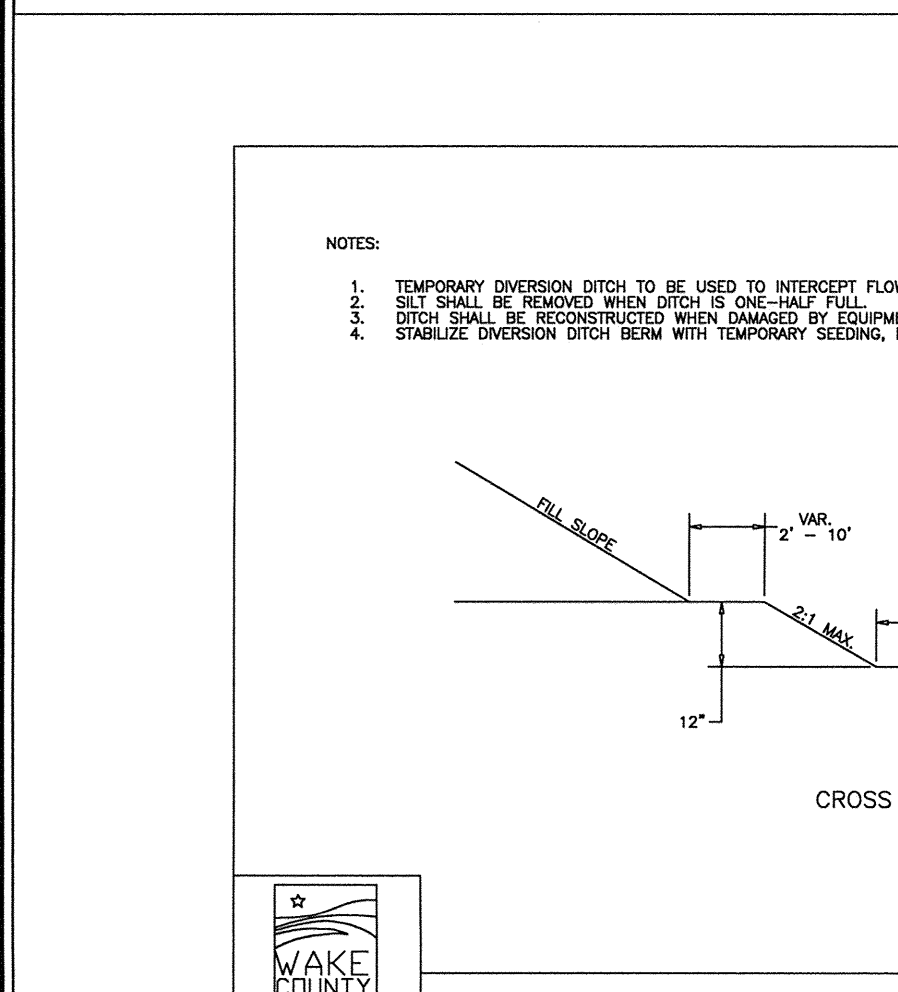
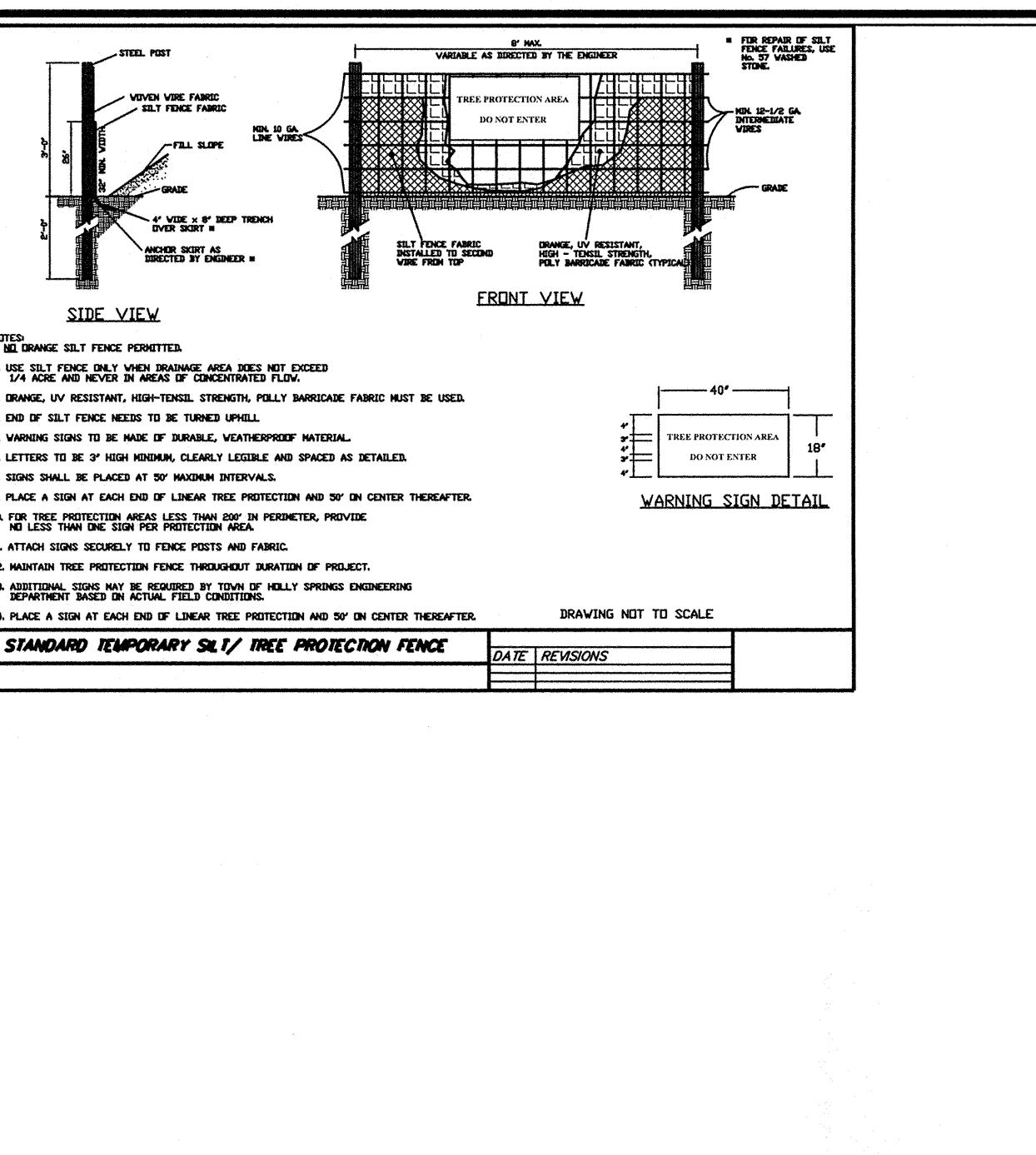
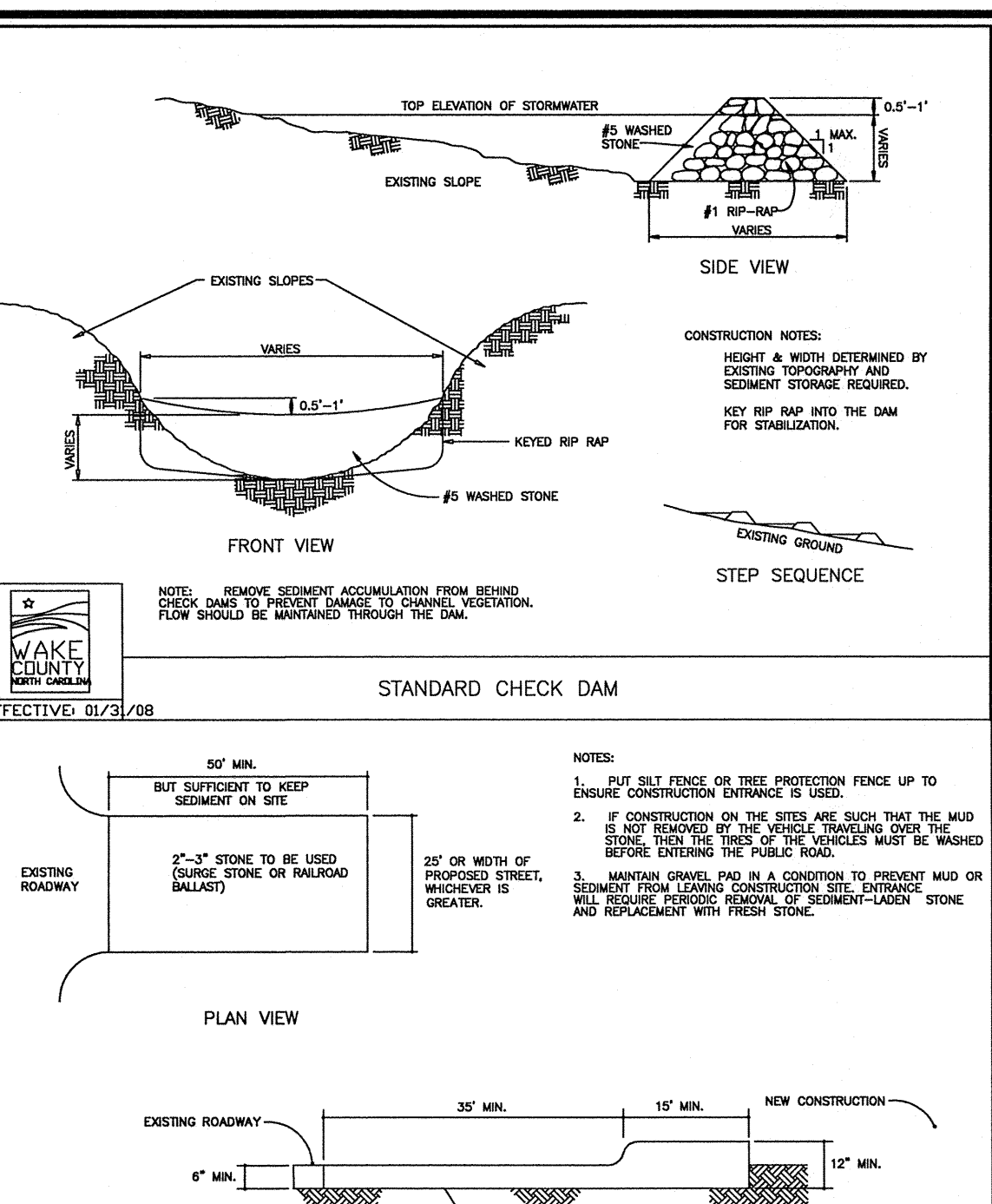
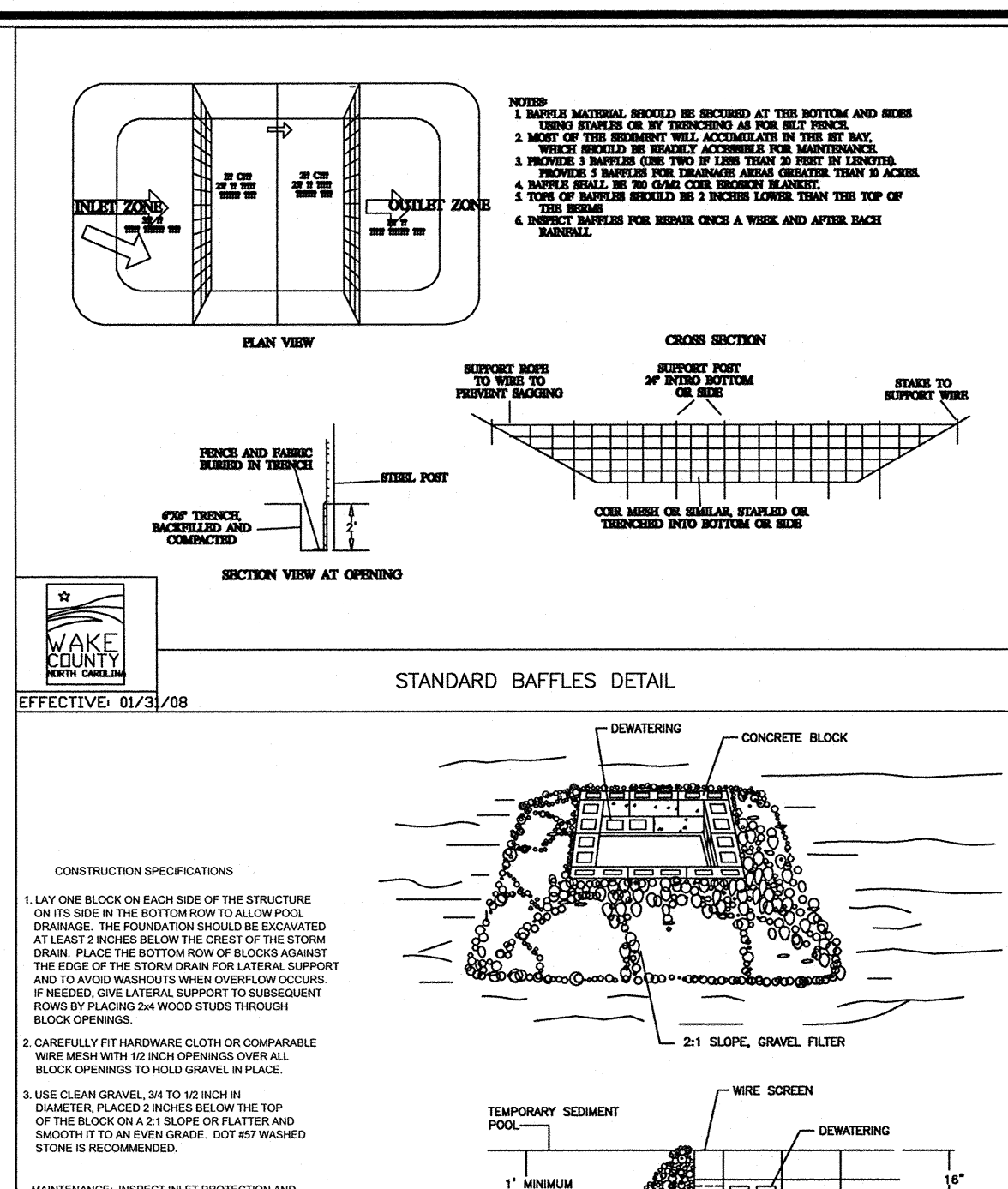
Effective September 1, 2008
Soil stockpiles shall be located on the approved plan and shall adhere to the following requirements:

Design Criteria

- A 25-foot temporary maintenance and access easement shall be shown around all proposed stockpiles (erosion control measures surrounding the stockpile shall be shown as the outer limit of the easement).
- Stockpile footprints shall be set back a minimum of 25' from adjacent property lines.
- A note shall be provided on the approved plan that stockpile height shall not exceed 15 feet.
- Stockpile slopes shall be 2:1 or flatter.
- Approved BMPs shall be shown on a plan to control any potential sediment loss from a stockpile.
- Stockpiling materials adjacent to a ditch, drainage, watercourse, wetland, stream buffer, or other body of water shall be avoided unless an alternative location is demonstrated to be unavailable.
- Any concentrated flow likely to affect the stockpile shall be diverted to an approved BMP.
- Off-site spoil or borrow areas must be in compliance with Wake County UDO and State Regulations. All spoil areas over an acre are required to have an approved sediment control plan. Developer/Contractor shall notify Wake County of any off-site disposal of soil, prior to disposal. Fill of FEMA Floodways and Non-encroachment Areas are prohibited except as otherwise provided by subsection 14-152 of the Wake County Unified Development Ordinance (certifications and permits required).

Maintenance Requirements to be Noted on the Plan

- Soiling or covering stockpiles with tarp or mulch is required and will reduce erosion problems. Tarps should be keyed in at the top of the slope to keep water from running underneath the plastic.
- If a stockpile is to remain for future use after the project is complete (builder, etc.), the financial responsible party must notify Wake County of a new responsible party for that stockpile.
- The approved plan shall provide for the use of staged seeding and mulching on a continual basis while the stockpile is in use.
- Establish and maintain a vegetative buffer at the toe of the slope (where practical).



REGULAR FLOW SILT TRACK

FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF

DESIGN	DESIGN	DESIGN
DESIGN 1	DESIGN 2	DESIGN 3

HI-FLOW SILT TRACK

FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF

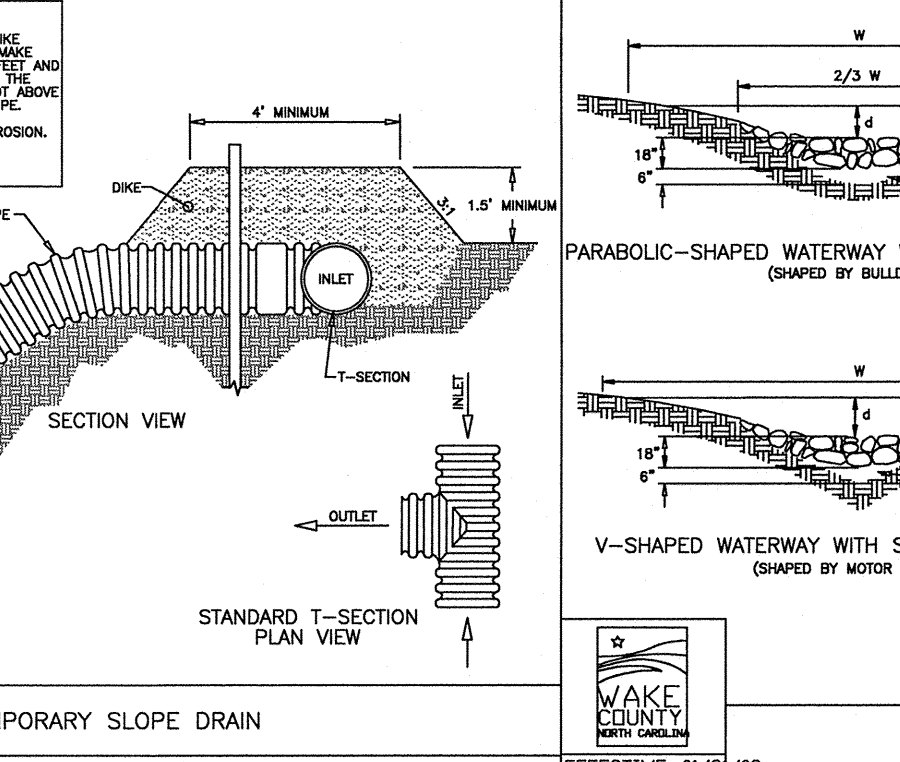
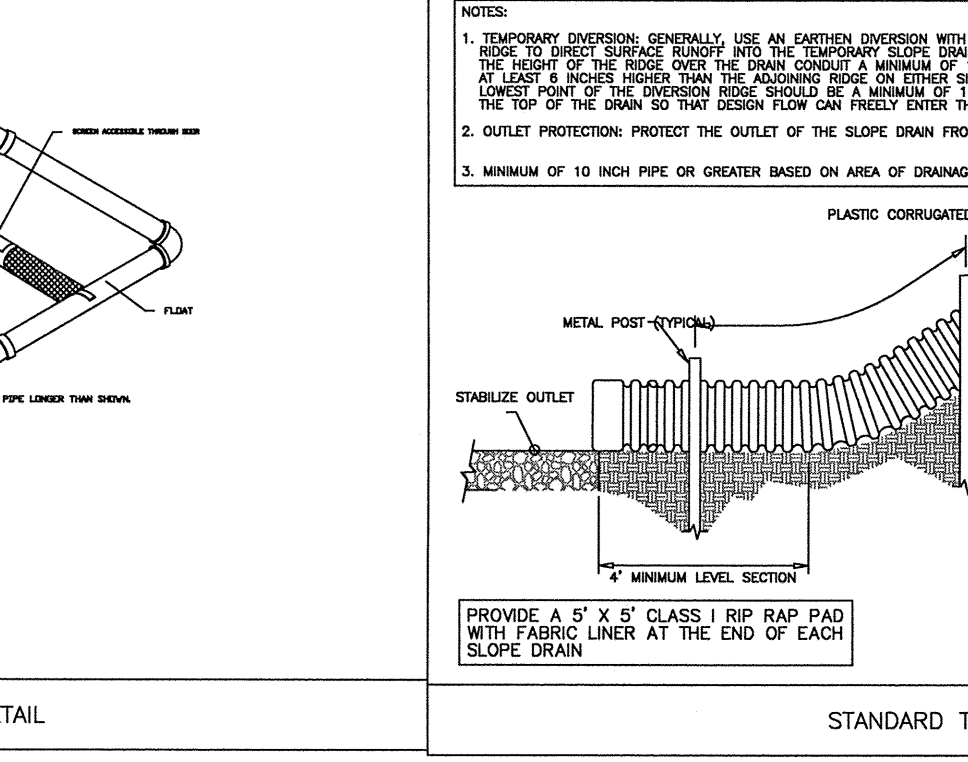
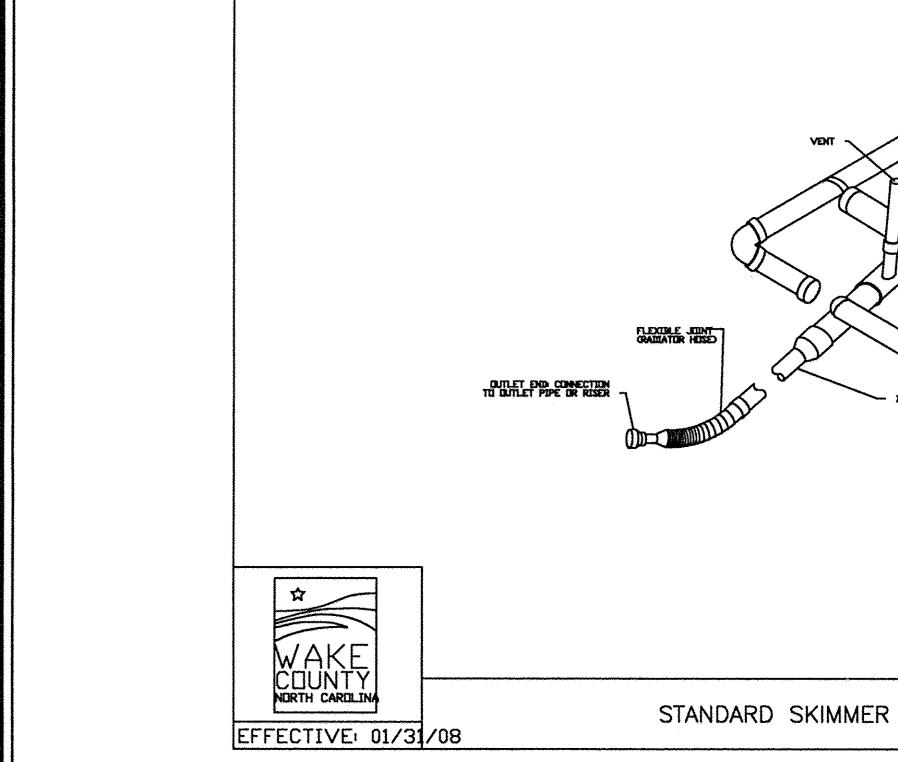
DESIGN	DESIGN	DESIGN
DESIGN 1	DESIGN 2	DESIGN 3

DIKE-ASSISTED SILT TRACK

FOR AREAS WHERE THERE IS A CRACK OR LEAK RUN-OFF OR SPILLS

FOR USE IN THIS PARTICULAR APPLICATION, THE SILT TRACK CAN BE MADE FROM THE POLYPROPYLENE SHEETING WITH THE FOLLOWING SPECIFICATIONS:

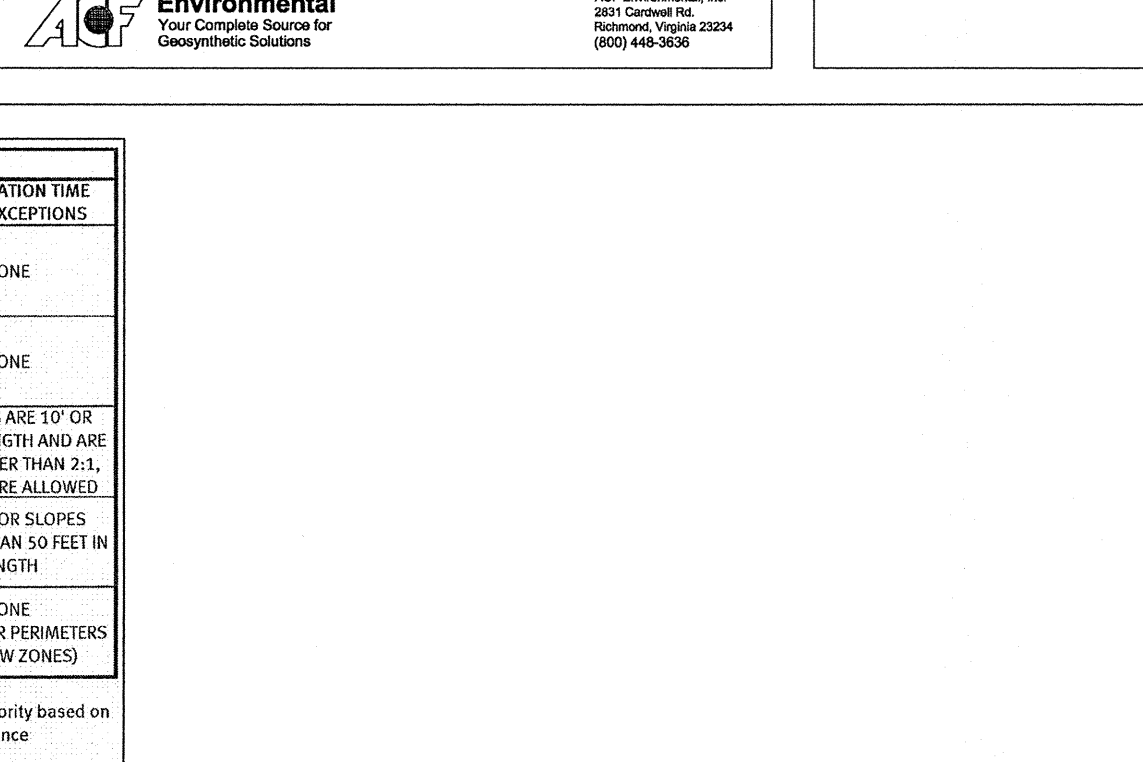
- 1. POLYPROPYLENE SHEETING
- 2. POLYPROPYLENE SHEETING
- 3. POLYPROPYLENE SHEETING
- 4. POLYPROPYLENE SHEETING
- 5. POLYPROPYLENE SHEETING
- 6. POLYPROPYLENE SHEETING
- 7. POLYPROPYLENE SHEETING
- 8. POLYPROPYLENE SHEETING
- 9. POLYPROPYLENE SHEETING
- 10. POLYPROPYLENE SHEETING



GROUND STABILIZATION

SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES FLATTER THAN 3:1	14 DAYS	GREATER THAN 50 FEET IN LENGTH
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE (EXCEPT FOR PERIMETERS AND HQW ZONES)

Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable. (Section 11.02.03)



Environmental Services

NOTICE: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

By: *[Signature]* DATE: 3-2-2017
DEVELOPMENT SERVICES ENGINEER

By: *[Signature]* DATE: 3-6-17
ADMINISTRATOR

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

North Carolina Professional Seal
38549
10/17/16

No.	Revision	Date	By
1	REVISION PER TOK COMMENTS	03/28/16	GAS
2	REVISION PER TOK COMMENTS	05/27/16	CAS
3	REVISION PER TOK COMMENTS	06/30/2016	SVT

Designer	Scale
WR	As Noted

Drawn By	Date
LEG/GAS	02/02/16

Checked By	Job No.
NJA	2090251.90

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County
North Carolina

EROSION CONTROL DETAILS

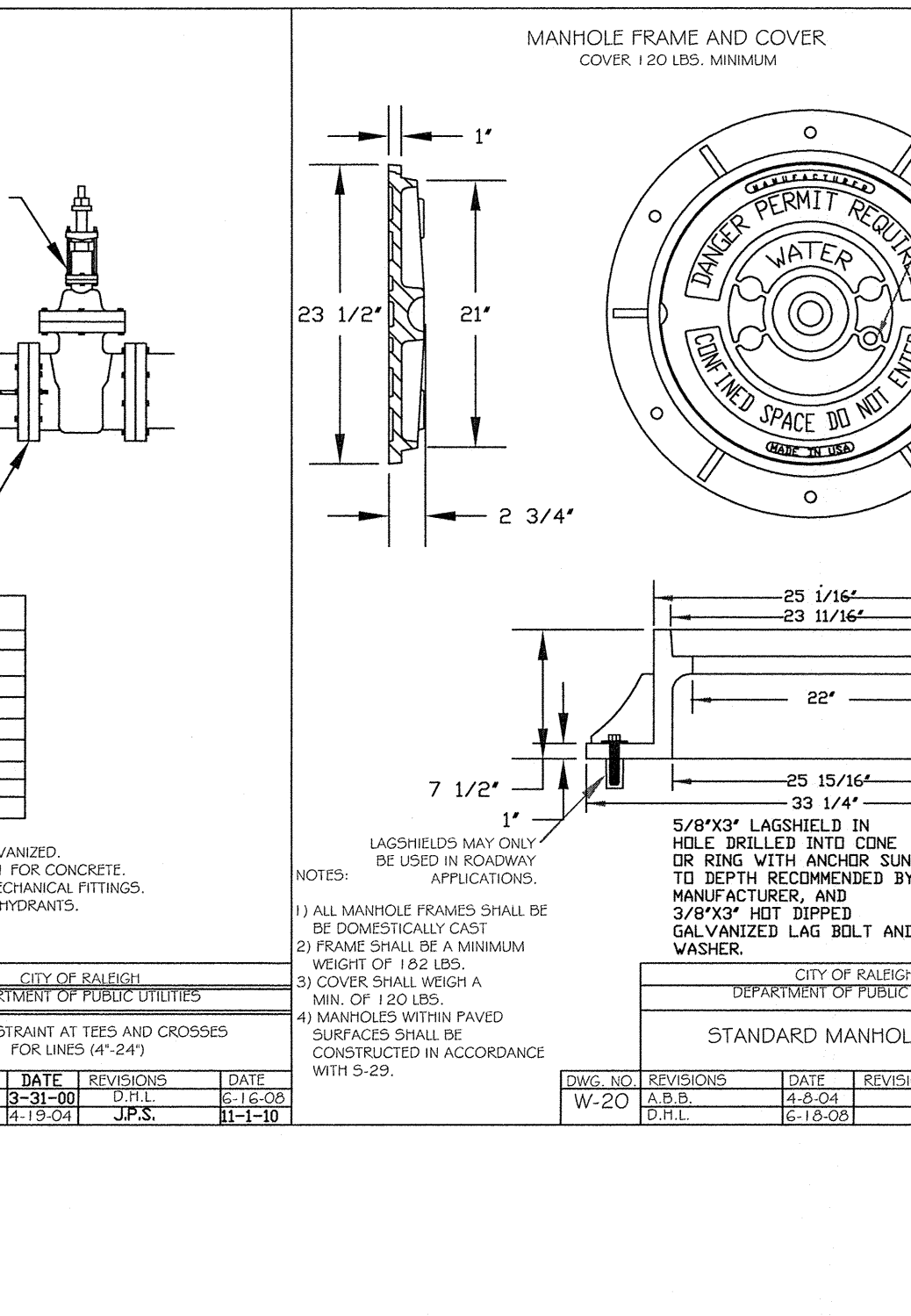
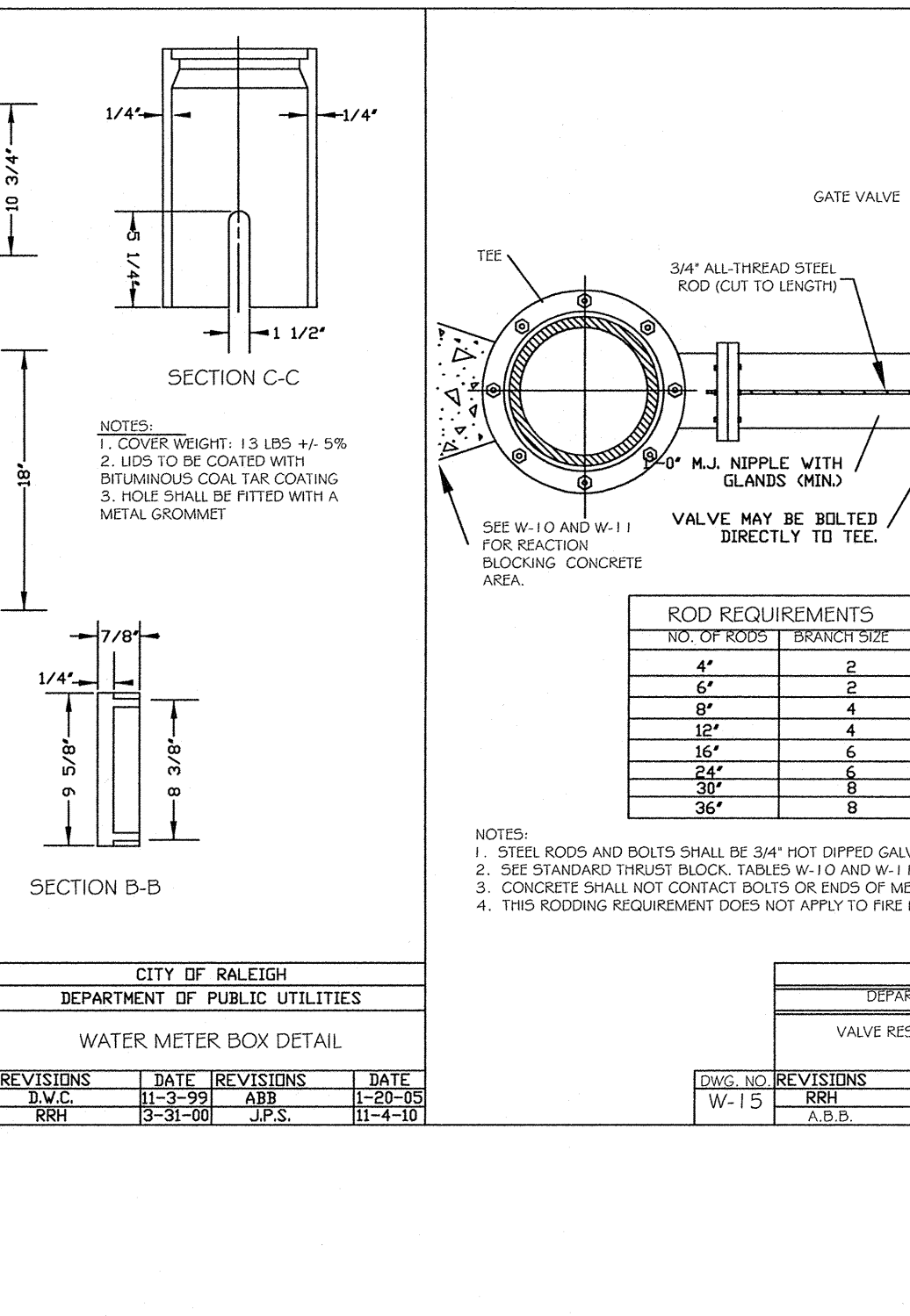
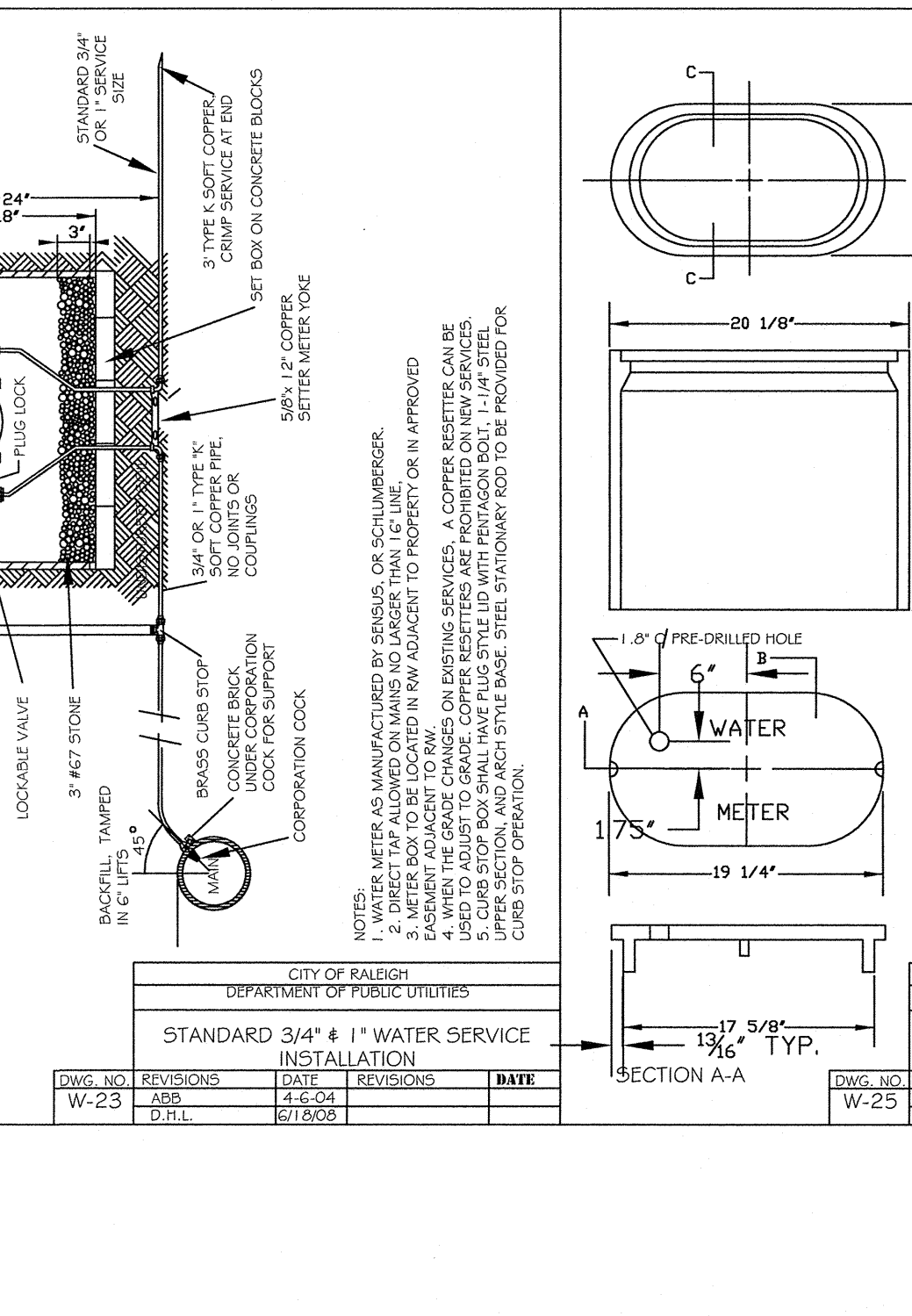
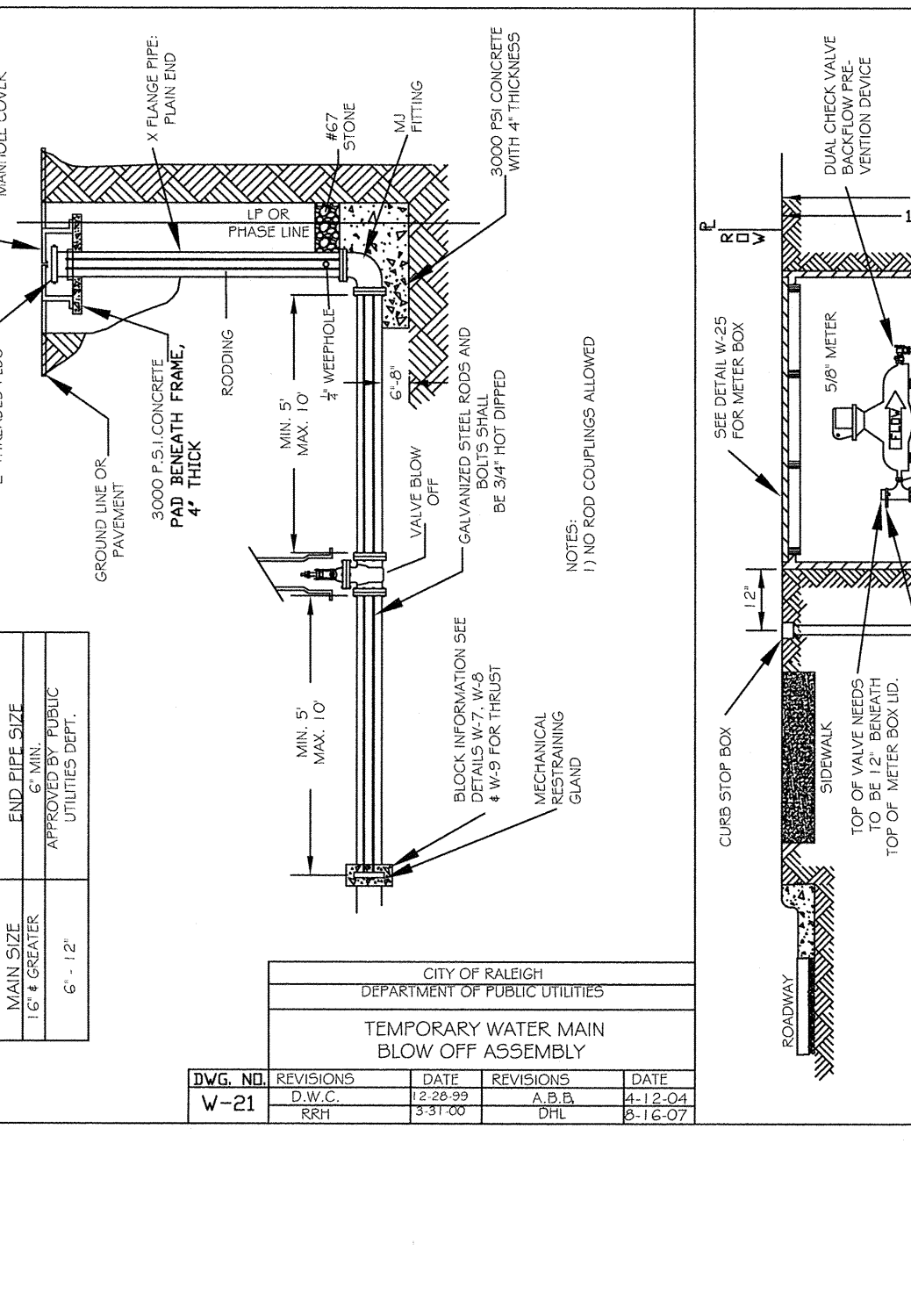
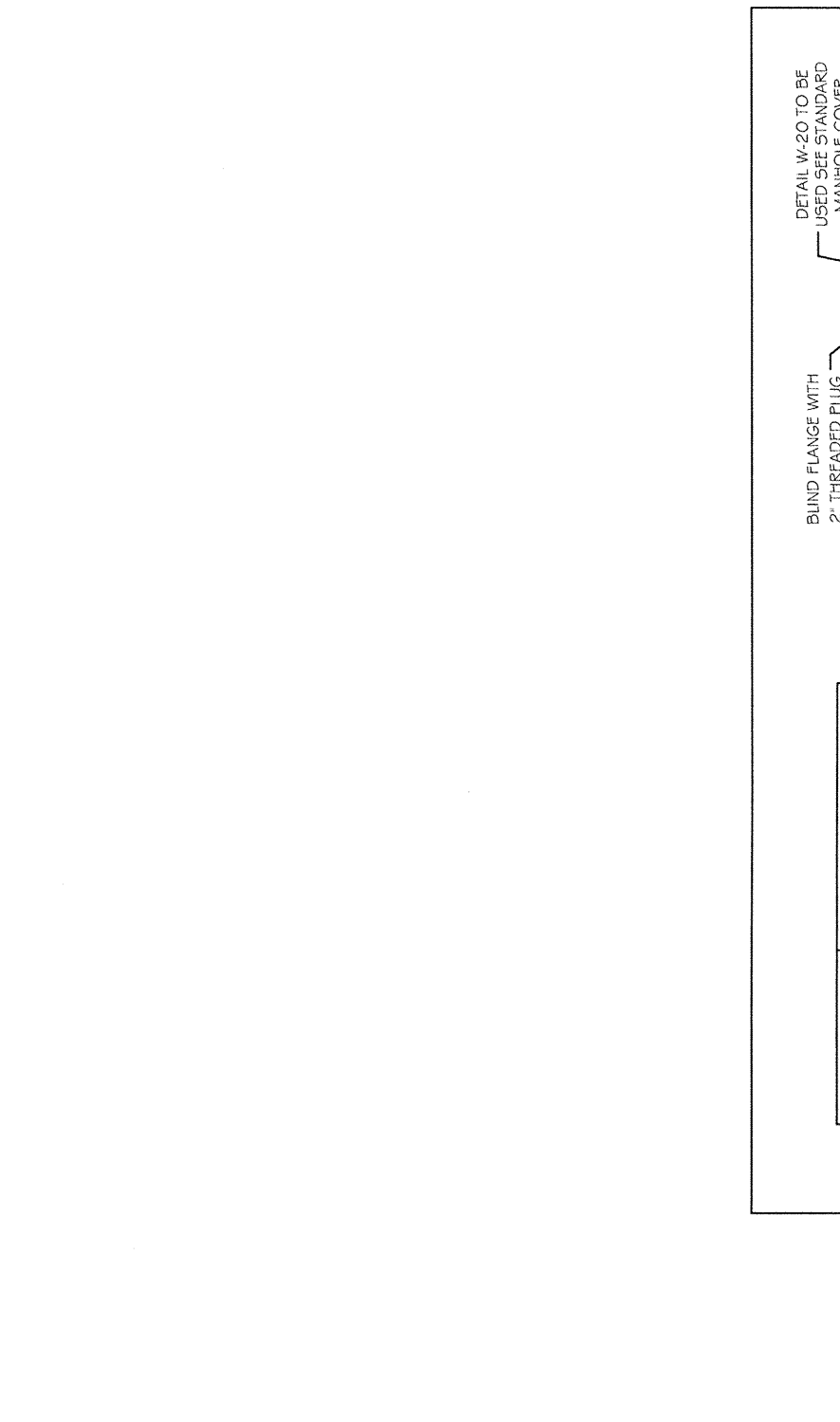
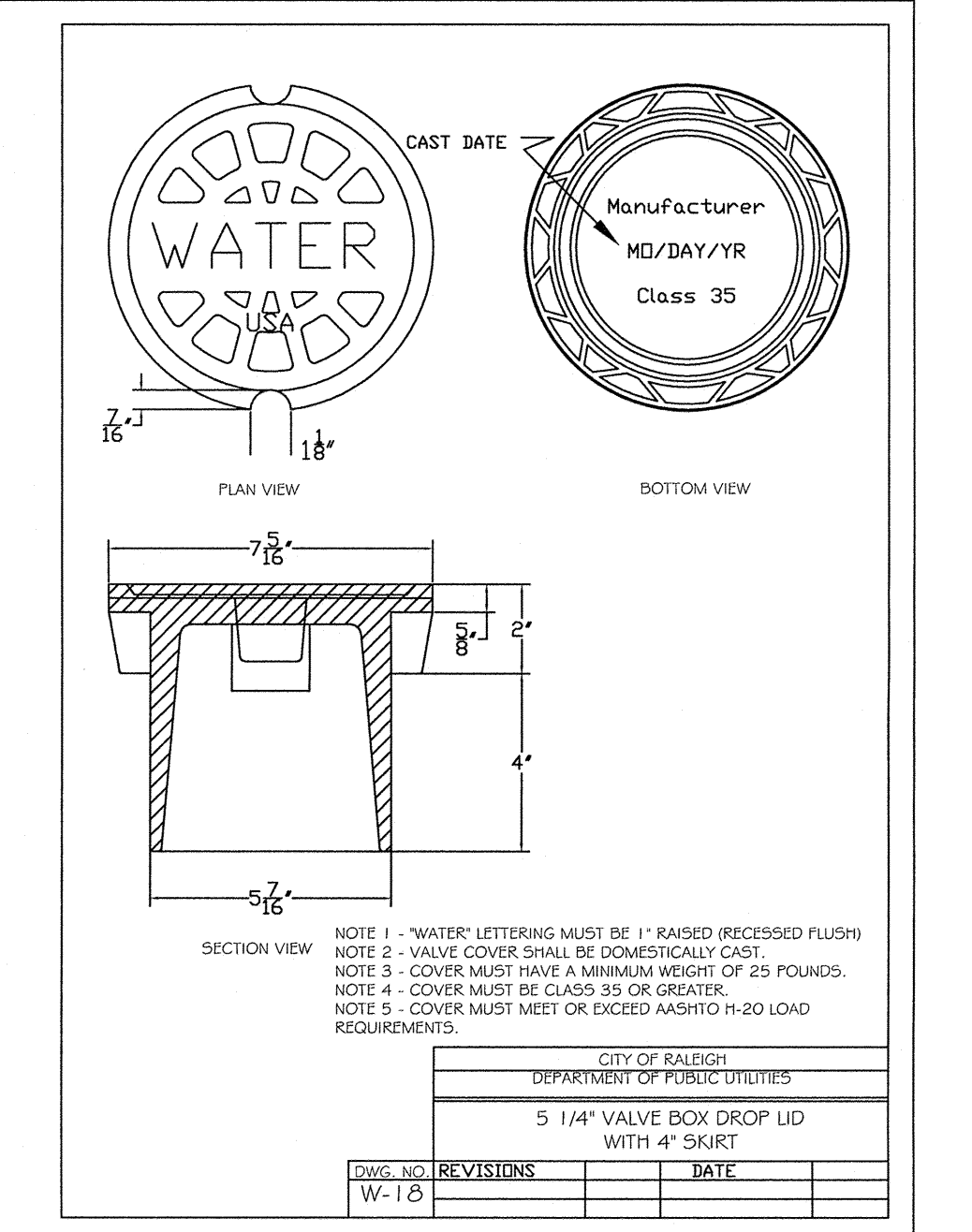
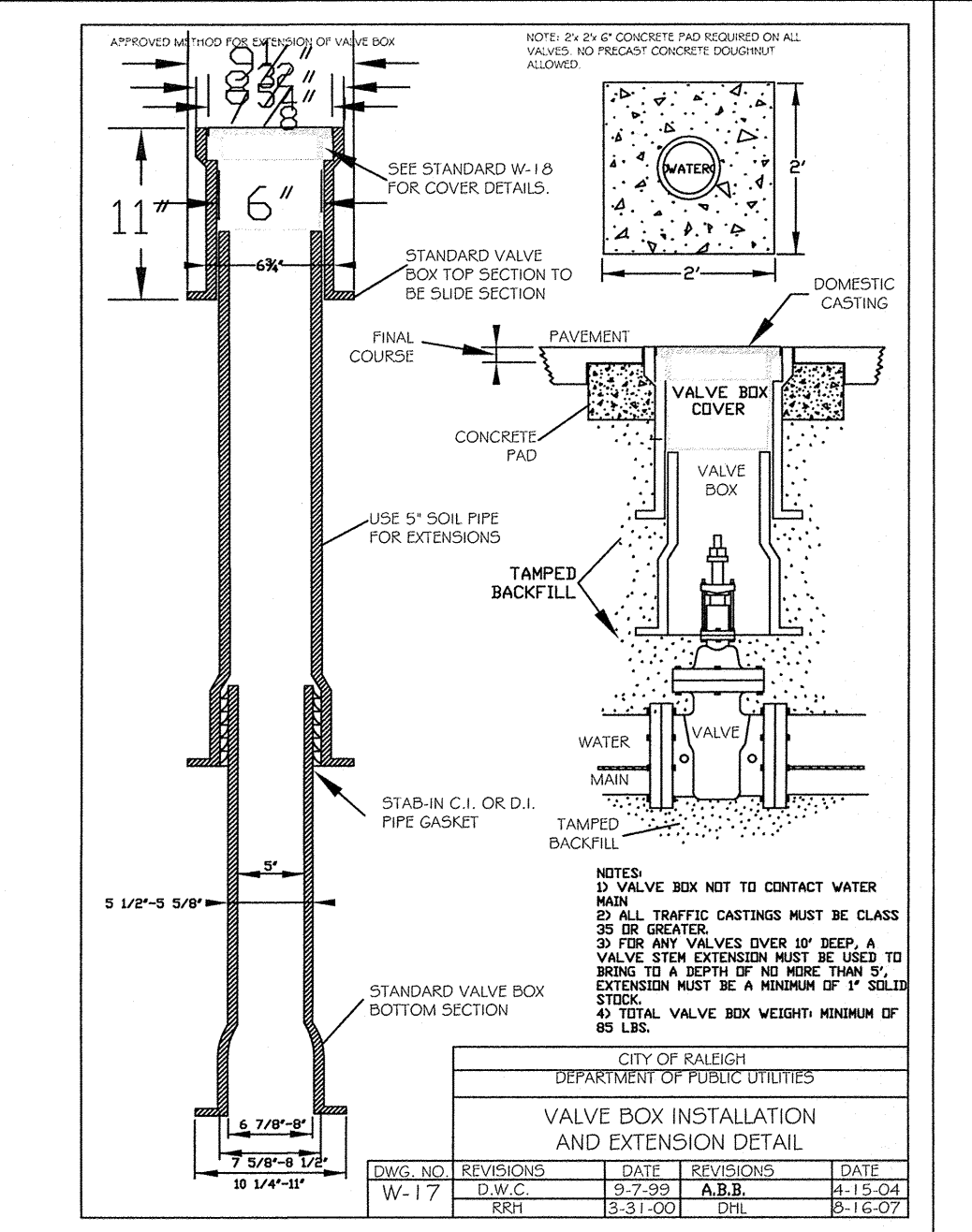
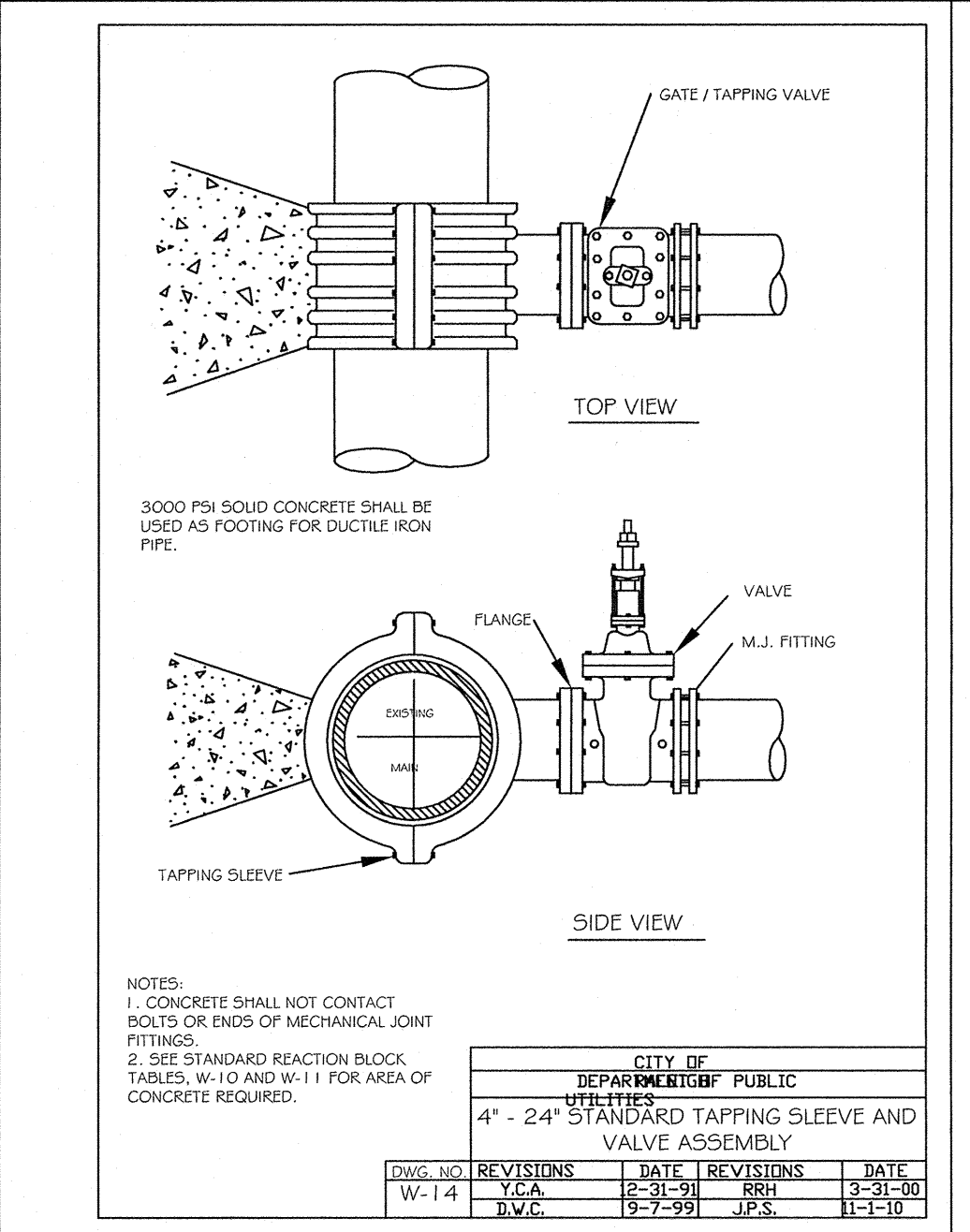
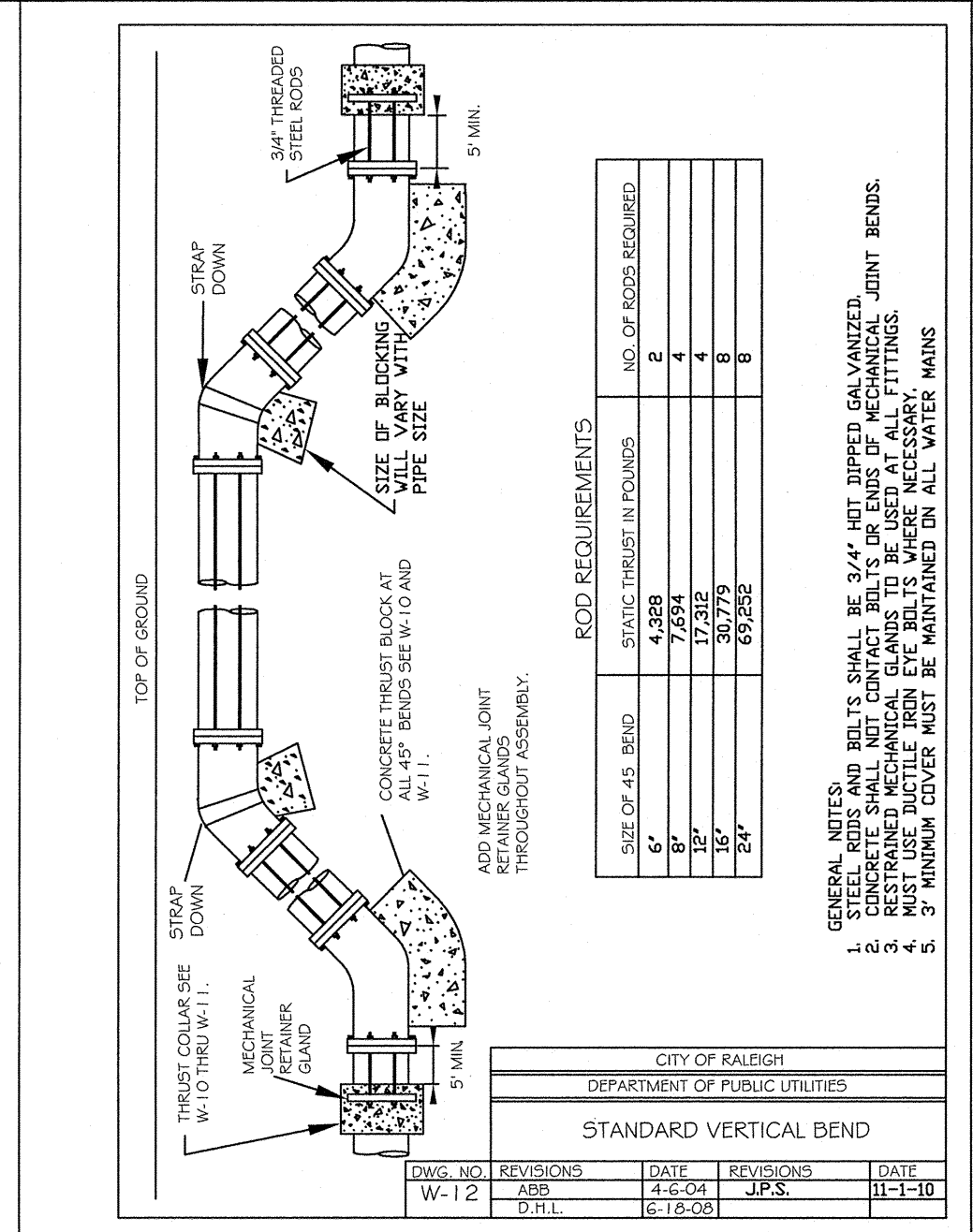
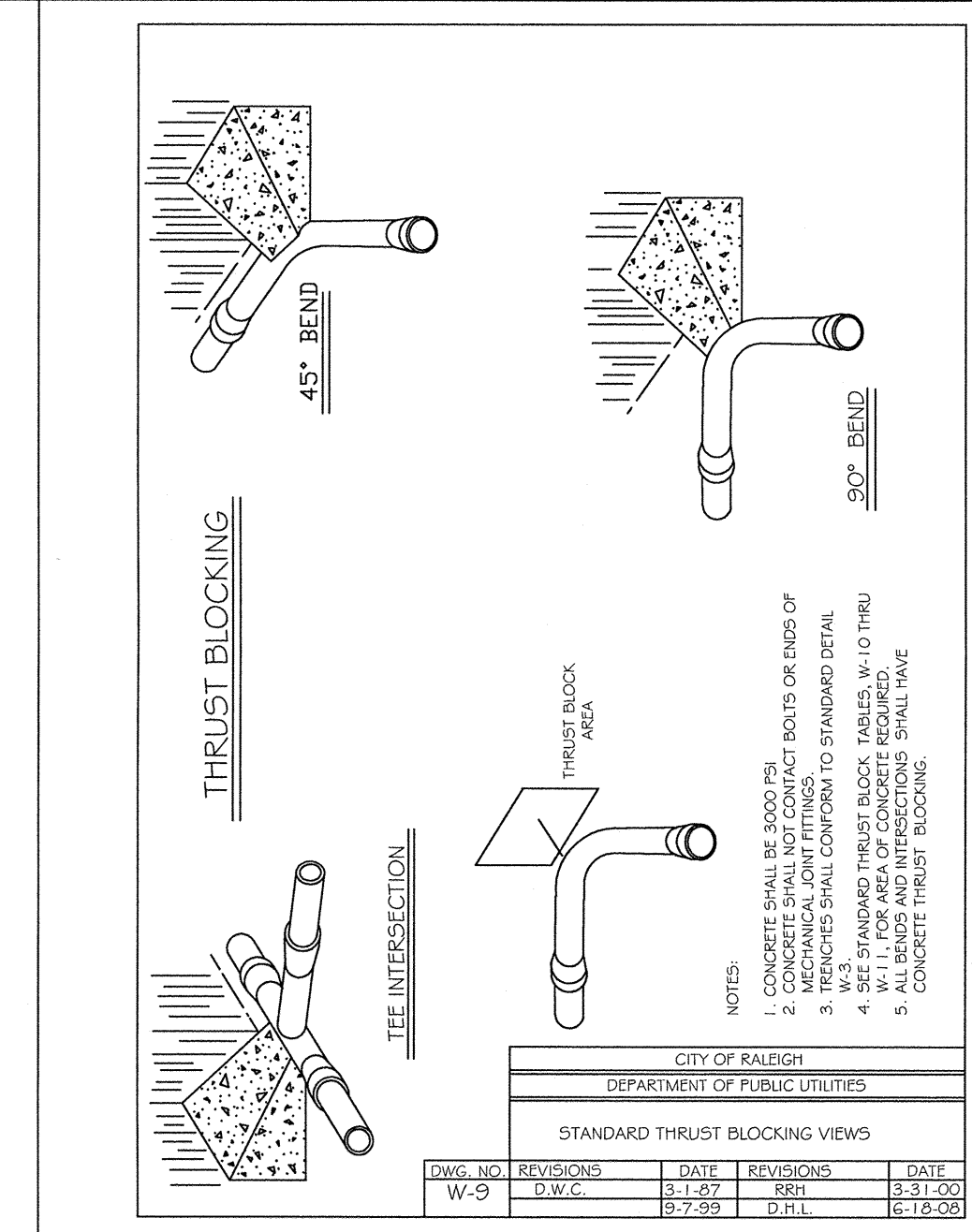
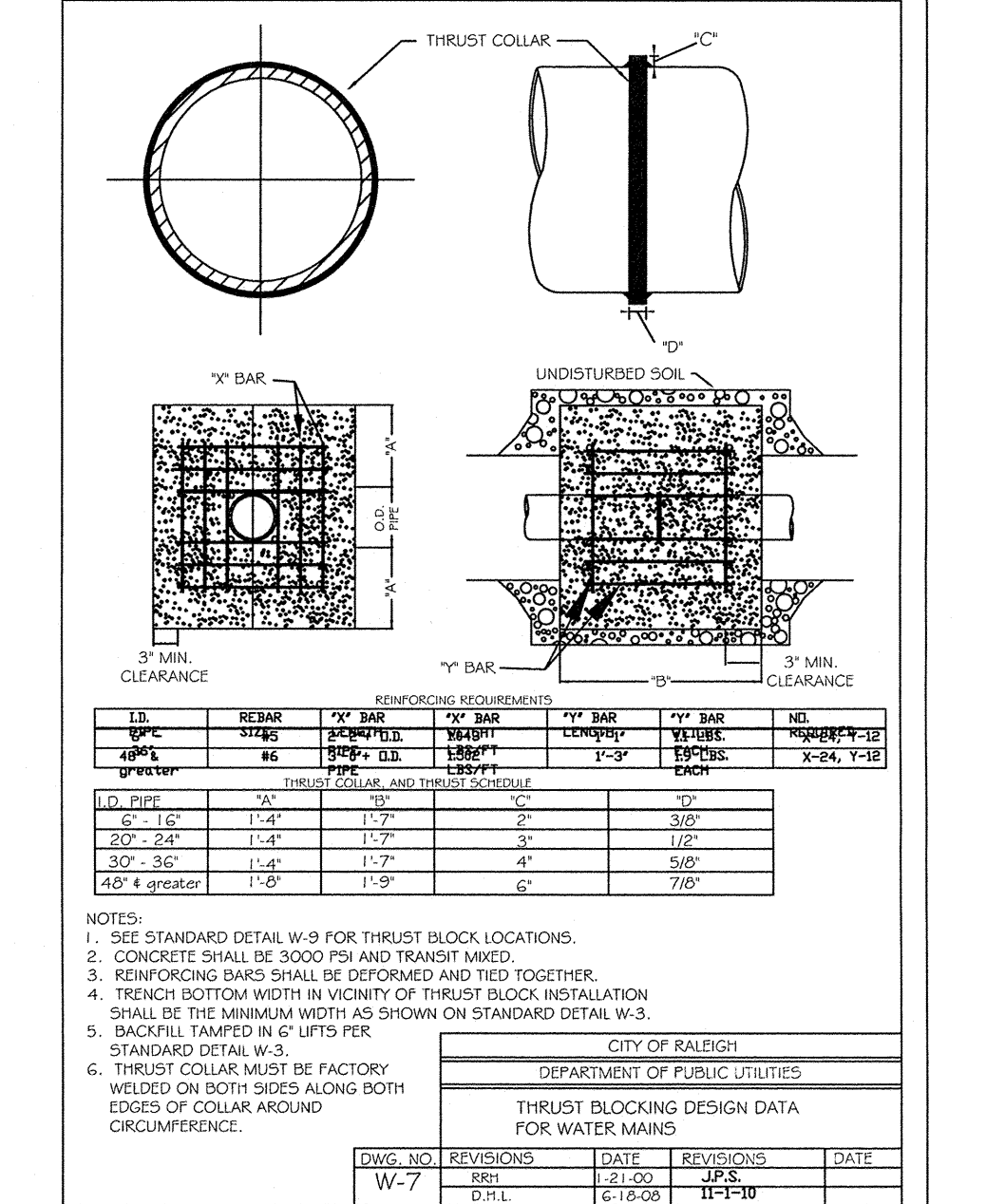
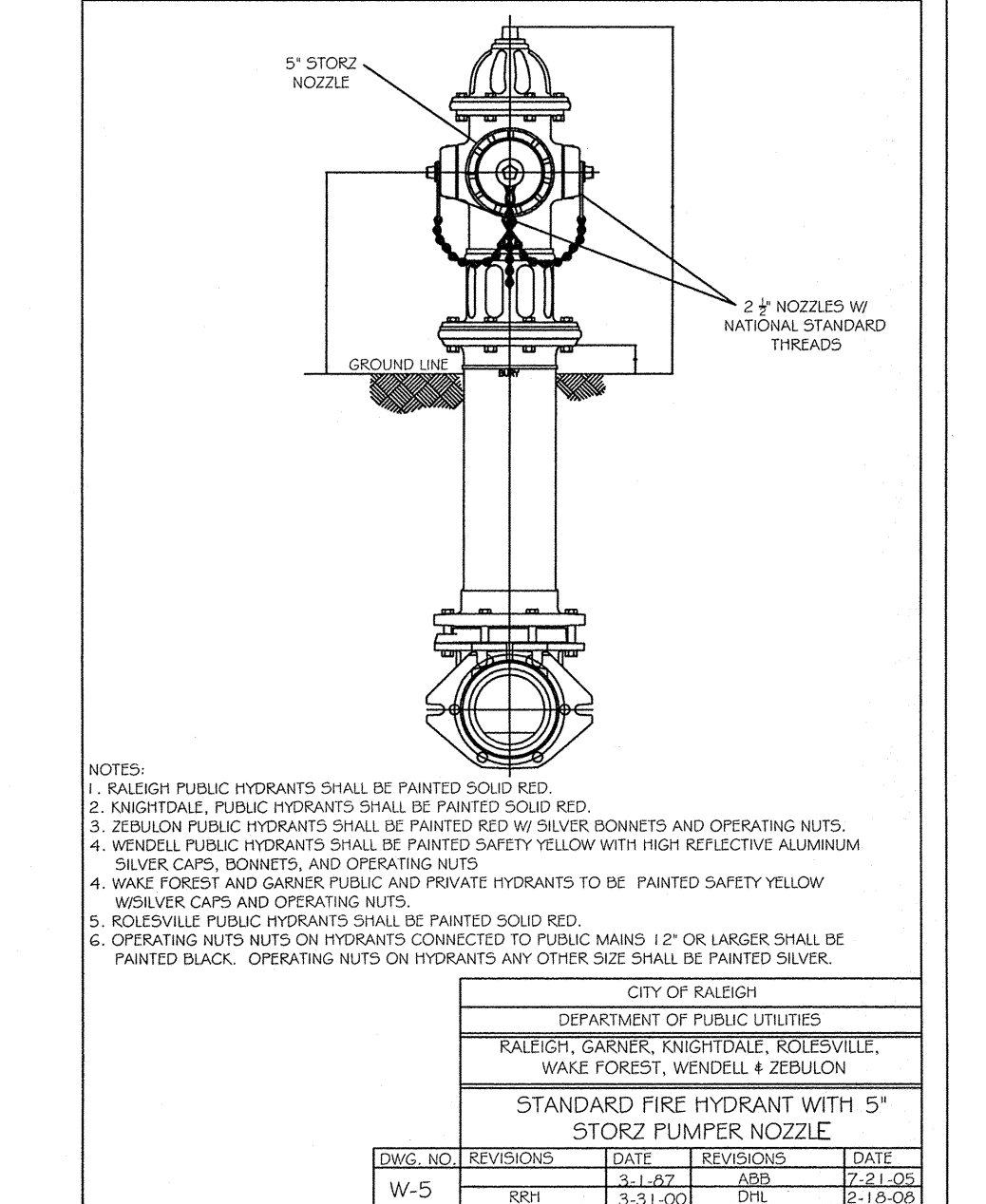
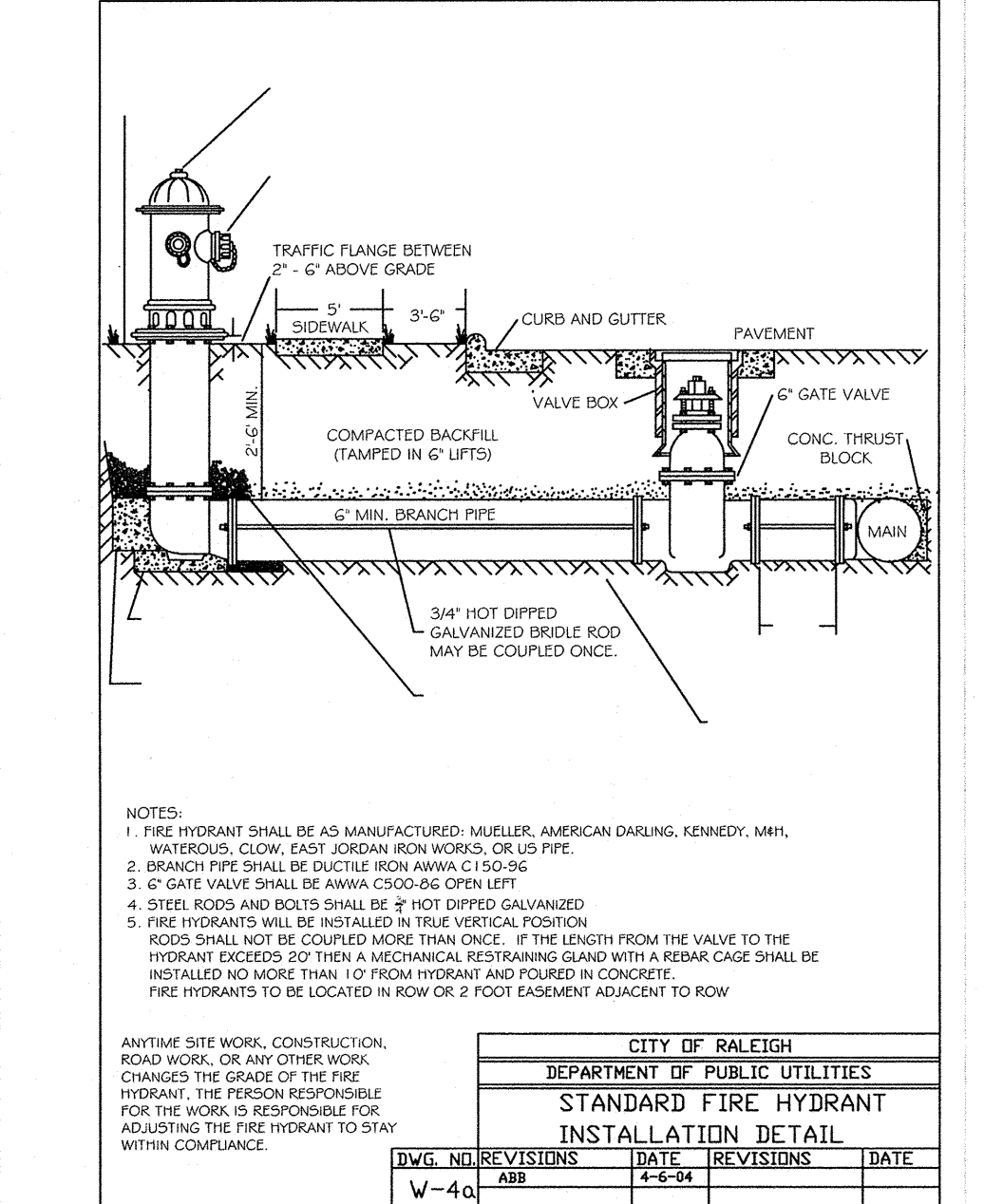
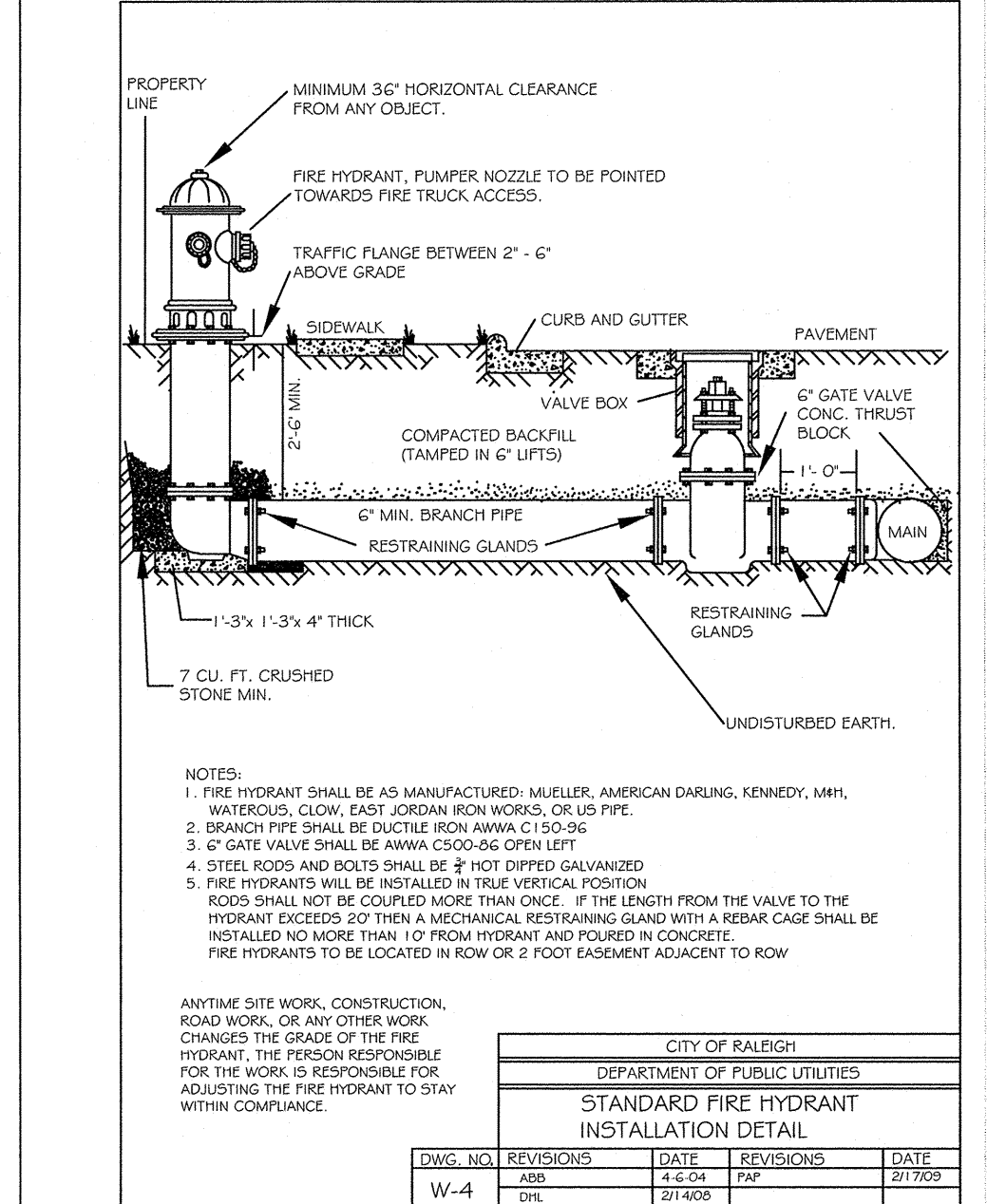
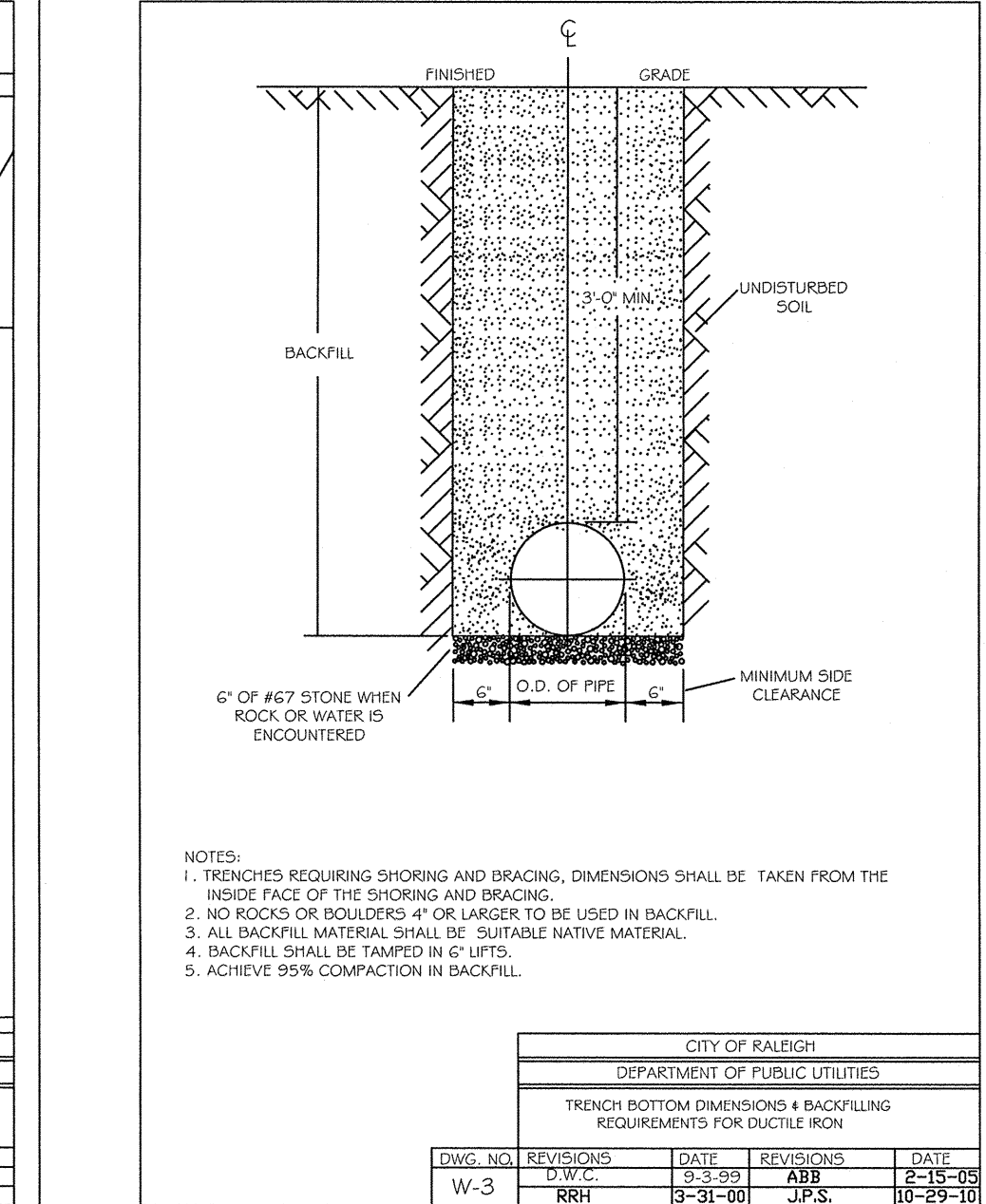
REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS
BASED ON TEST PRESSURE OF 200 P.S.I.

ALL AREAS GIVEN IN SQUARE FEET

DEPTH (FEET) OF	STATIC REACTION IN	REACTING	REACTING	REACTING	REACTING	REACTING	REACTING	REACTING	REACTING	REACTING	REACTING
BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL	BACKFILL
5'	1.100	1	1	1	1	1	1	1	1	1	1
11 1/4'	2.807	1	2	2	1	1	1	1	1	1	1
22 1/2'	4.388	2	3	3	1	1	2	5	1	1	1
45'	7.996	2	4	5	1	1	2	8	1	1	1
90'	14.215	4	8	9	2	2	4	15	2	1	1
PLUG	5.655	2	3	4	1	1	2	6	1	1	1
5'	1.970	1	1	2	1	1	1	2	1	1	1
11 1/4'	3.922	1	2	3	1	1	1	4	1	1	1
22 1/2'	7.694	2	4	5	1	1	2	8	1	1	1
45'	14.215	4	8	9	2	2	4	15	2	1	1
90'	26.619	8	16	19	4	4	8	32	4	1	1
PLUG	10.053	3	5	6	2	2	3	10	1	1	1
5'	4.433	2	3	3	1	1	2	5	1	1	1
11 1/4'	8.866	3	5	6	2	2	3	9	1	1	1
22 1/2'	13.299	5	9	11	3	3	5	18	2	1	1
45'	26.598	8	16	19	4	4	8	32	4	1	1
90'	53.196	15	29	35	8	8	15	57	6	1	1
PLUG	22.619	6	12	14	3	3	6	23	3	1	1
5'	7.881	2	4	5	1	1	2	8	1	1	1
11 1/4'	15.761	4	8	10	2	2	4	16	2	1	1
22 1/2'	30.779	8	16	19	4	4	8	31	4	1	1
45'	61.558	15	29	35	8	8	15	57	6	1	1
90'	123.116	29	58	70	16	16	30	114	12	1	1
PLUG	51.558	10	21	25	5	5	10	41	5	1	1

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

USE 6" x 90" BEND VALUE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.



CITY OF RALEIGH

ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.

TRANSPORTATION-SERVICES N/A

PUBLIC UTILITIES *K.A. Jovan 1/2017*

STORMWATER N/A

PLANNING N/A

FIRE N/A

URBAN-FORESTRY N/A

TOWN CERTIFICATION, THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *S. H. H. H.* DATE: 7-2-2017
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

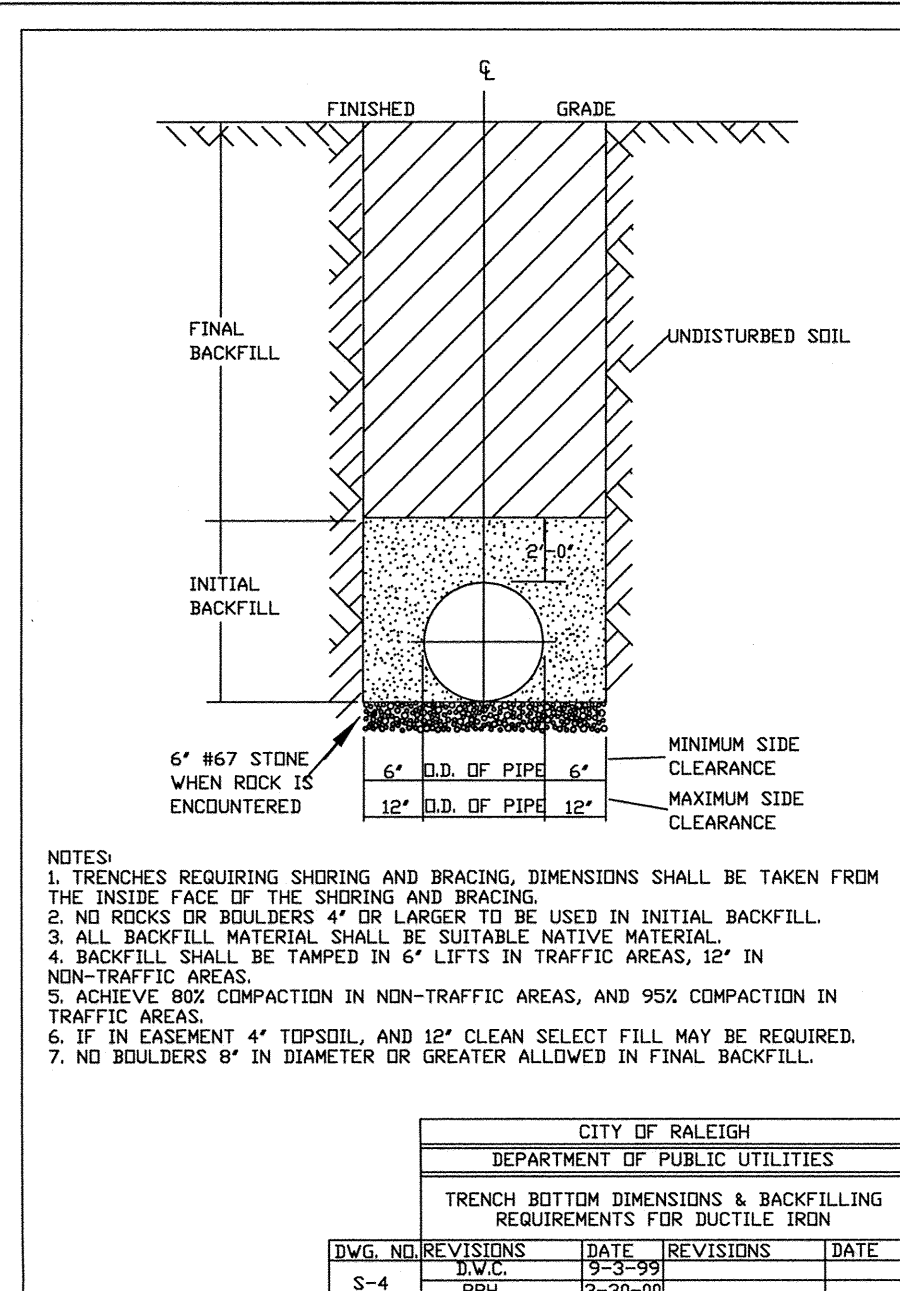
ADMINISTRATOR DATE: 3.16.17

KNIGHTDALE STATION
R-6 (SECTIONS A, B & C)
Wake County
North Carolina

WATER UTILITY DETAILS

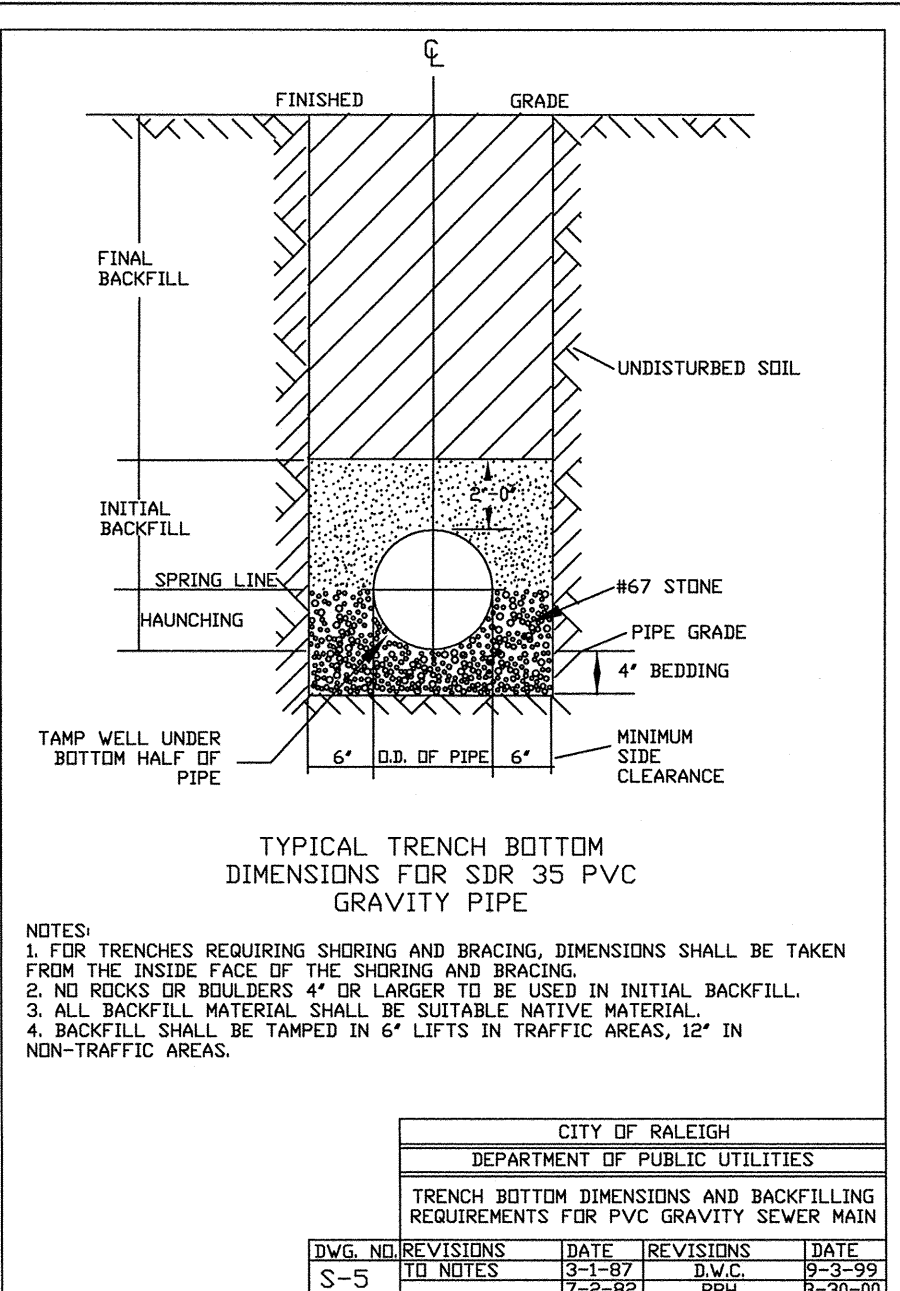
Sheet No. **9.4**

115 MacKenran Drive | Cary, NC 27511 | t: 919-469-3340 | license #: C-0832 | www.withersravenel.com



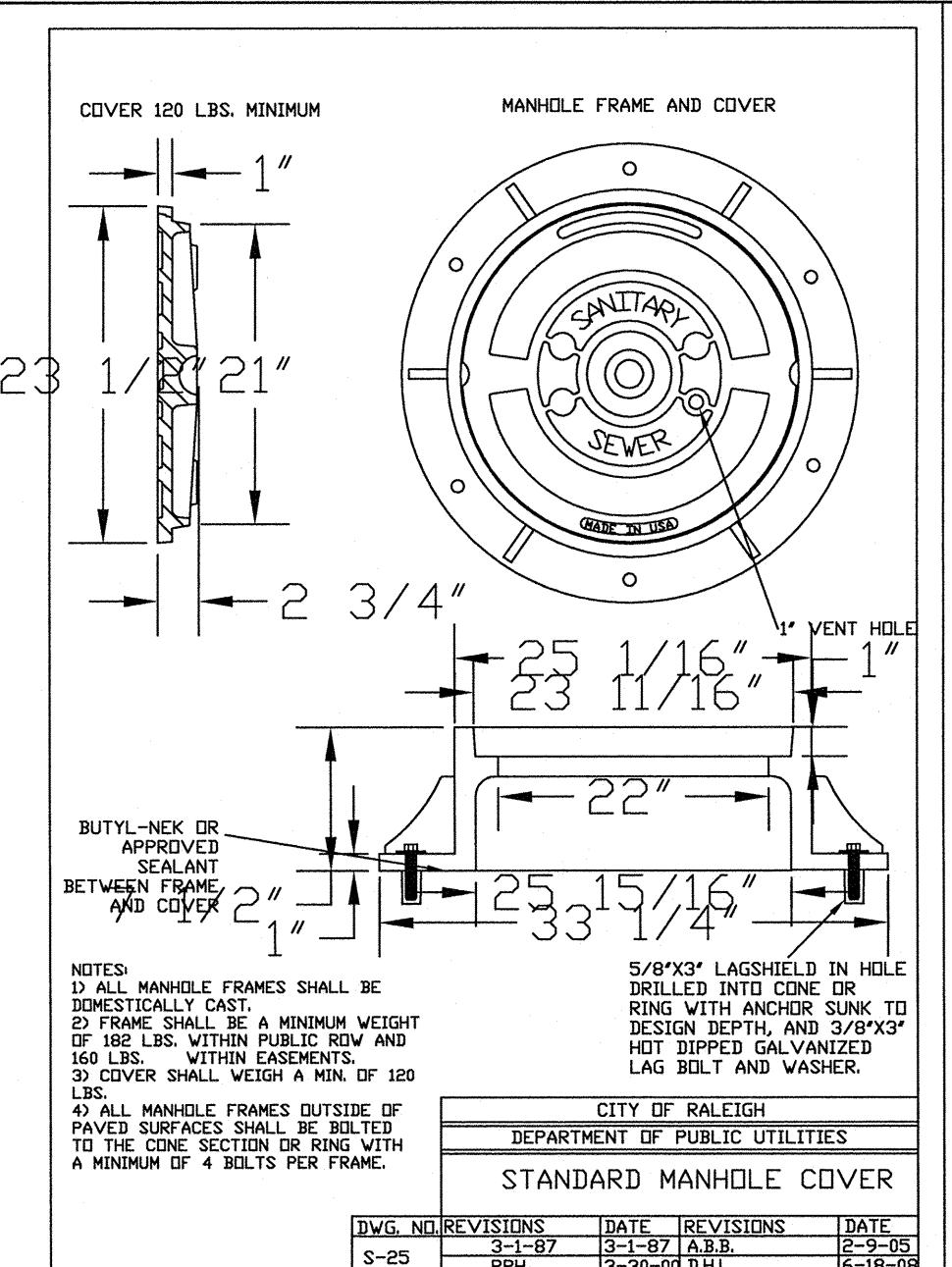
NOTES:
 1. TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
 2. NO ROCKS OR BOULERS 4\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-4	REV	9-3-99		
		8-20-08		



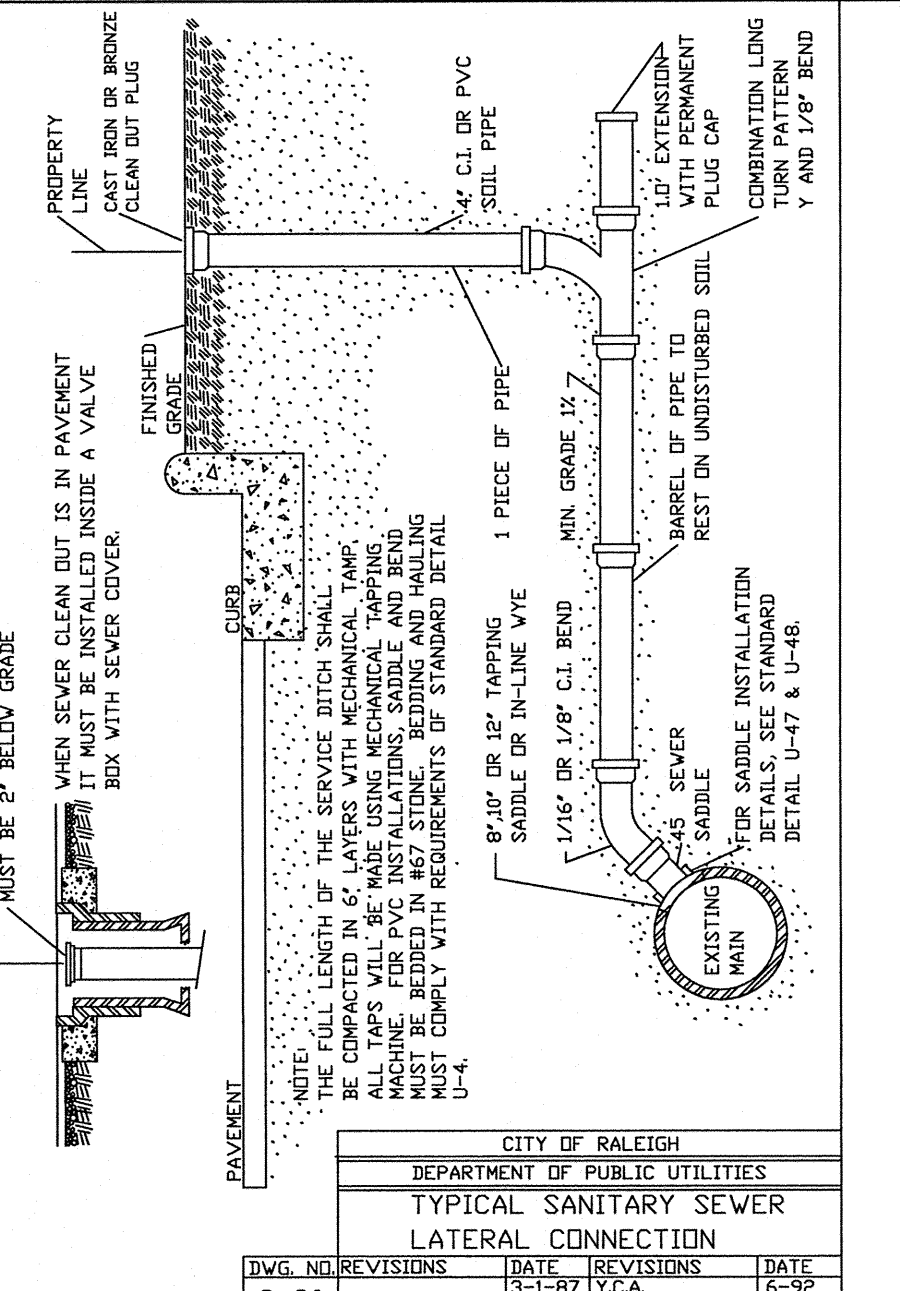
NOTES:
 1. FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
 2. NO ROCKS OR BOULERS 4\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-5	REV	8-1-87		
		7-2-88		
		9-3-99		
		8-20-08		



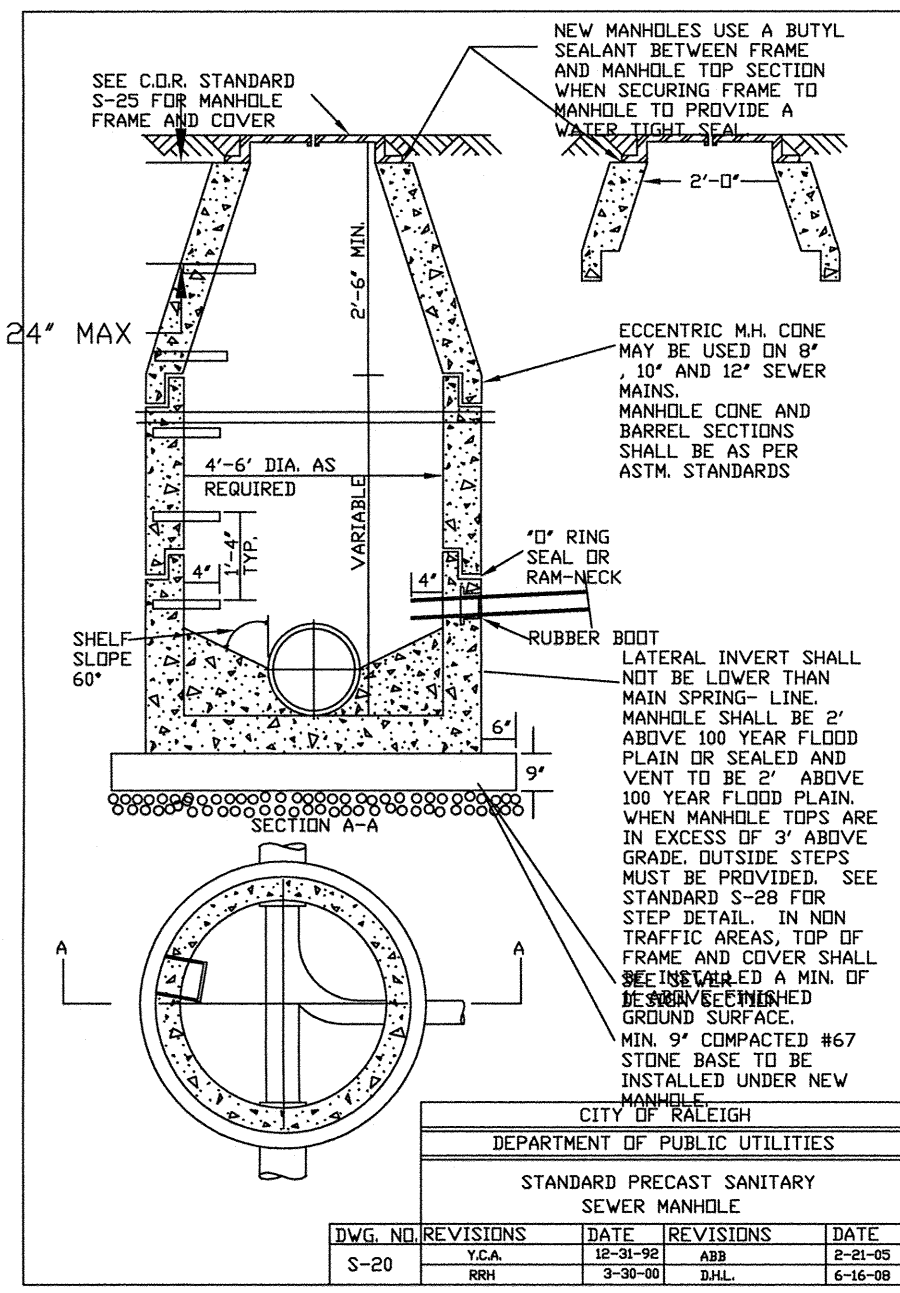
NOTES:
 1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
 2. FRAME SHALL BE MINIMUM WEIGHT OF 120 LBS. WITHIN PUBLIC ROW AND 80 LBS. WITHIN EASEMENTS.
 3. COVER SHALL WEIGH A MIN. OF 120 LBS.
 4. ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BUILT TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE COVER				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-25	REV	8-1-87		
		8-1-87		
		8-20-08		



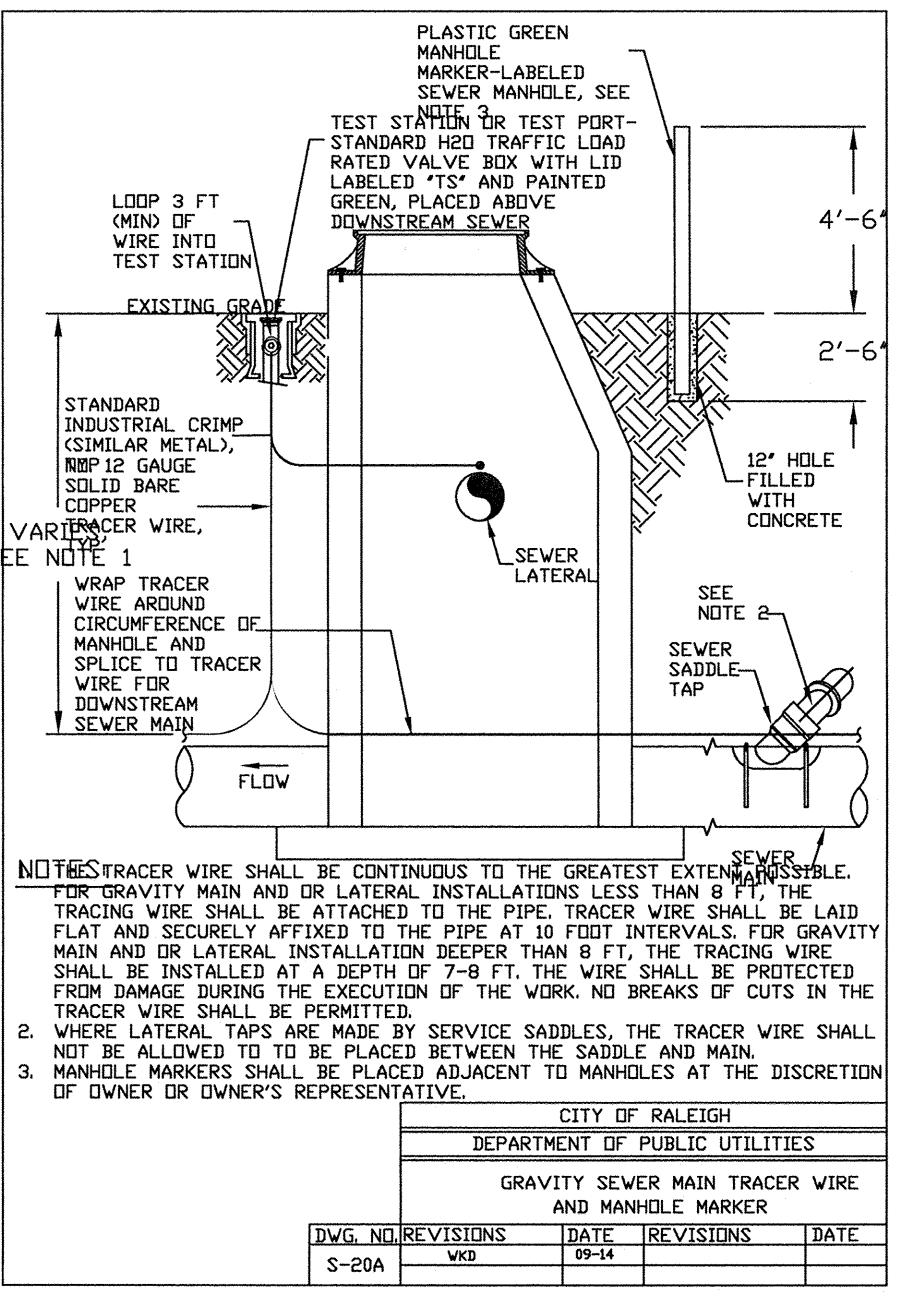
NOTES:
 1. ALL LENGTH OF THE SERVICE LATERAL SHALL BE COMPACTED IN 6\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
TYPICAL SANITARY SEWER LATERAL CONNECTION				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30	Y.C.A.	8-2-91		



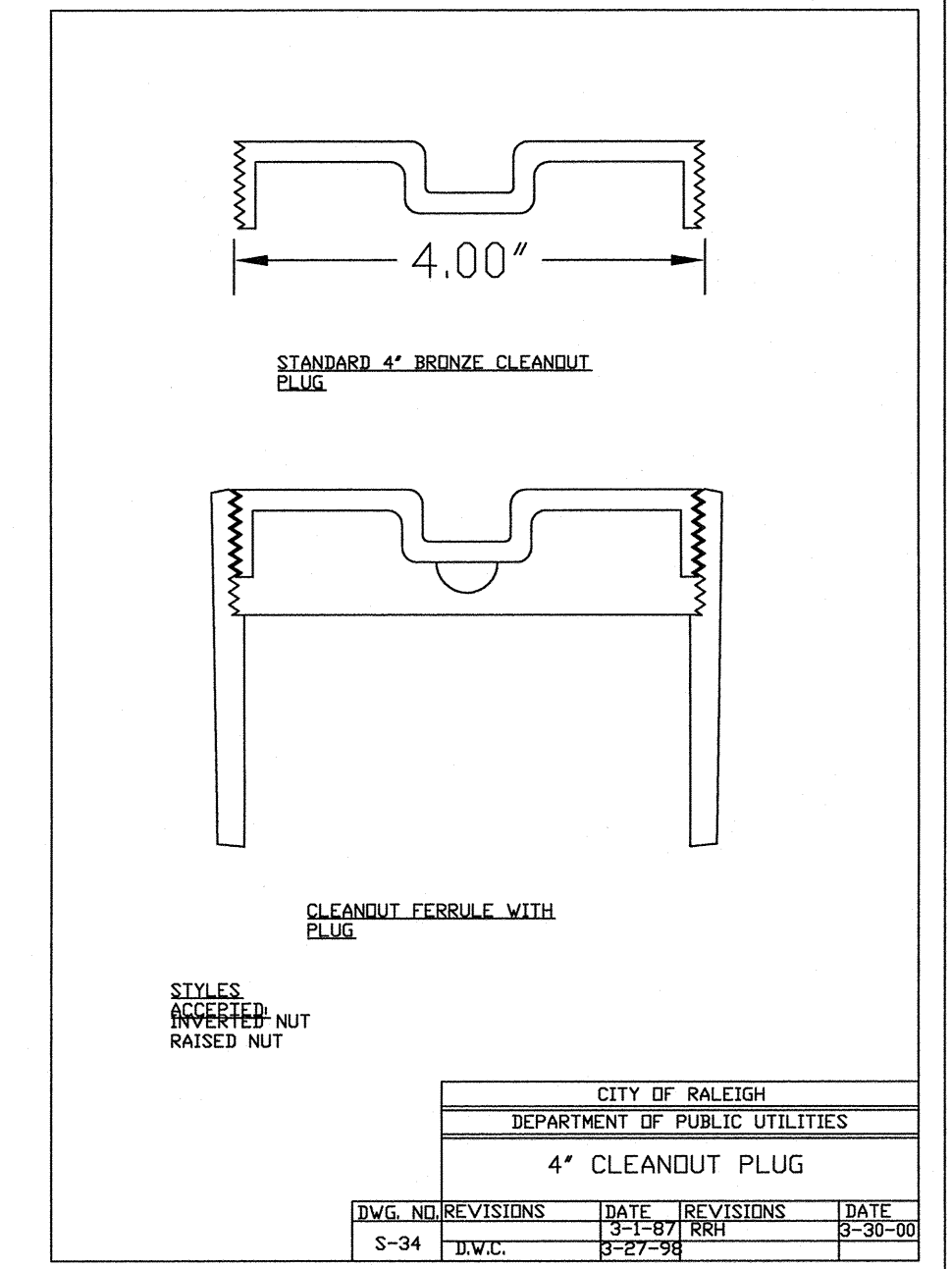
NOTES:
 1. THE LATERAL INVERT SHALL NOT BE LOWER THAN MAIN SPRING-LINE.
 2. MANHOLE SHALL BE 2\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD PRECAST SANITARY SEWER MANHOLE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20	REV	8-1-87		
		8-1-87		
		8-20-08		



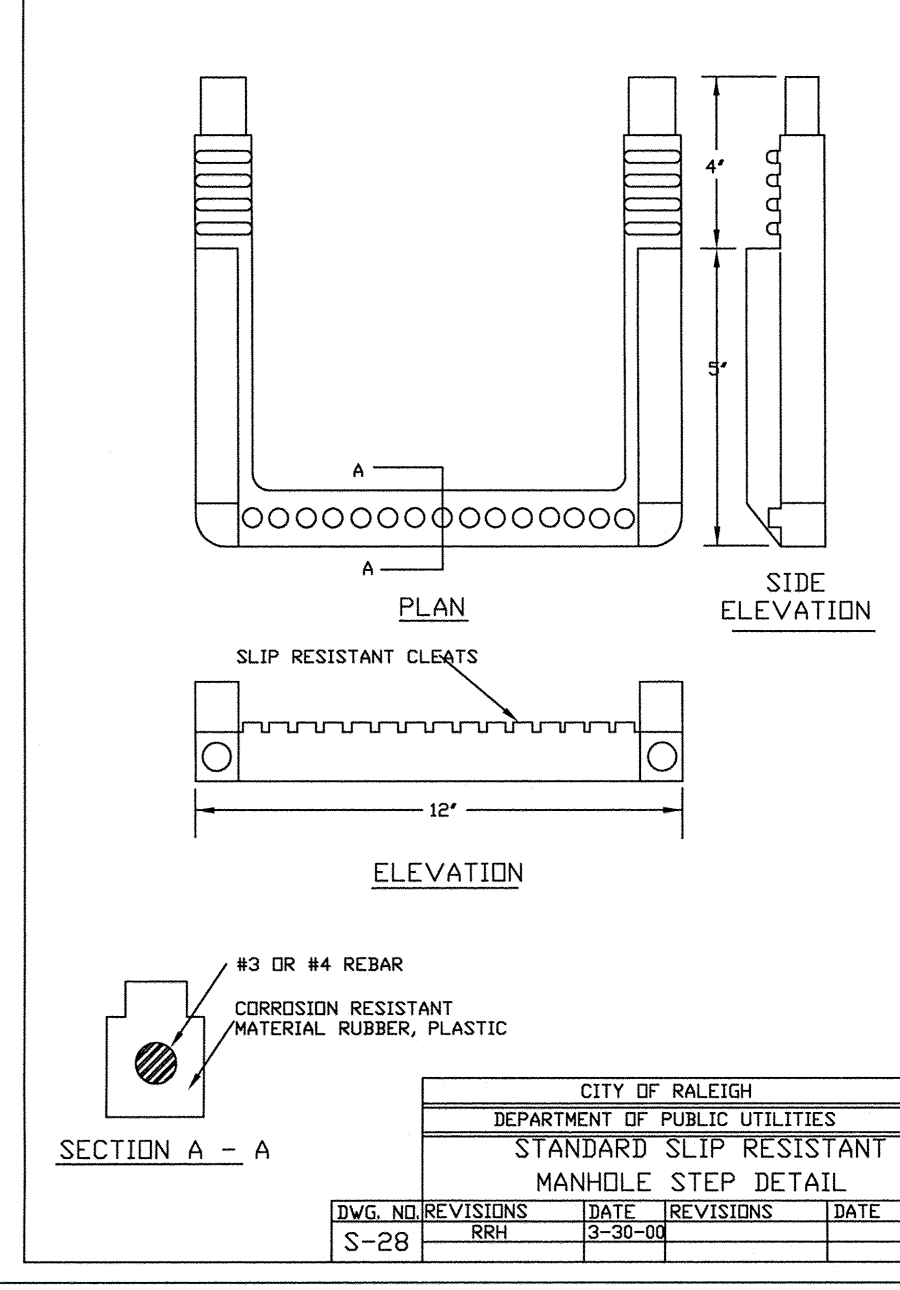
NOTES:
 1. TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE.
 2. FOR GRAVITY MAIN AND/OR LATERAL INSTALLATIONS LESS THAN 8\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
GRAVITY SEWER MAIN TRACER WIRE AND MANHOLE MARKER				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20A	REV	8-1-87		
		8-20-08		



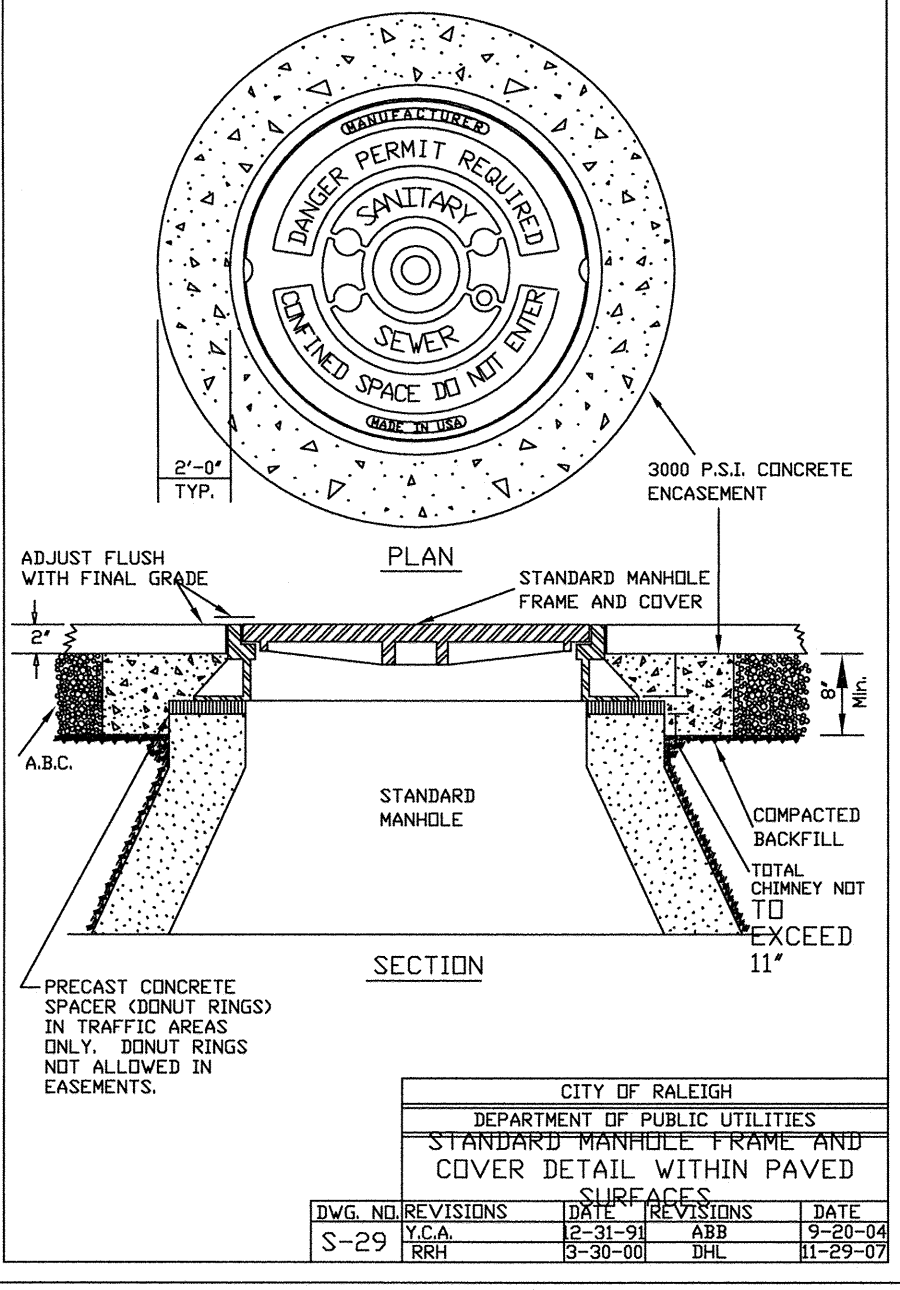
NOTES:
 1. ALL CLEANOUTS SHALL BE INSTALLED WITH A 4\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
4\"/>				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-24	D.W.L.	8-27-98		



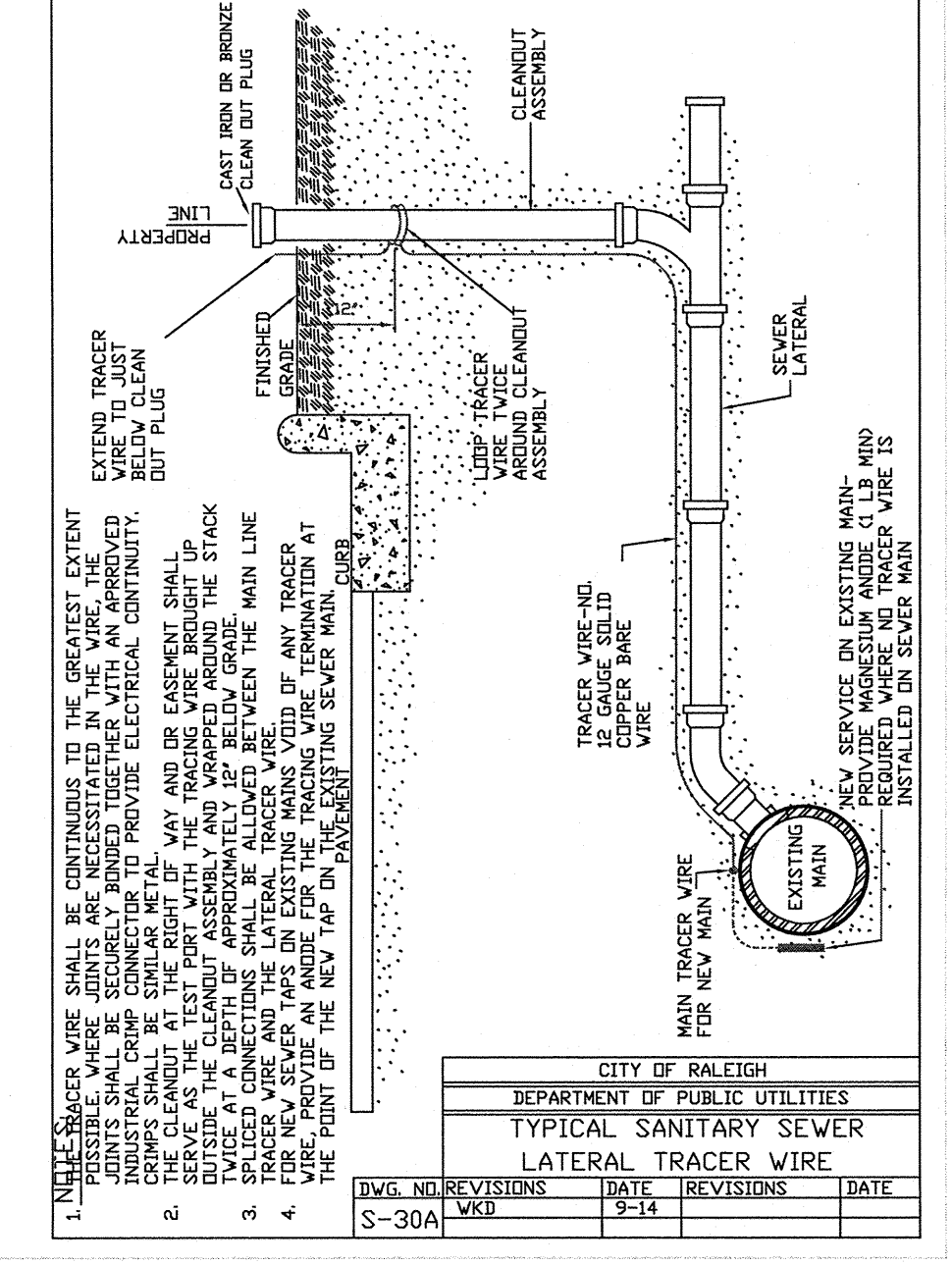
NOTES:
 1. ALL STEPS SHALL BE CONFORM TO THE GREATEST EXTENT POSSIBLE.
 2. ALL STEPS SHALL BE SLIP RESISTANT AND SHALL BE INSTALLED WITH A MINIMUM OF 4\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD SLIP RESISTANT MANHOLE STEP DETAIL				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-28	REV	8-2-04		



NOTES:
 1. ALL MANHOLE FRAMES SHALL BE DOMESTICALLY CAST.
 2. FRAME SHALL BE MINIMUM WEIGHT OF 120 LBS. WITHIN PUBLIC ROW AND 80 LBS. WITHIN EASEMENTS.
 3. COVER SHALL WEIGH A MIN. OF 120 LBS.
 4. ALL MANHOLE FRAMES OUTSIDE OF PAVED SURFACES SHALL BE BUILT TO THE CONE SECTION OR RING WITH A MINIMUM OF 4 BOLTS PER FRAME.

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
STANDARD MANHOLE FRAME AND COVER DETAIL WITHIN PAVED SURFACES				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-29	REV	8-2-04		
		8-20-08		

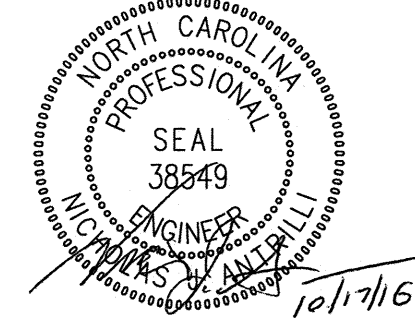


NOTES:
 1. ALL TRACER WIRE SHALL BE CONTINUOUS TO THE GREATEST EXTENT POSSIBLE.
 2. FOR GRAVITY MAIN AND/OR LATERAL INSTALLATIONS LESS THAN 8\"/>

CITY OF RALEIGH				
DEPARTMENT OF PUBLIC UTILITIES				
TYPICAL SANITARY SEWER LATERAL TRACER WIRE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-30A	REV	8-2-91		

CITY OF RALEIGH	
ALL CONSTRUCTION MUST BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS.	
TRANSPORTATION SERVICES	N/A
PUBLIC UTILITIES	K.A. JAW 2/20/17
STORMWATER	N/A
PLANNING	N/A
FIRE	N/A
URBAN FORESTRY	N/A

TOWN CERTIFICATION: THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.
 BY: *[Signature]* DATE: 7-2-2017
 DEVELOPMENT SERVICES ENGINEER
 THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
 BY: *[Signature]* DATE: 3.6.17
 ADMINISTRATOR



K:\08\08-0250\080251.9-Knightdale Station - REV\CAD\MASTER-CONSTRUCTION DRAWINGS\DETAILS.dwg - Tuesday, September 20, 2016 10:31:26 AM - STRICKLAND, GREG

No.	Revision	Date	By	Designer	Scale
1	REVISION PER TOK COMMENTS	03/20/16	CAS	WR	As Noted
2	REVISION PER TOK COMMENTS	05/27/16	GAS	Date	
3	REVISION PER TOK COMMENTS	06/30/2016	SY	LEG/GAS	02/02/16
				Checked by	Job No.
				NJA	2090251.90

KNIGHTDALE STATION
 R-6 (SECTIONS A, B & C)
 Knightdale Wake County North Carolina

SEWER UTILITY DETAILS

WithersRavenel
 Engineers | Planners | Surveyors
 115 MacKenan Drive | Cary, NC 27511 | 919.469.3340 | license #: C-0832 | www.withersravenel.com

Sheet No. **9.5**