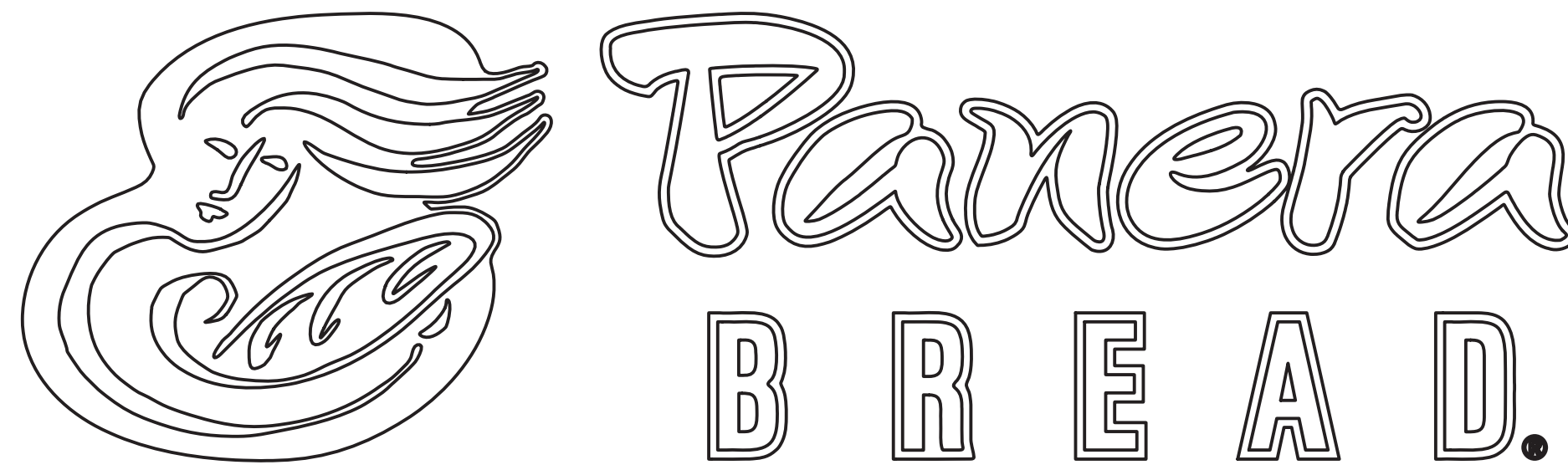
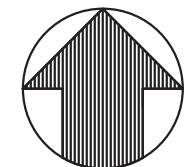




PROJECT SITE DOES NOT LIE WITHIN A 100 YEAR FLOOD HAZARD AREA AND IS LOCATED IN ZONE X AS SHOWN ON THE ABOVE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP NUMBER 3720174400J WITH AN EFFECTIVE DATE OF 05/02/2006.

FLOOD INSURANCE RATE MAP  
(N.T.S.)



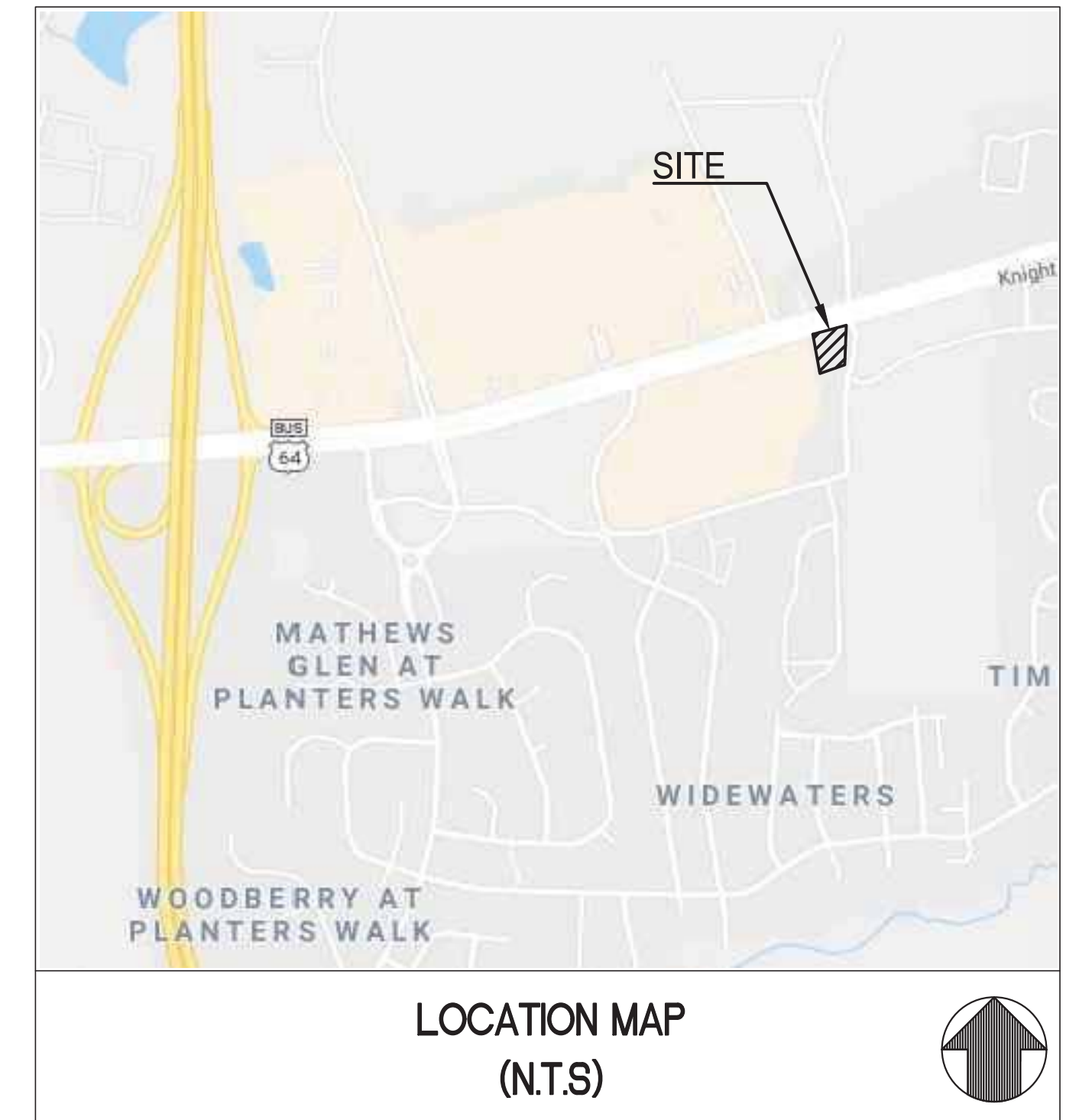
6800 KNIGHTDALE BLVD.  
KNIGHTDALE, NC 27545  
WAKE COUNTY

ZONED: HBCD (HIGHWAY BUSINESS CONDITIONAL DISTRICT)

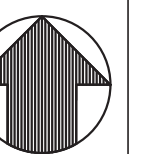
TOK PROJECT # ZMA-3-19

PROJECT OVERVIEW

PANERA BREAD IS PROPOSING A 4,200 SF CAFE' AND BAKERY WITH INTERIOR AND PATIO SEATING, DRIVE-THRU SERVICE WINDOW AND EXTENSIVE LANDSCAPING ON AN EXISTING 2.35 ACRE LOT IN THE KNIGHTDALE COMMONS SHOPPING CENTER. SITE AMENITIES ALSO INCLUDE A PUBLIC ART INSTALLATION, PEDESTRIAN ACCESS ROUTES TO THE NORTH AND SOUTH AS WELL AS BICYCLE AND AUTOMOBILE PARKING AREAS. SITE IMPROVEMENTS ALSO INCLUDE A BUFFER SCREEN WALL, STORM WATER MANAGEMENT FACILITY, AS WELL AS WATER, WASTEWATER AND DRY UTILITY CONNECTIONS.



LOCATION MAP  
(N.T.S.)



SHEET INDEX

- C-0.0 COVER SHEET
- C-1.0 GENERAL NOTES
- C-2.0 DEMOLITION PLAN
- C-3.0 SITE PLAN
- C-3.1 SIGNAGE PLAN
- C-4.0 GRADING PLAN
- C-4.1 STORM SEWER PLAN
- C-4.2 POND PLAN
- C-4.3 POND SECTIONS
- C-4.4 STORM SEWER PROFILES
- C-4.5 STORM SEWER PROFILES
- C-4.6 PRE DEVELOP. DRAIN AREA MAP
- C-4.7 POST DEVELP. DRAIN AREA MAP
- C-5.0 UTILITY PLAN
- C-5.1 SANITARY SEWER LINE PROFILE
- C-6.0 EROSION & SEDIMENT CONTROL PLAN PHASE 1
- C-6.1 EROSION & SEDIMENT CONTROL PLAN PHASE 2
- C-6.2 EROSION & SEDIMENT CONTROL PLAN PHASE 3
- C-6.3 EROSION CONTROL DETAILS
- C-6.4 EROSION CONTROL DETAILS
- C-6.5 EROSION CONTROL DETAILS
- C-6.6 EROSION CONTROL DETAILS
- C-6.7 EROSION CONTROL DETAILS
- C-6.8 NCG01 - GROUND STABILIZATION & MATERIALS HANDLING
- C-6.9 NCG01 - SELF INSPECTION
- C-7.0 CONSTRUCTION DETAILS
- C-7.1 CONSTRUCTION DETAILS
- C-7.2 CONSTRUCTION DETAILS
- C-7.3 CONSTRUCTION DETAILS
- C-7.4 CONSTRUCTION DETAILS
- L-1.0 LANDSCAPE PLAN
- L-1.1 LANDSCAPE DETAILS
- I-1.0 IRRIGATION PLAN
- I-1.1 IRRIGATION DETAILS

- IR-1.2 IRRIGATION DETAILS
  - EL-1 PHOTOMETRIC PLAN
  - EL-2 PHOTOMETRIC DETAILS SURVEY
- 38 SHEETS TOTAL

CITY OF RALEIGH PUBLIC IMPROVEMENT QUANTITIES TABLE	
SEWER MANHOLE	1
SEWER CLEAN OUT	1
4" PVC SEWER PIPE	±38 LF
WATER METER	1
IRRIGATION METER	1
2" X 1-1/2" REDUCER	1
1-1/2" X 1" REDUCER	1
CURB STOP	2
1-1/2" 90°	1
2" X 1-1/2" TEE	1
2" PE TUBING	±86 LF
1.5" PE TUBING	± 4 LF
TREE PROTECTION FENCE	472 LF

TOWN OF KNIGHTDALE WATER ALLOCATION COMPLIANCE	
POINTS REQUIRED	50
PROPOSED POINTS	51
BASE POINTS	41
PATIO	1
XERISCAPING	3
PUBLIC ART	4
ENHANCED ROADSIDE LANDSCAPE	2
TOTAL PROPOSED POINTS	51

OWNER

WIDEWATERS KNIGHTDALE COMPANY, LLC  
CONTACT: CHRIS KUTLICK  
1520 N. COMMUNITY HOUSE RD., SUITE 175  
CHARLOTTE, NC 28227  
CKUTLICK@WIDEWATERS.COM  
TEL: (704) 280-1249

DEVELOPER

PANERA LLC  
CONTACT: PAUL WILSON  
3630 SOUTH GEYER ROAD, SUITE 100  
SUNSET HILLS MO, 63127  
PAUL.WILSON@PANERABREAD.COM  
TEL: (314) 984-3061

ENGINEER



CONTACT: BILL LOTZ  
1230 PEACHTREE STREET NW, STE. 2900  
ATLANTA, GA 30309  
WLOTZ@GREENBERGFARROW.COM  
TEL: (770) 881-1384

24-HOUR CONTACT  
PAUL WILSON (312) 848-7076

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 PLAT(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.

**ATTENTION CONTRACTORS**  
The Construction Contractor responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for contacting the **Public Utilities Department** at (919) 996-4540 at least **twenty four hours** prior to beginning any of their 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 **Jobsite**, 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**.

SITE PERMITTING APPROVAL

WATER AND SEWER PERMITS (IF APPLICABLE)

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 # \_\_\_\_\_

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 # \_\_\_\_\_

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION TO ITS PUBLIC SEWER SYSTEM AND EXTENSION OF THE PRIVATE SEWER COLLECTION SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTIONS 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 # \_\_\_\_\_

CITY OF RALEIGH -- PLANS AUTHORIZED FOR CONSTRUCTION

ELECTRONIC APPROVAL: THIS APPROVAL IS BEING ISSUED ELECTRONICALLY. THIS APPROVAL IS VALID UPON THE SIGNATURE OF A CITY OF RALEIGH REVIEW OFFICER BELOW. THE CITY WILL RETAIN A COPY OF THE APPROVED PLANS. ANY WORK AUTHORIZED BY THIS APPROVAL MUST PROCEED IN ACCORDANCE WITH THE PLANS KEPT ON FILE WITH THE CITY. THIS ELECTRONIC APPROVAL MAY NOT BE EDITED ONCE ISSUED. ANY MODIFICATION TO THIS APPROVAL ONCE ISSUED WILL INVALIDATE THIS APPROVAL.

CITY OF RALEIGH DEVELOPMENT APPROVAL  
CITY OF RALEIGH WATER REVIEW OFFICER

Cydney S. Terry  
RALEIGH WATER REVIEW OFFICER

CONTACTS

PLANNING AND ZONING  
TOWN OF KNIGHTDALE  
DEVELOPMENT SERVICES  
950 STEEPLE SQUARE CT.  
KNIGHTDALE, NC 27545  
CONTACT: KEVIN LEWIS  
PHONE: (919) 217-2243  
EMAIL: KEVIN.LEWIS@KNIGHTDALENC.GOV

STORMWATER  
STORMWATER PROGRAM MANAGER  
FIRE DEPARTMENT  
CONTACT: IKE ARCHER  
PHONE: (919) 217-2255  
EMAIL: IKE.ARCHER@KNIGHTDALENC.GOV

WATER AND SEWER  
CITY OF RALEIGH  
DEVELOPMENT REVIEW  
PUBLIC UTILITIES DEPARTMENT  
ONE EXCHANGE PLAZA, SUITE 620  
RALEIGH, NC 27601  
CONTACT: CYDNEY TERRY  
PHONE: (919) 996-3546  
EMAIL: CYDNEY.TERRY@RALEIGHNC.GOV

BUILDING  
TOWN OF KNIGHTDALE  
INSPECTION SERVICES  
950 STEEPLE SQUARE CT.  
KNIGHTDALE, NC 27545  
CONTACT: TRACY PADGETT  
PHONE: (919) 217-2244  
EMAIL: TRACY.PADGETT@KNIGHTDALENC.GOV

FIRE PREVENTION  
TOWN OF KNIGHTDALE  
FIRE DEPARTMENT  
967 STEEPLE SQUARE CT.  
KNIGHTDALE, NC 27545  
CONTACT: CANDLER THORNTON  
PHONE: (919) 217-2292  
EMAIL: FIREINSPECTIONS@KNIGHTDALENC.GOV

ELECTRIC  
DUKE ENERGY  
1825 OLD 264 HWY  
ZEBULON, NC 27597  
CONTACT: KELLY P. ALPHIN  
EMAIL: Kelly.Alphin@duke-energy.com  
PHONE: (919) 210-2495

SURVEYOR  
BECHTLER GREENFIELD SURVEYING, LLC  
1230 PEACHTREE ST. NW, SUITE 2900  
ATLANTA, GA 30309  
PHONE: (770) 422-8181  
SURVEYOR'S PROJECT NO. 19-124-0

GAS  
PSNC  
CONTACT: MATT KOEHL  
3516 SPRING FOREST RD.  
RALEIGH, NC 27616  
PHONE: (919) 819-0485  
EMAIL: MKOEHL@SCAN.A

TELEPHONE  
AT&T  
PHONE: (800) 620-6900

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, KERI WILLIAMS, 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 SHEETS(S) OF THESE DRAWINGS.

SEAL: BY: KERI WILLIAMS, PE

DATE: \_\_\_\_\_



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: Samuel A. MacDonnell, TOWN ENGINEER DATE: \_\_\_\_\_

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

BY: Donna T. Gooding, ADMINISTRATOR DATE: 10.31.2022



990 Steeple Square Court  
Knightdale, NC 27549  
KnightdaleNC.gov

**ORDINANCE #19-07-17-001  
AN ORDINANCE TO AMEND THE UNIFIED DEVELOPMENT ORDINANCE  
OF THE TOWN OF KNIGHTDALE  
WHICH INCLUDES THE ZONING DISTRICT MAP**

**ZMA-3-19 Panera Bread**

**WHEREAS**, the Town of Knightdale has received a petition to amend the zoning of the property from Highway Business (HB) to Highway Business Conditional District (HBCD); and

**WHEREAS**, the Town Council finds the proposed zoning map amendment is consistent with the 2035 KnightdaleNext Comprehensive Plan. It is consistent with the overall Growth Framework Map, Growth & Conservation Map, and three Guiding Principles of the plan including compact development patterns, infill development and redevelopment. The Town Council finds that the proposed zoning map amendment is reasonable and in the public interest as it aids in developing a vibrant, sustainable, and safe community design in which people desire to live, work and visit;

**NOW, THEREFORE, BE IT ORDAINED** by the Town Council of the Town of Knightdale, North Carolina:

**SECTION 1:** That the Unified Development Ordinance of the Town of Knightdale Code, which includes the Zoning District Map, be amended to rezone approximately 2.35 ± acres located within the Town of Knightdale's Corporate Limits located south of Knightdale Blvd., east of Widewaters Parkway, and west of ParkStone Towne Blvd., and identified as Wake County PIN 1744-75-6480 from Highway Business (HB) to Highway Business Conditional District (HBCD) as indicated.

**SECTION 2:** That the additional conditions contained within the application identified as ZMA-3-19 and listed below apply as additional zoning conditions to the parcels of land identified as PIN 1744-75-6480:

- The required 20 foot Type B Buffer yard required between Knightdale Boulevard and the drive-thru service window per UDO Section 3.3.7 is reduced by 10 feet. The applicant will also provide a low, decorative masonry screen wall along the frontage.
- The applicant is not required to provide a Mixed Use Building Type, which is typical requirement per UDO Section 3.3.7 for Drive-Thru Retail/Restaurants & Drive-Thru Services in the Highway Business and Neighborhood Mixed Use zoning districts. The approved elevations contain a mixture of materials including stone and brick, a significant amount of windows and awnings on each side, and an overall high level of architectural articulation.
- The applicant will provide a masonry screen wall and a densely landscaped area between Knightdale Blvd. and the dumpster enclosure to ensure the dumpster is adequately screened from off-site view per UDO Section 4.5.
- The submitted site plan will serve as the site-specific development plan. However, the applicant must submit Construction Drawings to the Town for approval that are in conformance with the approved conditions of the HBCD zoning district, master plan comments, Unified Development Ordinance, and comments from the May 30, 2019 DRC meeting.

**SECTION 3:** That all laws and clauses of law in conflict herewith are hereby repealed to the extent of said conflict.

**SECTION 4:** That if this ordinance or application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions of this ordinance which can be given separate effect and to the end the provisions of this ordinance are declared to be severable.

**SECTION 5:** That this ordinance has been adopted following a duly advertised public hearing of the Town Council and following review and recommendation by the Land Use Review Board.

**SECTION 6:** That this ordinance shall be enforced as provided in G.S. 160A-175 or as provided for in the Knightdale Town Code

**SECTION 7:** That this ordinance shall become effective upon its adoption by Town Council.

Adopted this 17<sup>th</sup> day of July, 2019

James A. Roberson, Mayor

ATTEST:  
  
Heather M. Smith, Town Clerk

APPROVED AS TO FORM:

Roger Knight, Town Attorney

**SITE NOTES:**

- CONTRACTOR MUST SECURE ALL NECESSARY PERMITS PRIOR TO STARTING WORK.
- IF THE CONTRACTOR, IN THE COURSE OF THE WORK, FINDS ANY DISCREPANCIES BETWEEN THE PLANS AND THE PHYSICAL CONDITIONS OF THE LOCALITY, OR ANY ERRORS OR OMISSIONS IN THE PLANS OR IN THE LAYOUT AS GIVEN BY THE ENGINEER, IT SHALL BE HIS DUTY TO IMMEDIATELY INFORM THE ENGINEER, IN WRITING, AND THE ENGINEER WILL PROMPTLY VERIFY THE SAME. ANY WORK DONE AFTER SUCH A DISCOVERY, UNTIL AUTHORIZED, WILL BE AT THE CONTRACTOR'S RISK.
- CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL SETBACKS, EASEMENTS, AND DIMENSIONS SHOWN HEREON BEFORE BEGINNING CONSTRUCTION.
- ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE TO THE STATE AND LOCAL GOVERNMENT AGENCY LATEST CONSTRUCTION SPECIFICATIONS AND DETAILS.
- ALL HANDICAP SITE FEATURES SHALL BE CONSTRUCTED TO MEET ALL FEDERAL, STATE AND LOCAL CODE.
- NOTIFY THE CITY INSPECTOR TWENTY-FOUR (24) HOURS BEFORE BEGINNING EACH PHASE OF CONSTRUCTION.
- THE CONTRACTOR SHALL CAREFULLY PRESERVE BENCHMARKS, REFERENCE POINTS, AND STAKES.
- ARCHITECTURAL PLANS ARE TO BE USED FOR BUILDING STAKE OUT.
- ALL DIMENSIONS ARE FROM FACE OF BUILDING, CURB, AND WALL UNLESS OTHERWISE SPECIFIED ON PLANS.
- CONTRACTOR SHALL MAINTAIN THE SITE IN A MANNER SO THAT WORKMEN AND PUBLIC SHALL BE PROTECTED FROM INJURY, AND ADJOINING PROPERTY PROTECTED FROM DAMAGE.
- CONTRACTOR IS RESPONSIBLE FOR DAMAGE TO ANY EXISTING ITEM AND/OR MATERIAL INSIDE OR OUTSIDE CONTRACT LIMITS DUE TO CONSTRUCTION OPERATION.]
- ALL STREET SURFACES, DRIVEWAYS, CULVERTS, CURB AND GUTTERS, ROADSIDE DRAINAGE DITCHES AND OTHER STRUCTURES THAT ARE DISTURBED OR DAMAGED IN ANY MANNER AS A RESULT OF CONSTRUCTION SHALL BE REPLACED OR REPAIRED IN ACCORDANCE WITH THE SPECIFICATIONS.
- ALL ROAD WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE STATE AND LOCAL GOVERNMENT AGENCY SPECIFICATIONS.
- STANDARD/HEAVY DUTY PAVEMENT AND CONCRETE SECTIONS SHALL FOLLOW THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT PREPARED BY GEOTECHNOLOGIES, INC, DATED APRIL 17, 2018.
- ALL CURB RADII SHALL BE 5' UNLESS OTHERWISE NOTED ON THE PLANS.
- CONTRACTOR SHALL REFER TO APPROVED ARCHITECTURAL SITE SIGNAGE PLANS FOR DETAILS AND LOCATIONS.
- CONTRACTOR SHALL REFER TO APPROVED PHOTOMETRIC PLANS FOR LOCATIONS OF LIGHT POLES.

**GENERAL NOTES:**

- THE CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY AND WAYS, MEANS AND METHODS OF CONSTRUCTION.
- THE CONTRACTOR SHALL COMPLY WITH APPLICABLE STATE, FEDERAL, AND LOCAL CODES AND OBTAIN ALL NECESSARY LICENSES AND PERMITS.
- THE GENERAL SPECIFICATION WHICH APPLY TO THE CONSTRUCTION WORK AS SHOWN ON THE ENGINEERING PLANS, ARE CONTAINED IN STANDARD SPECIFICATIONS, CONSTRUCTION DETAILS, AND/OR THE CITY'S ENGINEERING DEPARTMENT.
- GENERAL GRADING  
THE GRADING CONTRACTOR SHALL:  
A. MAINTAIN PROPER SITE DRAINAGE AT ALL TIMES DURING THE COURSE OF CONSTRUCTION, AND PREVENT STORM WATER FROM RUNNING INTO OR STANDING IN EXCAVATED AREAS.  
B. SPREAD AND COMPACT UNIFORMLY TO THE DEGREE SPECIFIED ALL EXCESS TRENCH SPOIL AFTER COMPLETION OF THE UNDERGROUND IMPROVEMENTS (EARTHWORK CONTRACTOR SHALL MAKE APPROPRIATE ADJUSTMENTS IN ROUGH GRADING TO ACCOMMODATE TRENCH SPOIL).  
C. PROVIDE WATER TO ADD TO DRY MATERIAL IN ORDER TO ADJUST THE MOISTURE CONTENT FOR THE PURPOSE OF ACHIEVING THE SPECIFIED COMPACTION.  
D. BACKFILL THE CURB AND GUTTER AFTER ITS CONSTRUCTION AND PRIOR TO THE PLACEMENT OF BASE COURSE MATERIAL.  
E. UNSUITABLE MATERIAL SHALL BE CONSIDERED AS MATERIAL WHICH IS NOT SUITABLE FOR THE SUPPORT OF PAVEMENT AND BUILDING CONSTRUCTION, AND IS ENCOUNTERED BELOW NORMAL TOPSOIL DEPTHS AND THE PROPOSED SUB-GRADE ELEVATION. THE DECISION TO REMOVE SAID MATERIAL, AND TO WHAT EXTENT, SHALL BE MADE BY A SOILS ENGINEER WITH THE CONCURRENCE OF THE OWNER.
- GENERAL PAVING  
THE PAVING CONTRACTOR SHALL:  
A. REPAIR ANY BASE COURSE AND BINDER COURSE FAILURES PRIOR TO THE INSTALLATION OF THE FINAL BITUMINOUS CONCRETE SURFACE COURSE.  
B. SWEEP CLEAN THE BINDER COURSE PRIOR TO THE INSTALLATION OF THE FINAL BITUMINOUS CONCRETE SURFACE COURSE. EXCESSIVE CLEANING OF THE BINDER COURSE THAT MAY BE REQUIRED, AND IS NOT THE FAULT OF THE PAVING CONTRACTOR, SHALL BE PAID FOR ON A TIME AND MATERIAL BASIS BY PRIOR AGREEMENT WITH THE GENERAL CONTRACTOR.  
6. INCIDENTAL TO CONSTRUCTION  
THE CONTRACTOR SHALL:  
A. ADHERE TO THE CRITERIA FOR THE SEPARATION BETWEEN WATER MAINS AND THE STORM AND SANITARY SEWER LINES AS DESCRIBED: WHEREVER A SANITARY/COMBINED SEWER CROSSES UNDER A WATER MAIN, THE MINIMUM VERTICAL DISTANCE FROM THE TOP OF THE SEWER TO THE BOTTOM OF THE WATER MAIN SHALL BE 18 INCHES. FURTHERMORE, A MINIMUM HORIZONTAL DISTANCE OF 10 FEET BETWEEN SANITARY/COMBINED SEWERS AND WATER MAIN SHALL BE MAINTAINED UNLESS: THE SEWER IS LAID IN A SEPARATE TRENCH, KEEPING A MINIMUM 18 INCH VERTICAL SEPARATION; OR THE SEWER IS LAID IN THE SAME TRENCH WITH THE WATER MAIN LOCATED AT THE OPPOSITE SIDE ON A BENCH OF UNDISTURBED EARTH, KEEPING A MINIMUM 18 INCH VERTICAL SEPARATION. IF EITHER THE VERTICAL OR HORIZONTAL DISTANCES DESCRIBED ABOVE CANNOT BE MAINTAINED, OR THE SEWER CROSSES ABOVE THE WATER MAIN, THE SEWER SHALL BE CONSTRUCTED TO WATER MAIN STANDARDS.  
B. BE RESPONSIBLE TO PLACE GRADE AND COORDINATE WITH OTHER CONTRACTORS, ALL UNDERGROUND UTILITY STRUCTURE FRAMES SUCH AS MANHOLES, CATCH BASINS, AND INLETS.  
C. BE AWARE OF POTENTIAL CONFLICTS WITH EXISTING UTILITIES. THE CONTRACTOR SHALL EXCAVATE AROUND THE EXISTING UTILITIES TO DETERMINE THEIR EXACT LOCATIONS AND ELEVATIONS PRIOR TO THE CONSTRUCTION OF THE PROPOSED UTILITY IMPROVEMENTS.  
D. PROVIDED Poured CONCRETE FILLETS CONFORMING TO THE SHAPE OF THE PIPE IN ALL SANITARY AND STORM MANHOLES, AND INLETS.  
E. BE RESPONSIBLE FOR MAINTAINING THE TOP OF ANY UTILITY TRENCH AT LEAST TWO (2) FEET AWAY FROM ANY EXISTING OR PROPOSED CURB OR PAVEMENT, IN THOSE INSTANCES WHERE THE TRENCH RUNS PARALLEL TO THE SAID CURB OR PAVEMENT.  
F. BE RESPONSIBLE FOR THE DE-WATERING OF UTILITY TRENCHES DURING CONSTRUCTION AND PROVIDING THE NECESSARY TRENCH BRACING THAT MAY BE REQUIRED IN ORDER TO ADHERE TO CURRENT SAFETY STANDARDS.  
G. REMOVE SOFT MATERIAL THAT MAY BE ENCOUNTERED AT THE PIPE INVERT ELEVATION TO A DEPTH OF AT LEAST ONE (1) FOOT BELOW THE BOTTOM OF THE PIPE, AND BACKFILL WITH COMPACTED BEDDING MATERIAL.  
H. REMOVE ALL EXCESS MATERIAL OFF THE SITE OR TO AN APPROVED LOCATIONS DESIGNATED BY THE OWNER.  
I. COMPLETE ANY REQUIRING ADJUSTMENTS OR RECONSTRUCTION TO ANY EXISTING UTILITY STRUCTURES TO THE SATISFACTION OF THE UTILITY OWNER. ADJUSTMENTS AND/OR RECONSTRUCTION NOT CALLED FOR ON THE PLANS SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. NO MORE THAN A TOTAL OF EIGHT (8) INCHES OF ADJUSTING RINGS SHALL BE ALLOWED.
- TESTING AND FINAL ACCEPTANCE  
A. THE CONTRACTOR SHALL PROVIDE AS A MINIMUM, A FULLY LOADED SIX-WHEEL TRUCK FOR PROOF ROLLING THE PAVEMENT SUB-GRADE PRIOR TO THE PLACEMENT OF THE CURB AND GUTTER AND THE BASE MATERIAL.  
B. SPECIFIC COMPACTING TESTING MAY BE REQUIRED BY THE OWNER IN SELECTED FILL AREAS. THE CONTRACTOR SHALL BEAR THE COST OF COMPACTION TESTING AS WELL AS THE RESPONSIBILITY FOR THE NECESSARY CORRECTIONS.  
C. APPROVAL OF THE PAVEMENT SUB-GRADE BY THE OWNER'S GEOTECHNICAL ENGINEER SHALL BE REQUIRED PRIOR TO THE PLACEMENT OF THE PAVEMENT MATERIAL.  
D. SANITARY SEWER MAINS AND SERVICES SHALL BE TESTED FOR LEAKAGE AND DEFLECTION IN ACCORDANCE WITH THE REQUIREMENT OF THE LOCAL JURISDICTIONAL AUTHORITIES PRIOR TO THEIR FINAL ACCEPTANCE. ALLOWABLE TESTING LIMITS SHALL BE AS DESCRIBED PER THE LOCAL REQUIREMENTS. SERVICE STUBS MUST BE PROPERLY PLUGGED AND SEALED AND CLEARLY LOCATED AT THEIR TERMINATION POINTS PRIOR TO TESTING. ALL SEWER MAINS, SERVICE LINES, AND MANHOLES SHALL BE CLEAN AND FREE OF DEBRIS PRIOR TO THEIR FINAL ACCEPTANCE.  
E. WATER MAINS SHALL BE TESTED IN ACCORDANCE WITH THE LOCAL JURISDICTIONAL REQUIREMENTS PRIOR TO ITS FINAL ACCEPTANCE. THE PRESSURE AND LEAKAGE TESTS AND DISINFECTION OF THE MAINS SHALL BE DESCRIBED PER LOCAL REQUIREMENTS. ALL VALVE VAULTS SHALL BE CLEAN AND FREE OF DEBRIS AND WATER PRIOR TO THEIR FINAL ACCEPTANCE. THE INDIVIDUAL SERVICE BOXES SHALL BE VISIBLE AND CLEARLY LOCATED PRIOR TO THEIR FINAL ACCEPTANCE.  
F. SPECIAL CONDITIONS – ALTERNATE SOLUTIONS SHALL BE PRESENTED TO THE EPA WHEN EXTREME TOPOGRAPHICAL, GEOLOGICAL OR EXISTING STRUCTURAL CONDITIONS MAKE STRICT COMPLIANCE WITH THE ABOVE (D) OR (E) TECHNICALLY AND ECONOMICALLY IMPRACTICAL. ALTERNATE SOLUTIONS WILL BE APPROVED PROVIDED WATERTIGHT CONSTRUCTION STRUCTURALLY EQUIVALENT TO APPROVED WATER MAIN MATERIAL IS PROPOSED.  
G. WATER MAINS AND WATER SERVICE LINES SHALL BE PROTECTED AGAINST ENTRANCE OF HYDROCARBONS THROUGH DIFFUSION AND THROUGH ANY MATERIAL USED IN CONSTRUCTION OF THE LINE.  
8. MINIMUM REQUIREMENT FOR MANHOLE STRUCTURES  
A. THE FRAME LIP SHALL BE CLEANED OF ALL MUD AND DEBRIS TO PROVIDE WATERTIGHT SEAL BETWEEN THE FRAME AND THE MANHOLE COVER GASKET.  
B. MORTAR SHALL BE USED BETWEEN THE FRAME AND ADJUSTING RINGS AND BETWEEN ADJUSTING RINGS AND THE CONE SECTION IN ALL PAVED AREAS. E-Z STICK MAY BE USED IN LANDSCAPE AREAS.  
C. ALL STEPS MUST BE INSTALLED, ALIGNED AND CLEANED.  
D. ALL PINHOLES MUST BE MORTARED WITH BRUSH FINISH TO PROVIDE A WATERTIGHT SEAL.  
E. THE UPSTREAM AND DOWNSTREAM PIPE CAVITIES MUST BE FILLED WITH MORTAR AND SMOOTHED WITH A BRUSH FINISH.  
F. THE UPSTREAM AND DOWNSTREAM FLOW LINES (INVERTS) SHALL HAVE A SMOOTH TRANSITION FROM THE PIPE TO THE MANHOLE INVERT.  
G. ALL MANHOLE STRUCTURES SHALL BE FREE OF ANY TYPE OF INFILTRATION (WATER LEAKING INTO THE STRUCTURE).  
H. IF THERE IS AN INTERNAL DROP IN THE STRUCTURE THERE MUST BE A SMOOTH TRANSITION FROM THE PIPE TO THE INVERT (I.E. CHANNEL THE FLOW FROM THE PIPE TO THE MANHOLE INVERT).  
I. ALL MANHOLES SHALL BE CLEANED OF ANY ACCUMULATION OF SILT, DEBRIS, OR FOREIGN MATTER OF ANY KIND, AND SHALL BE FREE FROM SUCH ACCUMULATIONS AT THE TIME OF FINAL INSPECTION.  
9. THE CONTRACTOR SHALL PRESERVE BENCHMARKS, REFERENCE POINTS AND STAKES.  
10. IF THE CONTRACTOR IN THE COURSE OF WORK FINDS ANY DISCREPANCIES BETWEEN THE PLANS AND THE PHYSICAL CONDITIONS OF THE LOCALITY, OR ANY ERRORS OR OMISSIONS IN THE PLANS OR IN THE LAYOUT AS GIVEN BY THE ENGINEER, IT SHALL BE HIS DUTY TO IMMEDIATELY INFORM THE ENGINEER, IN WRITING AND THE ENGINEER WILL PROMPTLY VERIFY THE SAME. ANY WORK DONE AFTER SUCH A DISCOVERY, UNTIL AUTHORIZED, WILL BE AT THE CONTRACTOR'S RISK.  
11. ASSURANCES OF COMPLIANCE WITH AMERICAN WITH DISABILITIES ACT (ADA) IS THE RESPONSIBILITY OF THE OWNER/DEVELOPER.  
12. THE TRAFFIC CONTROL DEVICES MUST COMPLY WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND APPROVED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT).

**GRADING/DRAINAGE NOTES:**

- ALL GRADING AND SITE PREPARATION SHALL CONFORM WITH SPECIFICATIONS CONTAINED IN THE GEOTECHNICAL REPORT.
- ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE TO THE CITY LATEST CONSTRUCTION SPECIFICATIONS AND DETAILS.
- PRIOR TO ANY EXCAVATION OF THE PROJECT SITE, THE CONTRACTOR SHALL NOTIFY THE CITY 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR SHALL CAREFULLY PRESERVE BENCHMARKS, REFERENCE POINTS AND STAKES.
- ALL INDICATED ELEVATIONS ARE FINISHED ELEVATIONS.
- FIELD VERIFY LOCATIONS, SIZES AND IF APPLICABLE INVERTS OF EXISTING UTILITIES FOR PROPOSED CONNECTIONS PRIOR TO CONSTRUCTION.
- LOCATE AND PROTECT ALL UTILITIES ASSOCIATED WITH THE PROJECT PRIOR TO CONSTRUCTION.
- INSTALL SILT CONTROL MEASURES BEFORE BEGINNING SITE WORK. THESE MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
- MAINTAIN PROPER SITE DRAINAGE AT ALL TIMES DURING CONSTRUCTION. PREVENT STORM WATER FROM RUNNING INTO OR STANDING IN EXCAVATED AREAS.
- INSTALL ALL APPROPRIATE TREE PROTECTION MEASURES PRIOR TO GRADING.
- CUT AND FILL SLOPES SHALL HAVE A MAXIMUM SLOPE OF 2:1.
- ALL EXCAVATION SHALL INCLUDE CLEARING, STRIPPING AND STOCKPILING TOPSOIL, REMOVING UNSUITABLE MATERIALS, THE CONSTRUCTION OF EMBANKMENTS, CONSTRUCTION FILLS, AND THE FINAL SHAPING AND TRIMMING TO THE THE LINES AND GRADES SHOWN ON THE PLANS.
- ALL TREES, BRUSH, AND ORGANIC TOPSOIL AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED, UNLESS OTHERWISE SPECIFIED, AND DISPOSED OF AT AN OFF-SITE LOCATION, WITH THE EXCEPTION THAT ENOUGH TOPSOIL SHALL BE RETAINED FOR RESPREAD AND GENERAL LANDSCAPING. AREAS WHICH ARE TO BE FILLED SHALL BE COMPACTED TO A MAXIMUM DENSITY OF 95% AS DETERMINED BY THE MODIFIED ASHTO COMPACTION TEST IN THE PAVED AREAS AND 85% IN THE OTHER AREAS.
- STRIP AND STOCKPILE TOPSOIL. SPREAD FOUR (4) INCHES MINIMUM OF TOPSOIL ON LANDSCAPE AREAS AND REMOVE EXCESS TOPSOIL FROM SITE. PREPARE SUB-GRADE FOR PAVEMENT AND CURBS AND BACKFILL CURBS AFTER CURB CONSTRUCTION.
- PROVIDE SUPPLY OF TOPSOIL FOR LANDSCAPE CONTRACTOR FOR INSTALLATION IN ALL LANDSCAPE ISLANDS.
- PROVIDE AND INSTALL TOPSOIL IN DISTURBED AREAS TO BE GRASSED, TO INCLUDE PAVEMENT SHOULDERS AND DETENTION AREAS.
- ALL EARTHWORK AND BASE COURSE FOR THE PARKING AREA SHALL BE COMPACTED TO A MINIMUM OF 95% MODIFIED LABORATORY DENSITY. CERTIFICATION SAID COMPACTION SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER, OR HIS/HER REPRESENTATIVE, PRIOR TO THE PLACEMENT OF THE BASE COURSE MATERIAL. BOTH PROOF ROLLING AND COMPACTION TESTING MUST BE APPROVED AND WITNESSED BY THE ENGINEER OR OWNER REPRESENTATIVE.
- THE PAVEMENT SUBGRADE AND BASE COURSE MATERIAL SHALL BE INSPECTED AND APPROVED BY THE ENGINEER OR OWNER REPRESENTATIVE PRIOR TO CONSTRUCTING THE BASE AND SURFACE COURSES THEREON.
- CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE TO ALL INLETS AND CATCH BASINS. AREAS OF SURFACE PONDING SHALL BE CORRECTED BY CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
- IF AREAS ARE DISTURBED BEYOND PROPOSED GRADES BY NEGLIGENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY REGRADING OR REPAIR TO MATCH ORIGINAL EXISTING CONDITIONS.
- SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. SHORING SHALL BE IN ACCORDANCE WITH ALL O.S.H.A AND LOCAL REGULATIONS.
- STRUCTURES FOR STORM SEWERS SHALL BE IN ACCORDANCE WITH THESE IMPROVEMENT PLANS AND THE APPLICABLE STANDARD SPECIFICATIONS. WHERE GRANULAR TRENCH BACKFILL IS REQUIRED AROUND THESE STRUCTURES, THE COST SHALL BE CONSIDERED AS INCIDENTAL AND SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR THE STRUCTURE.
- CONFIRM INVERTS OF ALL EXISTING STORM INLETS AND SANITARY SEWER MANHOLES BEFORE COMMENCING CONSTRUCTION.
- ALL STORM SEWER LINES 18"-54" DIAMETER ARE TO BE REINFORCED CONCRETE PIPE ACCORDING TO ASTM C-76 TYPE III, UNLESS OTHERWISE SPECIFIED ON PLANS.
- A GEOTEXTILE MATTING (LANDLOCK TRM 450 OR EQUIVALENT) SHALL BE USED FOR EROSION CONTROL AN ALL SLOPES GREATER THAN 3H:1V.
- DRAINAGE STRUCTURES AND DETENTION POND SHALL BE MAINTAINED BY PROPERTY OWNERS.
- ALL PROPOSED SPOT ELEVATIONS SHOWN INDICATE FINISHED GRADED ELEVATIONS AT EDGE OF PAVEMENT AND/OR GRADE BREAKS, UNLESS OTHERWISE NOTED.
- SEE GENERAL NOTES FOR ADDITIONAL INFORMATION.

**SITE PERMITTING APPROVAL**

**WATER AND SEWER PERMITS (IF APPLICABLE)**

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 # \_\_\_\_\_

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 # \_\_\_\_\_

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION TO ITS PUBLIC SEWER SYSTEM AND EXTENSION OF THE PRIVATE SEWER COLLECTION SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTIONS 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 # \_\_\_\_\_

**CITY OF RALEIGH – PLANS AUTHORIZED FOR CONSTRUCTION**

ELECTRONIC APPROVAL: THIS APPROVAL IS BEING ISSUED ELECTRONICALLY. THIS APPROVAL IS VALID ONLY UPON THE SIGNATURE OF A CITY OF RALEIGH REVIEW OFFICER BELOW. THE CITY WILL RETAIN A COPY OF THE APPROVED PLANS. ANY WORK AUTHORIZED BY THIS APPROVAL MUST PROCEED IN ACCORDANCE WITH THE PLANS KEPT ON FILE WITH THE CITY. THIS ELECTRONIC APPROVAL MAY NOT BE EDITED ONCE ISSUED. ANY MODIFICATION TO THIS APPROVAL ONCE ISSUED WILL INVALIDATE THIS APPROVAL.

Digitally signed by Cydney S. Terry  
Date: 2022.10.12 16:05:16-04'00'  
CITY OF RALEIGH DEVELOPMENT APPROVAL  
RALEIGH WATER REVIEW OFFICER

**STANDARD UTILITY NOTES (AS APPLICABLE):**

- 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) A DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED 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.  
B) 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.  
C) WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS  
D) 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER  
E) MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 18" 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)  
F) ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.  
3. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT PRIOR TO CONSTRUCTION  
4. DEVELOPER SHALL PROVIDE 30 DAYS ADVANCE WRITTEN NOTICE TO OWNER FOR ANY WORK REQUIRED WITHIN AN EXISTING CITY OF RALEIGH UTILITY EASEMENT TRAVERSING PRIVATE PROPERTY  
5. 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  
6. MINIMUM COVER IS REQUIRED ON ALL WATER MAINS & SEWER FORCEMAINS: 4.0'  
7. IT IS THE DEVELOPER'S RESPONSIBILITY TO ABANDON OR REMOVE EXISTING WATER & SEWER SERVICES NOT BEING USED IN REDEVELOPMENT OF A SITE UNLESS OTHERWISE DIRECTED BY THE CITY OF RALEIGH PUBLIC UTILITIES DEPARTMENT. THIS INCLUDES ABANDONING TAP AT MAIN & REMOVAL OF SERVICE FROM ROW OR EASEMENT PER CORPUD HANDBOOK PROCEDURE  
8. INSTALL 2" PVC WATER SERVICES WITH METERS LOCATED AT ROW OR WITHIN A 2'X2' WATERLINE EASEMENT IMMEDIATELY ADJACENT. NOTE: IT IS THE APPLICANT'S RESPONSIBILITY TO PROPERLY SIZE THE WATER SERVICE FOR EACH CONNECTION TO PROVIDE ADEQUATE FLOW & PRESSURE  
9. INSTALL 4" PVC SEWER SERVICES @ 1.0% MINIMUM GRADE WITH CLEANOUTS LOCATED AT ROW OR EASEMENT LINE & SPACED EVERY 75 LINEAR FEET MAXIMUM  
10. PRESSURE REDUCING VALVES ARE REQUIRED ON ALL WATER SERVICES EXCEEDING 80 PSI; BACKWATER VALVES ARE REQUIRED ON ALL SANITARY SEWER SERVICES HAVING BUILDING DRAINS LOWER THAN 1.0' ABOVE THE NEXT UPSTREAM MANHOLE  
11. ALL ENVIRONMENTAL PERMITS APPLICABLE TO THE PROJECT MUST BE OBTAINED FROM NCDOW, USACE &/OR FEMA FOR ANY RIPARIAN BUFFER, WETLAND &/OR FLOODPLAIN IMPACTS (RESPECTIVELY) PRIOR TO CONSTRUCTION  
12. NCDOT / RAILROAD ENCROACHMENT AGREEMENTS ARE REQUIRED FOR ANY UTILITY WORK (INCLUDING MAIN EXTENSIONS & SERVICE TAPS) WITHIN STATE OR RAILROAD ROW PRIOR TO CONSTRUCTION  
13. 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 STEPHEN CALVERLEY@RALEIGHNC.GOV FOR MORE INFORMATION  
14. 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 UNIVERSITY OF 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. A CERTIFICATE OF COMPLIANCE SHALL ALSO BE OBTAINED FOR EACH DEVICE PRIOR TO ISSUANCE OF A BUILDING PERMIT. CONTACT JOANIE HARTLEY AT (919) 996-5923 OR JOANIE.HARTLEY@RALEIGHNC.GOV FOR MORE INFORMATION



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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**

KERI WILLIAMS, PE

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA  
BREAD  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD**



**PROJECT NUMBER**

20211261.0

**SHEET TITLE**

**GENERAL NOTES**

**SHEET NUMBER**

**C-1.0**

NOT ISSUED FOR CONSTRUCTION

**ISSUE/REVISION RECORD**

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	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



Todd Fleming  
Professional Engineer  
No. 055113  
State of North Carolina

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

20211261.0

**SHEET TITLE**

**DEMOLITION PLAN**

**SHEET NUMBER**

**C-2.0**

**EXISTING LEGEND**

[Symbol]	EXISTING BUILDING	[Symbol]	ELECTRICAL TRANSFORMER BOX
[Symbol]	CURB LINE	[Symbol]	ELECTRICAL METER
[Symbol]	TREE LINE	[Symbol]	TELEPHONE MANHOLE/PEDESTAL
[Symbol]	FENCE	[Symbol]	FIRE HYDRANT
[Symbol]	MEASURED DATA	[Symbol]	WATER VALVE
[Symbol]	RECORDED DATA	[Symbol]	GAS VALVE
[Symbol]	EXISTING 5 FOOT CONTOUR	[Symbol]	WATER METER
[Symbol]	EXISTING 1 FOOT CONTOUR	[Symbol]	GAS METER
[Symbol]	EXISTING GRADE SPOT ELEVATION	[Symbol]	MONITORING WELL
[Symbol]	STORM SEWER LINE	[Symbol]	MAILBOX
[Symbol]	STORM DRAIN PIPE W/ HEADWALL	[Symbol]	STREET SIGN
[Symbol]	DRAINAGE MANHOLE	[Symbol]	TRAFFIC SIGNAL POLE
[Symbol]	DRAINAGE CATCH BASIN	[Symbol]	BACKFLOW PREVENTER
[Symbol]	WATER LINE	[Symbol]	FIBER OPTIC BOX
[Symbol]	UNDERGROUND ELECTRIC LINE	[Symbol]	IRRIGATION CONTROL VALVE
[Symbol]	OVERHEAD ELECTRIC LINE	[Symbol]	PROPERTY MONUMENT
[Symbol]	UNDERGROUND TELE. LINE	[Symbol]	RIGHT-OF-WAY
[Symbol]	FIBER OPTIC CABLE	[Symbol]	REBAR PIN FOUND
[Symbol]	SANITARY SEWER LINE	[Symbol]	REBAR PIN SET
[Symbol]	SANITARY CLEAN-OUT (SCO)	[Symbol]	CORRUGATED METAL PIPE
[Symbol]	SANITARY SEWER MANHOLE	[Symbol]	REINFORCED CONC. PIPE
[Symbol]	UTILITY POLE & GUY	[Symbol]	HDPPE HIGH-DENS. POLYETHYLENE PIPE
[Symbol]	LIGHT POLE (LP)	[Symbol]	DIP DUCTILE IRON PIPE
[Symbol]		[Symbol]	PVC POLYVINYL CHLORIDE PIPE

**PROPOSED LEGEND**

[Symbol]	BOUNDARY LINE
[Symbol]	PAVEMENT REMOVAL

**GENERAL DEMOLITION NOTES:**

- ANY DEMOLITION IS TO BE PERFORMED IN STRICT CONFORMANCE WITH ALL APPLICABLE CITY, COUNTY AND STATE, AND/OR GOVERNING BODY'S STANDARDS.
- THE DEMOLITION PLAN SHALL BE DONE IN CONJUNCTION WITH THE GEOTECHNICAL INVESTIGATION REPORT.
- EROSION AND SEDIMENT CONTROL MEASUREMENTS SHALL BE MAINTAINED AT ALL TIMES DURING DEMOLITION.
- THE PURPOSE OF THIS DRAWING IS TO CONVEY THE OVERALL SCOPE OF WORK AND IT IS NOT INTENDED TO COVER ALL DETAILS OR SPECIFICATIONS REQUIRED TO COMPLY WITH GENERALLY ACCEPTED DEMOLITION PRACTICES. CONTRACTOR SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE SITE, SCOPE OF WORK, AND ALL EXISTING CONDITIONS AT THE JOB SITE PRIOR TO BIDDING AND COMMENCING THE WORK. THE DEMOLITION CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEANS, METHODS, TECHNIQUES, OR PROCEDURES USED TO COMPLETE THE WORK IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND IS LIABLE FOR THE SAFETY OF THE PUBLIC OR CONTRACTOR'S EMPLOYEES DURING THE COURSE OF THE PROJECT.
- THE DEMOLITION PLAN IS INTENDED TO SHOW REMOVAL OF KNOWN SITE FEATURES AND UTILITIES AS SHOWN ON THE SURVEY. THERE MAY BE OTHER SITE FEATURES, UTILITIES, STRUCTURES, AND MISCELLANEOUS ITEMS BOTH BURIED AND ABOVE GROUND THAT ARE WITHIN THE LIMITS OF WORK THAT MAY NEED TO BE REMOVED FOR THE PROPOSED PROJECT THAT ARE NOT SHOWN HEREON. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL OF SUCH ITEMS AT NO ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL CONTACT RESPECTIVE UTILITY COMPANIES PRIOR TO DEMOLITION TO COORDINATE DISCONNECTION AND REMOVAL OF EXISTING UTILITIES WITHIN THE AREA OF WORK.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES THAT ARE INTENDED TO CONTINUE TO PROVIDE SERVICE WHETHER THESE UTILITIES ARE SHOWN ON THE PLAN OR NOT.
- UPON DISCOVERY OF ANY UNDERGROUND TANKS, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE. NO REMOVAL OF TANKS SHALL OCCUR UNTIL AUTHORIZED BY OWNER.
- DEBRIS SHALL NOT BE BURIED ON THE SUBJECT SITE. ALL UNSUITABLE MATERIAL AND DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH ALL CITY, STATE, AND FEDERAL LAWS AND ORDINANCES.
- ALL MATERIAL, EXCEPT THAT BELONGING TO A PUBLIC UTILITY COMPANY OR DENOTED FOR SALVAGE, SHALL BECOME PROPERTY OF THE CONTRACTOR. THE CONTRACTOR SHALL NOTIFY THE OWNER OF WATER, ELECTRIC, OR GAS METERS WHEN THE METERS ARE READY FOR REMOVAL AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR DISCONNECTING ALL UTILITIES IN COMPLIANCE WITH LOCAL REQUIREMENTS.
- AS SOON AS DEMOLITION WORK HAS BEEN COMPLETED, THE FINAL GRADE OF BACKFILL IN DEMOLITION AREAS SHALL BE COMPACTED PER THE GEOTECHNICAL REPORT TO PRESENT A NEAT, WELL DRAINED APPEARANCE, AND TO PREVENT WATER FROM DRAINING UNNECESSARILY ON ADJACENT PROPERTIES. CONTRACTOR SHALL GRADE SITE TO EXISTING STORM DRAINAGE SYSTEM TO REMAIN ON SITE.
- EXISTING TREES TO REMAIN SHOULD BE PROTECTED FROM DAMAGE DURING DEMOLITION AND CONSTRUCTION.
- THE USE OF EXPLOSIVES SHALL NOT BE PERMITTED.
- BLASTING PERMIT MUST BE OBTAINED FROM THE KNIGHTDALE FIRE DEPARTMENT.

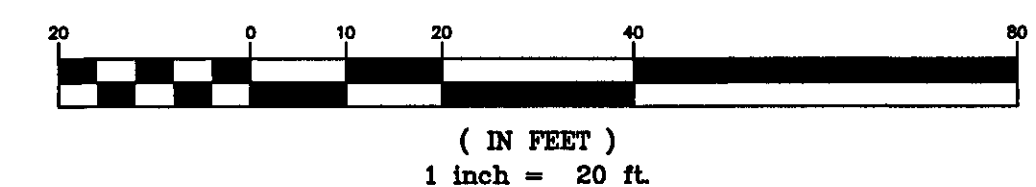
**DEMOLITION KEY NOTES**

- | Symbol | Description  |
|--------|--|
| D1     | EXISTING TO BE REMOVED   |
| D2     | EXISTING TO REMAIN   |
| D3     | REMOVE EXISTING MANHOLE FRAME AND COVER AND DEMOLISH TOP 3'-0" OF MANHOLE RISER; FILL STRUCTURE WITH 1200 PSI CONTROLLED LOW STRENGTH MATERIAL (FLOWABLE FILL) |
| D4     | LIMITS OF SANICUT AND FULL DEPTH PAVEMENT REMOVAL  |
| D5     | ABANDONED SANITARY SEWER EASEMENT; ABANDONMENT PLAN RECORDED 02/11/2022; DEED BOOK BM 2022 PAGE 00271  |
| D6     | SANITARY SEWER TO BE ABANDONED IN PLACE; PRESSURE FIT PIPE WITH CONTROLLED LOW STRENGTH MATERIAL (FLOWABLE FILL)   |
| D7     | EXISTING ELECTRICAL POLE GUY WIRE AND ANCHOR TO BE RELOCATED BY UTILITY  |
| D8     | TREE PROTECTION FENCE  |
| D9     | EXISTING ELECTRICAL UTILITY EQUIPMENT TO BE REMOVED BY UTILITY   |

**EROSION AND SEDIMENT CONTROL**

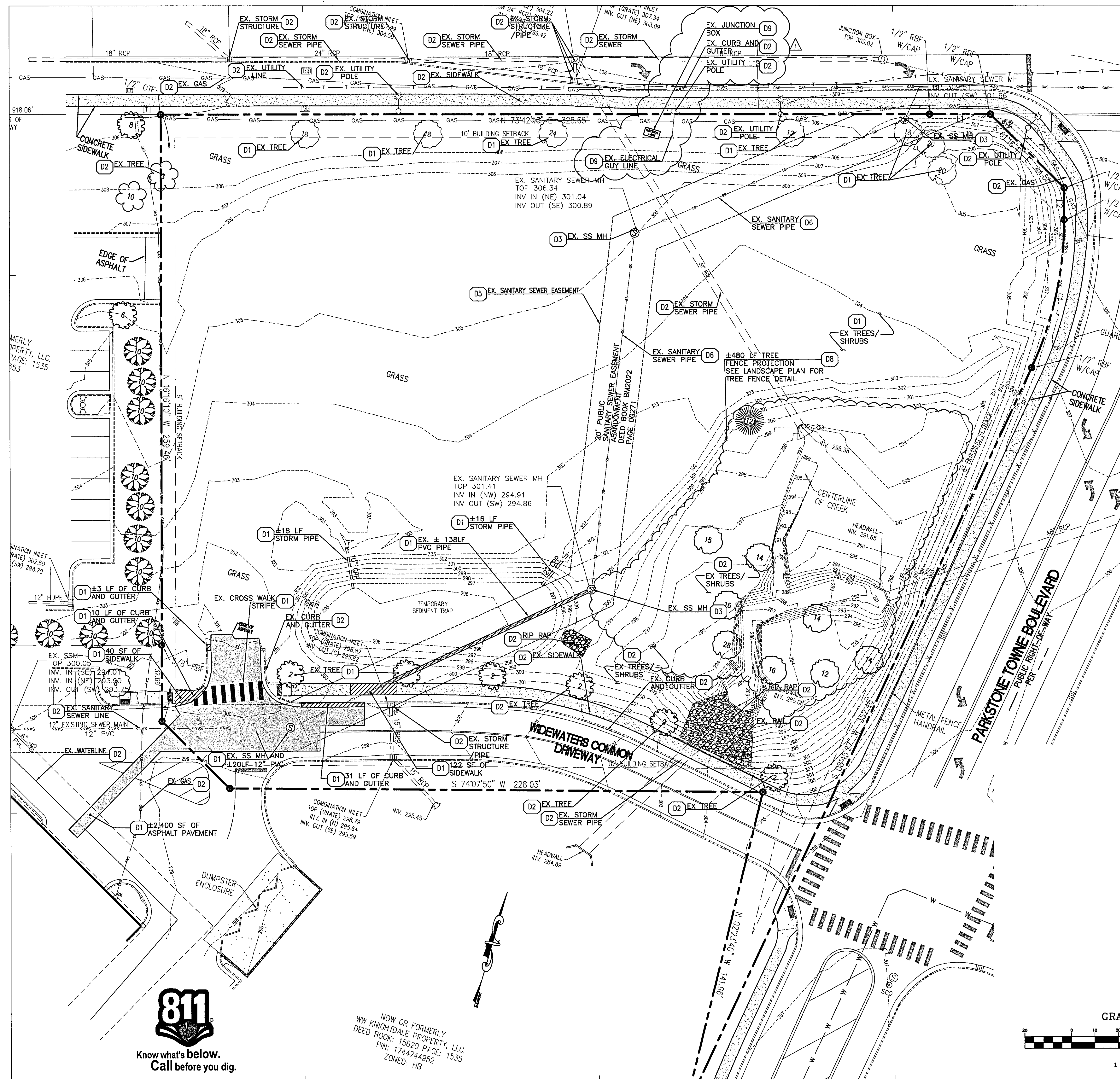
APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-561-000004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
019-217-2250  
Town of Knightdale Construction Inspector Signature

**GRAPHIC SCALE**



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	ADDENDUM 2
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**PROFESSIONAL SEAL**



Todd Fleming

**PROFESSIONAL IN CHARGE**

TODD FLEMING

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

20211261.0

**SHEET TITLE**

**SITE PLAN**

**SHEET NUMBER**

**C-3.0**

**PROPOSED LEGEND:**

---	PROPERTY LINE	[Pattern]	STANDARD DUTY ASPHALT PAVING
---	PROPOSED CURB & GUTTER	[Pattern]	3" ASPHALT
---	PROPOSED DRAINAGE STRUCTURES (SEE GRADING/DRAINAGE PLANS)	[Pattern]	6" AGGREGATE BASE
---	PROPOSED PARKING SPACES	[Pattern]	CONCRETE SIDEWALK
		[Pattern]	4" THICK CONCRETE
		[Pattern]	HEAVY DUTY ASPHALT PAVING
		[Pattern]	4" ASPHALT
		[Pattern]	6" AGGREGATE BASE
		[Pattern]	HEAVY DUTY CONCRETE PAVING
		[Pattern]	6" THICK w/ #3 REBAR 18" O.C.
		[Pattern]	6" AGGREGATE BASE
		[Pattern]	PAVEMENT REPAIR AREA (SEE DETAIL)
		[Pattern]	ENHANCED PAVING TREATMENT

**SITE KEY NOTES**

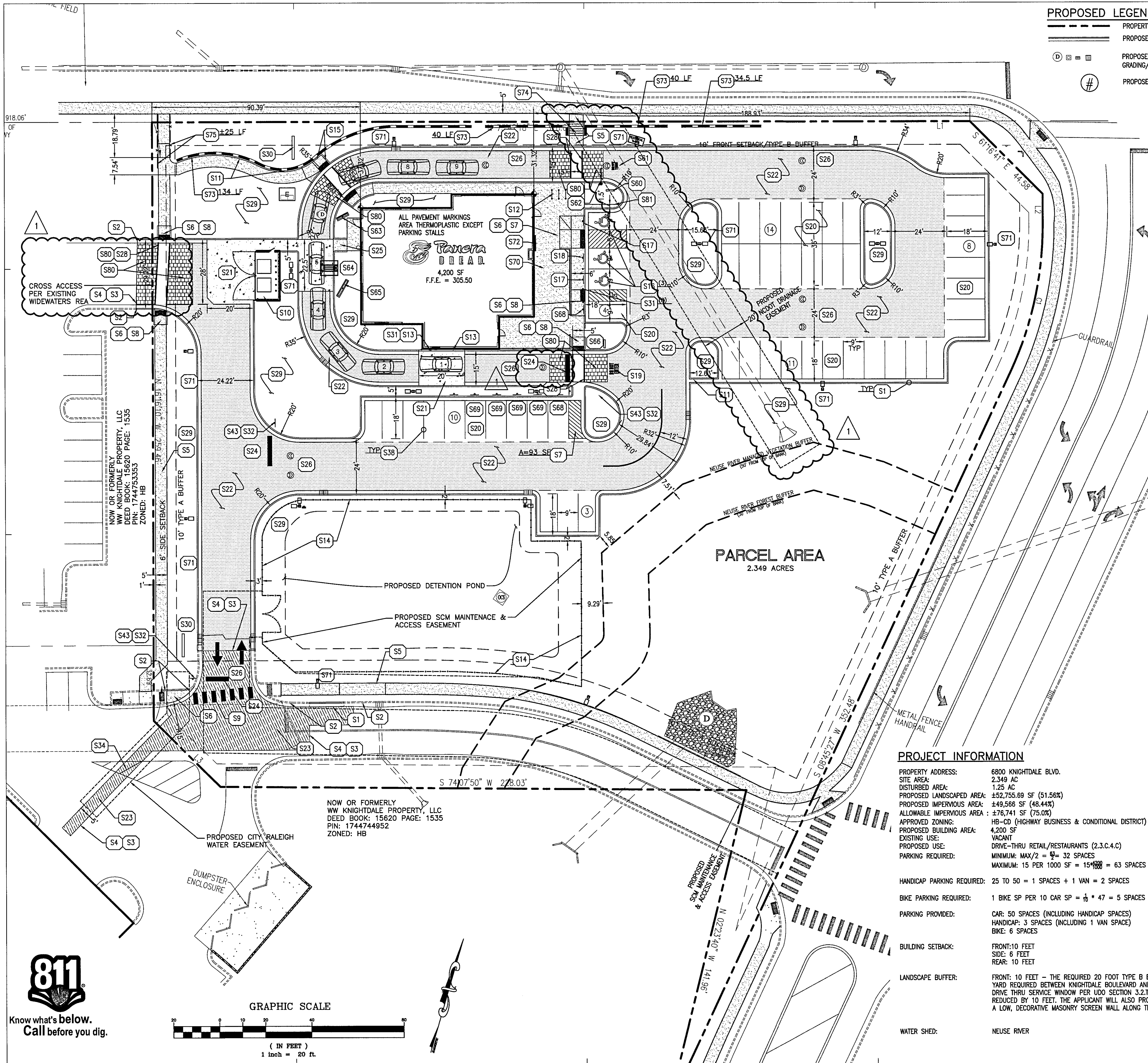
- S1 24" CONCRETE CURB AND GUTTER PER TOWN STD. 4.01
- S2 TIE INTO EXISTING CURB AND GUTTER
- S3 MATCH EXISTING PAVEMENT ELEVATION
- S4 LIMIT OF NEW PAVEMENT
- S5 CONCRETE SIDEWALK PER TOWN STD. 4.04
- S6 CURB RAMP @ 8.33% MAX. (SEE DETAILS)
- S7 4" WIDE PAINTED STRIPES, 2" O.C. @ 45'
- S8 DETECTABLE WARNING DOMES (SEE DETAILS)
- S9 CROSSWALK PER NCDOT STD. 1205.07
- S10 DUMPSTER ENCLOSURE (PER ARCH PLANS)
- S11 6" SIDEWALK CURB
- S12 BIKE RACK PER CITY STD. B-20.01 AND B-20.03
- S13 PROPOSED 10" WIDE CONCRETE CURB AT DRIVE-THRU WINDOW WITH A 10' TAPER TO 6" WIDE CONCRETE CURB (SEE ARCH. PLAN FOR DETAILS)
- S14 6" HIGH ALUMINUM FENCE AND 10' DOUBLE SWING GATE ECHELON II MAJESTIC FENCE BY AMERISTAR (SEE DETAILS)
- S15 12" SIDEWALK CURB AT CURB RAMP LANDING
- S16 HANDICAP PARKING STRIPING AND SYMBOL (SEE DETAILS)
- S17 PROPOSED HANDICAP PARKING SIGNS (SEE DETAILS)
- S18 VAN ACCESSIBLE HANDICAP SIGNS (SEE DETAILS)
- S19 DO NOT ENTER PAVEMENT MARKING
- S20 LIGHT DUTY ASPHALT PAVEMENT
- S21 HEAVY DUTY CONCRETE PAVEMENT
- S22 HEAVY DUTY ASPHALT PAVEMENT
- S23 PAVEMENT REPLACEMENT AREA PER CITY STD. S-3 (RALEIGH)
- S24 24" STOP BAR (WHITE) (SEE DETAILS)
- S25 SERVICE RAMP
- S26 DIRECTIONAL TRAFFIC ARROWS (SEE DETAILS)
- S27 HANDRAILS PER TOWN STD. 4.01
- S28 6" PEDESTRIAN/HANDICAP CROSSWALK STRIPING (WHITE)
- S29 LANDSCAPE AREA (PER LANDSCAPE PLAN)
- S30 MONUMENT AND WALL SIGNS (UNDER SEPARATE PERMIT)
- S31 BOLLARDS (SEE ARCHITECTURAL PLAN FOR DETAIL)
- S32 30" X 30" R1-1 "STOP SIGN"
- S33 30" CONCRETE CURB AND GUTTER PER CITY STD. 4.01
- S34 4" WIDE WHITE STRIPES
- S38 PARKING STALL STRIPING
- S40 SIGN BASE (SEE DETAILS)
- S60 DIRECTIONAL SIGN WITH ARROW (SEE ARCHITECTURAL PLANS)
- S61 DIRECTIONAL DRIVE THRU PAVEMENT MARKING
- S62 DRIVE THRU CLEARANCE BAR (SEE ARCHITECTURAL PLANS)
- S63 DRIVE THRU PREVIEW BOARD (SEE ARCHITECTURAL PLANS)
- S64 DRIVE THRU CANOPY AND SPEAKER (SEE ARCHITECTURAL PLANS)
- S65 DRIVE MENU BOARD (SEE ARCHITECTURAL PLANS)
- S66 THANK YOU SIGN (SEE ARCHITECTURAL PLANS)
- S68 DRIVE THRU "PULL AHEAD" PARKING SIGN (SEE ARCHITECTURAL PLANS)
- S69 RAPID PICK UP SIGN (SEE ARCHITECTURAL PLANS)
- S70 OUTDOOR PATIO AREA WITH RAILS (SEE ARCHITECTURAL PLANS)
- S71 SITE LIGHT POLE, SEE PHOTOMETRIC PLANS FOR POLE BASE DETAIL, FIXTURE, AND MOUNTING DETAILS.
- S72 PUBLIC ART (SEE ARCHITECTURAL PLANS)
- S73 MASONRY SCREEN WALL (SEE SHEET C-24)
- S74 CONCRETE STRIPS WITH WELDED STEEL RAILING ON BOTH SIDES (SEE DETAILS)
- S75 SIDEWALK RAMP WITH WELDED STEEL RAILING; 8.33% MAXIMUM SLOPE
- S80 10' LONG ENHANCED PAVEMENT AT PEDESTRIAN CROSSWALK. ENHANCED PAVEMENT TO BE HEAT SET AND STAMPED THERMOPLASTIC MATERIAL BY PPG OR APPROVED EQUAL SURFACE TREATMENT TO BE OFFSET BRICK PATTERN, COLORED BLACK.
- S81 18" PEDESTRIAN STEP UP

**PROJECT INFORMATION**

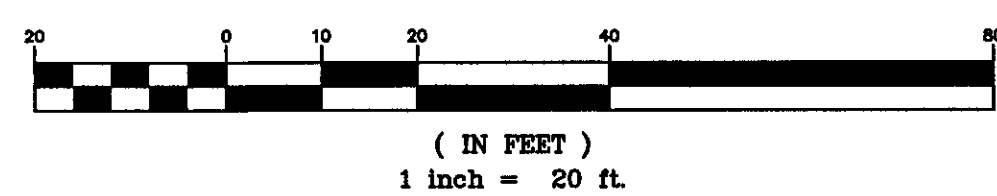
PROPERTY ADDRESS:	6800 KNIGHTDALE BLVD.
SITE AREA:	2.349 AC
DISTURBED AREA:	1.25 AC
PROPOSED LANDSCAPED AREA:	±52,755.69 SF (51.56%)
PROPOSED IMPERVIOUS AREA:	±49,566 SF (48.44%)
ALLOWABLE IMPERVIOUS AREA:	±76,741 SF (75.0%)
APPROVED ZONING:	HB-CD (HIGHWAY BUSINESS & CONDITIONAL DISTRICT)
PROPOSED BUILDING AREA:	4,200 SF
EXISTING USE:	VACANT
PROPOSED USE:	DRIVE-THRU RETAIL/RESTAURANTS (2.3.C.4.C)
PARKING REQUIRED:	MINIMUM: MAX/2 = 32 SPACES MAXIMUM: 15 PER 1000 SF = 15 * 306 = 4590 SPACES
HANDICAP PARKING REQUIRED:	25 TO 50 = 1 SPACES + 1 VAN = 2 SPACES
BIKE PARKING REQUIRED:	1 BIKE SP PER 10 CAR SP = 1 * 47 = 47 SPACES
PARKING PROVIDED:	CAR: 50 SPACES (INCLUDING HANDICAP SPACES) HANDICAP: 3 SPACES (INCLUDING 1 VAN SPACE) BIKE: 6 SPACES
BUILDING SETBACK:	FRONT: 10 FEET SIDE: 6 FEET REAR: 10 FEET
LANDSCAPE BUFFER:	FRONT: 10 FEET - THE REQUIRED 20 FOOT TYPE B BUFFER YARD REQUIRED BETWEEN KNIGHTDALE BOULEVARD AND THE DRIVE THRU SERVICE WINDOW PER UDO SECTION 3.2.T IS REDUCED BY 10 FEET. THE APPLICANT WILL ALSO PROVIDE A LOW, DECORATIVE MASONRY SCREEN WALL ALONG THE
WATER SHED:	NEUSE RIVER

**EROSION AND SEDIMENT CONTROL**

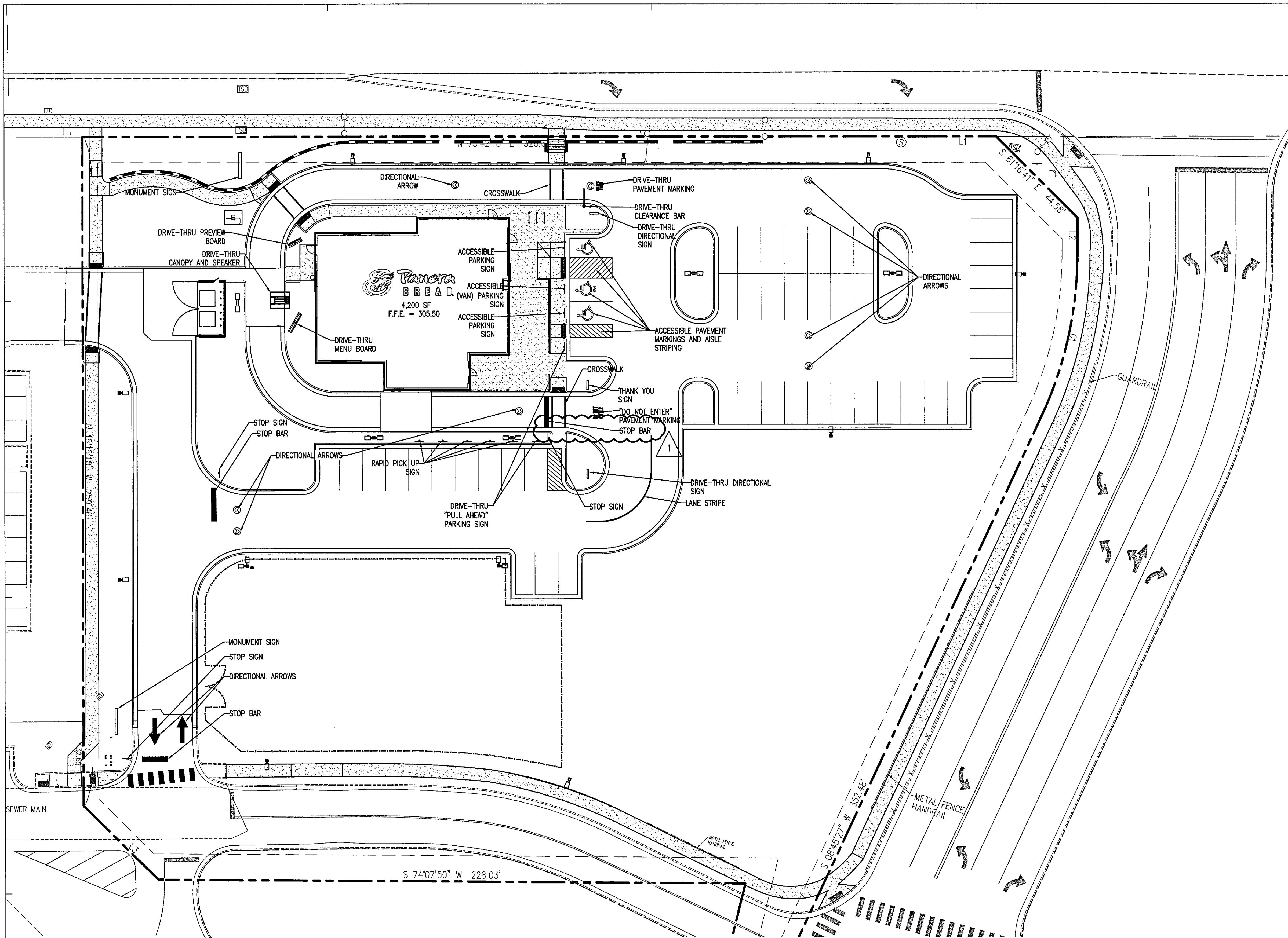
APPROVED PLAN  
DATE 8/12/2023  
PERMIT NO. S-SEC-000004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
919-217-2250



**GRAPHIC SCALE**



Know what's below.  
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**GENERAL NOTES:**  
 1. ALL PAVEMENT MARKING, EXCEPT PARKING STALL STRIPING TO BE THERMOPLASTIC.  
 2. ALL SIGNS WILL BE PERMITTED SEPARATED; CONSTRUCTION DRAWING APPROVAL DOES NOT APPROVE ANY SIGNS ON SITE.

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 www.greenbergfarrow.com  
 1230 Peachtree Street, NE  
 Suite 2900  
 Atlanta, GA 30309  
 t. 404 601 4000

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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

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	LDP SUBMITTAL
Δ 9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
Δ 3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**

**NORTH CAROLINA PROFESSIONAL SEAL**  
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 TODD D. FLEMING  
 Todd Fleming  
 www.greenbergfarrow.com  
 1230 Peachtree Street, NE  
 Suite 2900  
 Atlanta, GA 30309  
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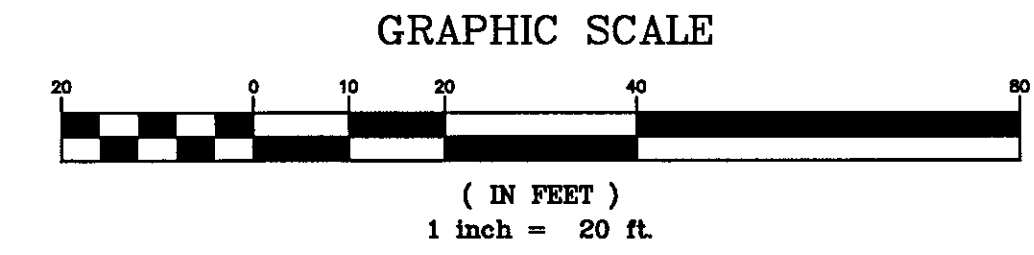
**PROFESSIONAL IN CHARGE**  
 TODD FLEMING  
**PROJECT MANAGER**  
 HAMILTON WILLIAMS  
**QUALITY CONTROL**  
 WILLIAM LOTZ  
**DRAWN BY**  
 VICTOR LU

**PROJECT NAME**  
**PANERA BREAD**  
**KNIGHTDALE**  
**NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD**

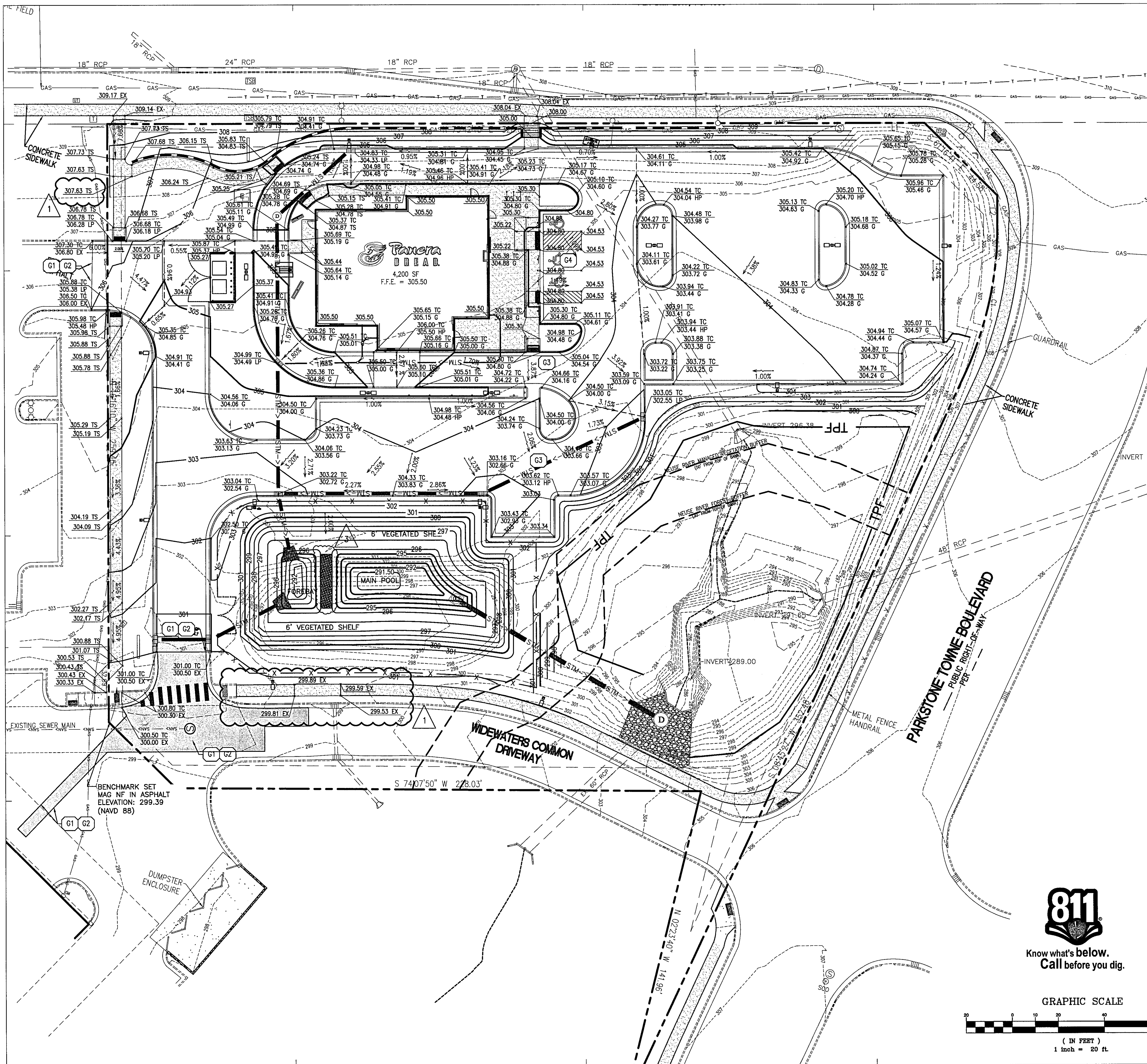


**PROJECT NUMBER**  
 20211261.0  
**SHEET TITLE**  
**SIGNAGE PLAN**

**SHEET NUMBER**  
**C-3.1**



**EROSION AND SEDIMENT CONTROL**  
 APPROVED PLAN  
 DATE 5/12/2023  
 PERMIT NO. S-SEL-000004-2023  
 Town of Knightdale Public Works  
 Sedimentation & Erosion Control  
 919-217-2250  
 [Signature]



**GENERAL GRADING/DRAINAGE NOTES:**

- ALL GRADING AND SITE PREPARATION SHALL CONFORM WITH SPECIFICATIONS CONTAINED IN THE GEOTECHNICAL REPORT.
- ALL CONSTRUCTION MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE TO THE CITY LATEST CONSTRUCTION SPECIFICATIONS AND DETAILS.
- PRIOR TO ANY EXCAVATION OF THE PROJECT SITE, THE CONTRACTOR SHALL NOTIFY THE CITY 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR SHALL CAREFULLY PRESERVE BENCHMARKS, REFERENCE POINTS AND STAKES.
- ALL INDICATED ELEVATIONS ARE FINISHED ELEVATIONS.
- FIELD VERIFY LOCATIONS, SIZES AND IF APPLICABLE INVERTS OF EXISTING UTILITIES FOR PROPOSED CONNECTIONS PRIOR TO CONSTRUCTION.
- LOCATE AND PROTECT ALL UTILITIES ASSOCIATED WITH THE PROJECT PRIOR TO CONSTRUCTION.
- INSTALL SILT CONTROL MEASURES BEFORE BEGINNING SITE WORK. THESE MEASURES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
- MAINTAIN PROPER SITE DRAINAGE AT ALL TIMES DURING CONSTRUCTION. PREVENT STORM WATER FROM RUNNING INTO OR STANDING IN EXCAVATED AREAS.
- INSTALL ALL APPROPRIATE TREE PROTECTION MEASURES PRIOR TO GRADING.
- CUT AND FILL SLOPES SHALL HAVE A MAXIMUM SLOPE OF 2:1.
- ALL EXCAVATION SHALL INCLUDE CLEARING, STRIPPING AND STOCKPILING TOPSOIL, REMOVING UNSUITABLE MATERIALS, THE CONSTRUCTION OF EMBANKMENTS, CONSTRUCTION FILLS, AND THE FINAL SHAPING AND TRIMMING TO THE THE LINES AND GRADES SHOWN ON THE PLANS.
- ALL TREES, BRUSH, AND ORGANIC TOPSOIL AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED, UNLESS OTHERWISE SPECIFIED, AND DISPOSED OF AT AN OFF-SITE LOCATION, WITH THE EXCEPTION THAT ENOUGH TOPSOIL SHALL BE RETAINED FOR REUSE AND GENERAL LANDSCAPING. AREAS WHICH ARE TO BE FILLED SHALL BE COMPACTED TO A MAXIMUM DENSITY OF 95% AS DETERMINED BY THE MODIFIED AASHTO COMPACTION TEST IN THE PAVED AREAS AND 85% IN THE OTHER AREAS.
- STRIP AND STOCKPILE TOPSOIL. SPREAD FOUR (4) INCHES MINIMUM OF TOPSOIL ON LANDSCAPE AREAS AND REMOVE EXCESS TOPSOIL FROM SITE. PREPARE SUB-GRADE FOR PAVEMENT AND CURBS AND BACKFILL CURBS AFTER CURB CONSTRUCTION.
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- ALL STORM SEWER LINES 18"-54" DIAMETER ARE TO BE REINFORCED CONCRETE PIPE ACCORDING TO ASTM C-76 TYPE III, UNLESS OTHERWISE SPECIFIED ON PLANS.
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- SEE GENERAL NOTES FOR ADDITIONAL INFORMATION.

**GRADING KEY NOTES**

- G1 MATCH EXISTING PAVEMENT ELEVATION
- G2 LIMITS OF SAWCUT AND PAVEMENT REMOVAL
- G3 MAXIMUM 5% RUNNING SLOPE AND MAXIMUM 2% CROSS SLOPE
- G4 MAXIMUM SLOPE OF 2% ALL DIRECTIONS

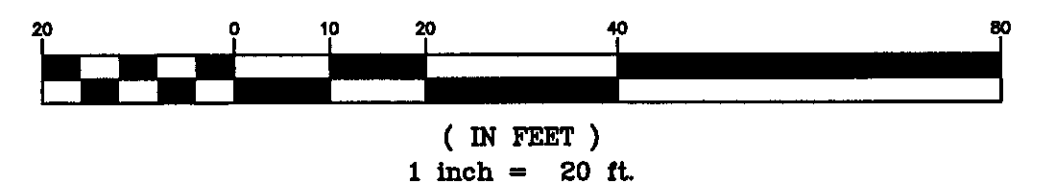
**LEGEND**

- XXXX TC TOP OF CURB
- XXXX G CUTTER
- HP TOP OF ISLAND
- XXXX EX EXISTING ELEVATION
- XXXX TS TOP OF SIDEWALK



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GRAPHIC SCALE



**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-561-00004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
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**PROFESSIONAL SEAL**



Todd Deleming  
Professional Engineer  
No. 055113  
03/20/2008 - 03/17/2030

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

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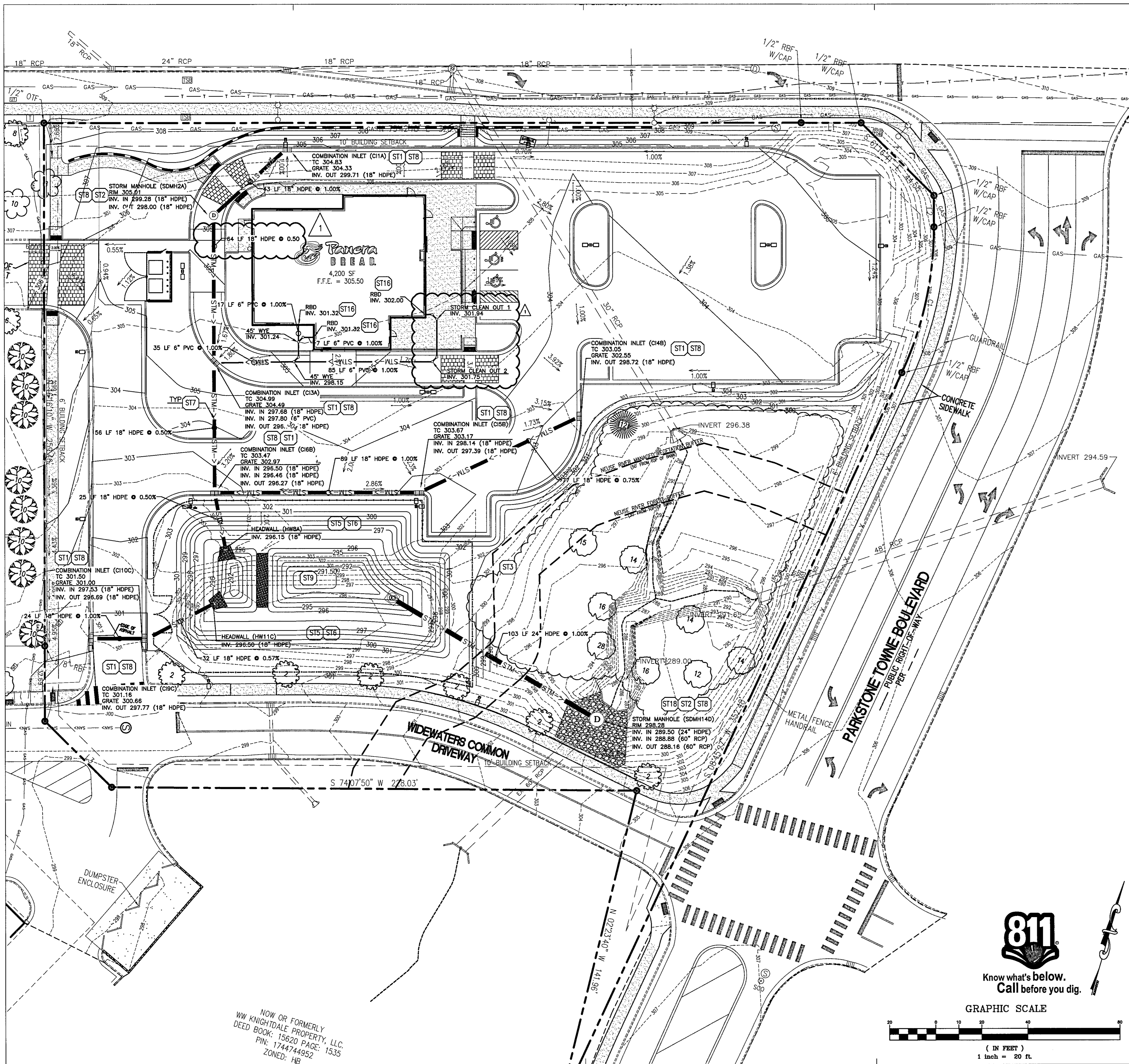


**PROJECT NUMBER**  
20211261.0

**SHEET TITLE**  
**GRADING PLAN**

**SHEET NUMBER**

**C-4.0**



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28. SEE GENERAL NOTES FOR ADDITIONAL INFORMATION.

**STORM SEWER KEY NOTES**

- ST1 CURB INLET PER CITY STD. 5.05
- ST2 STORM DRAINAGE MANHOLE PER NCDOT STD. 840.52
- ST3 OUTLET CONTROL STRUCTURE (SEE SHEET C-4.2)
- ST5 RIP RAP OUTFALL PROTECTION (SEE DETAILS)
- ST6 CONCRETE HEADWALL PER NCDOT STD. 838.80
- ST7 STORM SEWER TRENCH AND BEDDING PER CITY STD. 5.02
- ST8 WATERSTOP CONNECTION (SEE DETAILS)
- ST9 WET DETENTION POND W/ FOUNTAIN
- ST16 ROOF DRAIN CONNECTION
- ST17 INSERTA TEE (SEE DETAILS)
- ST18 DOGHOUSE MANHOLE CONSTRUCTION TECHNIQUE (SEE DETAILS)



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**PROFESSIONAL SEAL**



Todd Fleming  
Professional Engineer  
License No. 055113

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD

**PROJECT NUMBER**

20211261.0

**SHEET TITLE**

**STORM SEWER PLAN**

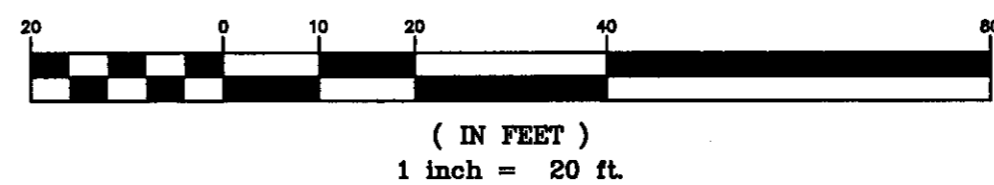
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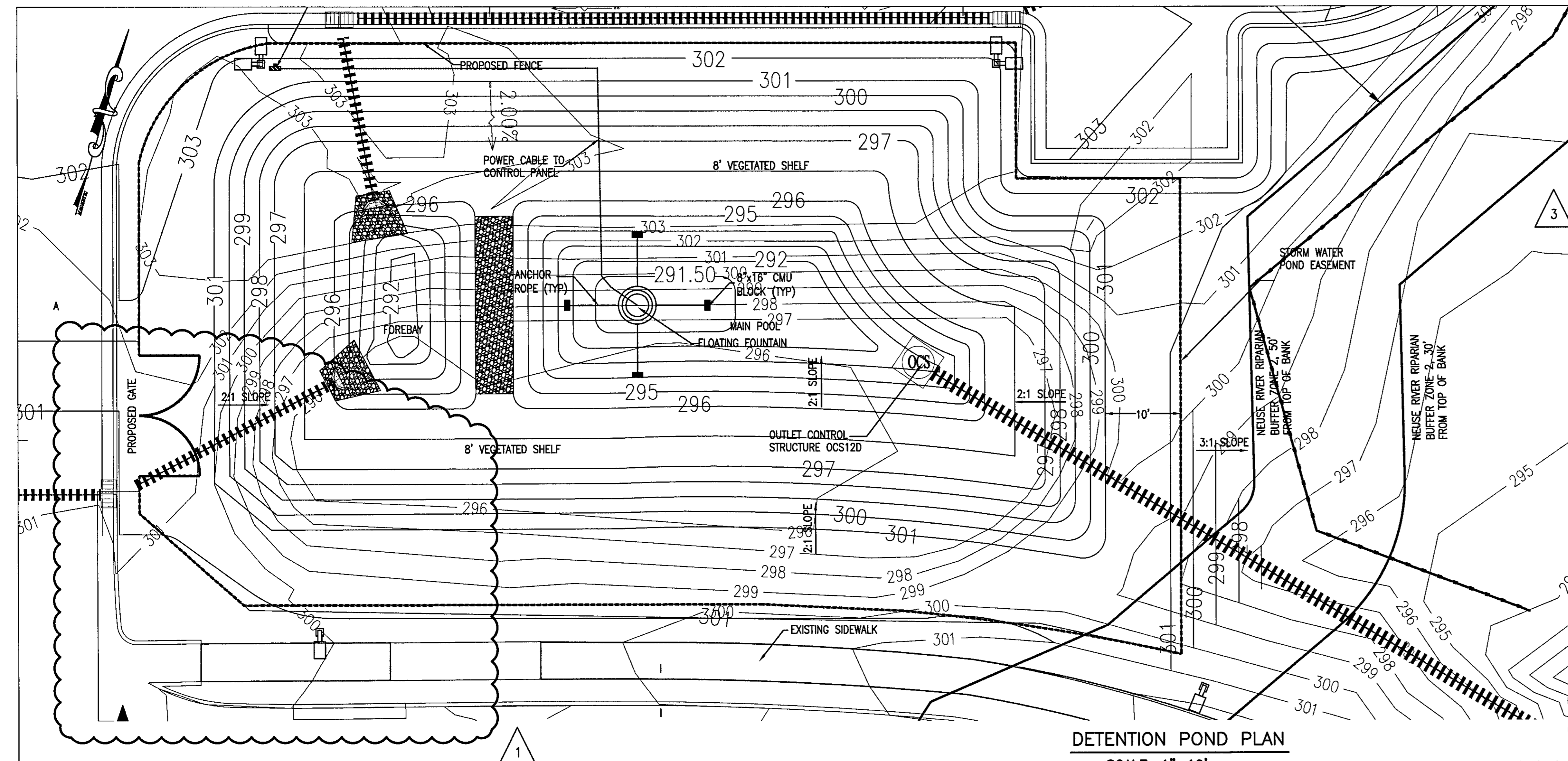
**GRAPHIC SCALE**



**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-56-00004-2023  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
9/12/23 2250

NOW OR FORMERLY  
WW KNIGHTDALE PROPERTY, LLC.  
DEED BOOK: 15620 PAGE: 1535  
PIN: 1744744952  
ZONED: HG



- ### SEDIMENT BASIN REMOVAL SEQUENCE NOTES
1. PHASE 1 SEDIMENT TRAP TO BE DEWATERED PRIOR TO CONSTRUCTION/CONVERSION OF SEDIMENT BASIN FOR PHASE 2 PROGRESSION. SEE EROSION AND SEDIMENT CONTROL PLAN SHEETS.
  2. SCHEDULE AN ON-SITE MEETING WITH THE TOWN OF KNIGHTDALE EROSION CONTROL INSPECTOR TO ESTABLISH IF A BASIN CAN BE REMOVED. INSTALL SILT FENCING OR OTHER TEMPORARY EROSION CONTROL MEASURES AS NEEDED PRIOR TO REMOVAL OF THE BASIN.
  3. CONTACT NCDCE TO CONFIRM THE DISTRIBUTION LIST FOR RECEIPT OF DEWATERING NOTIFICATIONS.
  4. AT MINIMUM OF 10 DAYS PRIOR TO BEGINNING DEWATERING ACTIVITY, SEND AN EMAIL TO NCDCE-DEMR CONTACT, TOWN OF KNIGHTDALE CONTACT FROM SITE MEETING, PANERA BREAD CONSTRUCTION MANAGER AND GF CONTACT.
  5. KEEP COPY EMAIL FOR YOUR NPDES MONITORING AND REPORTING RECORDS.
  6. AFTER RECEIVING AUTHORIZATION FROM NCDCE-DEMR FOR REMOVAL OF BASIN OR ON DAY 11, WHICHEVER IS SOONER, PROCEED WITH REMOVAL OF BASIN AND ASSOCIATED TEMPORARY DIVERSIONS DITCHES, SLOPE DRAINS AND OTHER BMPs. IF PIPES NEED TO BE EXTENDED, PERFORM THIS OPERATION AT THIS TIME.
  7. DEWATER SEDIMENT BASIN FOREBAY USING PORTABLE SUMP PUMPS AND DEWATERING SILT BAG; DEWATER PERMANENT POOL VIA SKIMMER.
  8. AFTER DEWATERING IS COMPLETE, REMOVE ACCUMULATED SEDIMENT AND GRADE POND BOTTOM AND SLOPES PER THE PLANS. FINE GRADE AREA IN PREPARATION FOR SEEDING. REMOVE TEMPORARY PLUGS FROM CONTROL STRUCTURE OUTLETS. INSTALL PIPE TEE ORIFICE FITTING.
  9. PREPARE SEEDBED AND VEGETATED SHELF FOR REQUIRED PLANTINGS. PROVIDE LIME AND INITIAL FERTILIZATION TO ESTABLISH PLANTS; NO FURTHER FERTILIZATION WITHIN THE POND IS ALLOWED. SEED AND MULCH AREA USING NON-CLUMPING TURF GRASS PER SURFACE STABILIZATION MEASURES TABLE AND LANDSCAPE PLAN.
  10. INSTALL VEGETATED SHELF PLANT PLUGS PER THE LANDSCAPE PLAN AND POND VEGETATION NARRATIVE. NEW SEEDINGS SHALL NOT BE SUBJECT TO INUNDATION UNTIL VEGETATION IS AT LEAST 6" TALL.
  11. SEED AND MULCH ANY RESULTING BARE AREAS IMMEDIATELY.
  12. INSTALL VELOCITY DISSIPATORS AND/OR LEVEL SPREADERS AS REQUIRED ON THE EROSION CONTROL PLAN.
  13. INSTALL RIPRAP PIPE OUTLET PROTECTION PER EROSION CONTROL PLAN.
  14. TURF GRASS SHALL ACHIEVE 90% GERMINATION PRIOR TO FINAL ACCEPTANCE BY TOWN OF KNIGHTDALE. WHEN THE SITE IS FULLY STABILIZED, CALL EROSION CONTROL INSPECTOR FOR APPROVAL OF REMOVING REMAINING TEMPORARY EROSION CONTROL MEASURES AND ADVICE ON WHEN SITE CAN BE ISSUED A CERTIFICATE OF COMPLETION.

- ### POND VEGETATION NARRATIVE
- AFTER COMPLETION OF PHASE 3 EROSION CONTROL (PERMANENT STABILIZATION), CONTRACTOR SHALL PLANT VEGETATED SHELF PER AS FOLLOWS:
- PLANT A MINIMUM OF 1200 PLUGS AT 18" ON CENTER  
PLACE PLUGS IN LARGE GROUPS OF 20-40 PLANTS EACH
- ASCLEPIAS INCARNATA (SWAMP MILKWEED)
  - SCIRPUS CYPERINUS (WOOLGRASS)
  - JUNCUS EFFUSES (COMMON RUSH)
  - IRIS VERSICOLOR (HARLEQUIN BLUEFLAG)
  - PONTEDERIA CORDATA (PICKERELWEED)
  - SCIRPUS VALLIDUS (STEMMED BULLRUSH)
  - SAGITARIA LATIFOLIA (BROADLEAF ARROWHEAD)
- SEE LANDSCAPE PLANS FOR ADDITIONAL PLANTING REQUIREMENTS
- ### MAINTENANCE
1. ALL NON-CLUMPING TURF GRASS SHALL ACHIEVE 90% GERMINATION PRIOR TO FINAL ACCEPTANCE BY TOWN OF KNIGHTDALE.
  2. NEW SEEDINGS SHALL NOT BE SUBJECT TO INUNDATION UNTIL VEGETATION IS AT LEAST 6" TALL. CONTRACTOR SHALL IRRIGATE PLANTS ON VEGETATED SHELF TWICE WEEKLY UNTIL PLANTS ARE ESTABLISHED; 8 WEEKS MINIMUM.)
  3. PROVIDE LIME AND INITIAL FERTILIZATION TO ESTABLISH PLANTS; NO FURTHER FERTILIZATION WITHIN THE POND IS ALLOWED
  4. INSPECT POND ONCE EVERY 3 MONTHS AFTER VEGETATED SHELF IS ESTABLISHED
  5. PRUNE VEGETATED SHELF PLANTINGS ACCORDING TO BEST MANAGEMENT PRACTICES
  6. REMOVE AND REPLACE DEAD OR DISEASED PLANTS AS REQUIRED; REMOVE WEEDS BY HAND WHEN PRESENT
  7. IMMEDIATELY REMOVE WOODY SHRUBS AND TREES FROM EMBANKMENT WHEN OBSERVED



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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
Δ 9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
Δ 3/23/23	LDP COMMENT RESPONSE
Δ 4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**

**TODD FLEMING**  
ENGINEER  
055113

**PROFESSIONAL IN CHARGE**  
TODD FLEMING

**PROJECT MANAGER**  
HAMILTON WILLIAMS

**QUALITY CONTROL**  
WILLIAM LOTZ

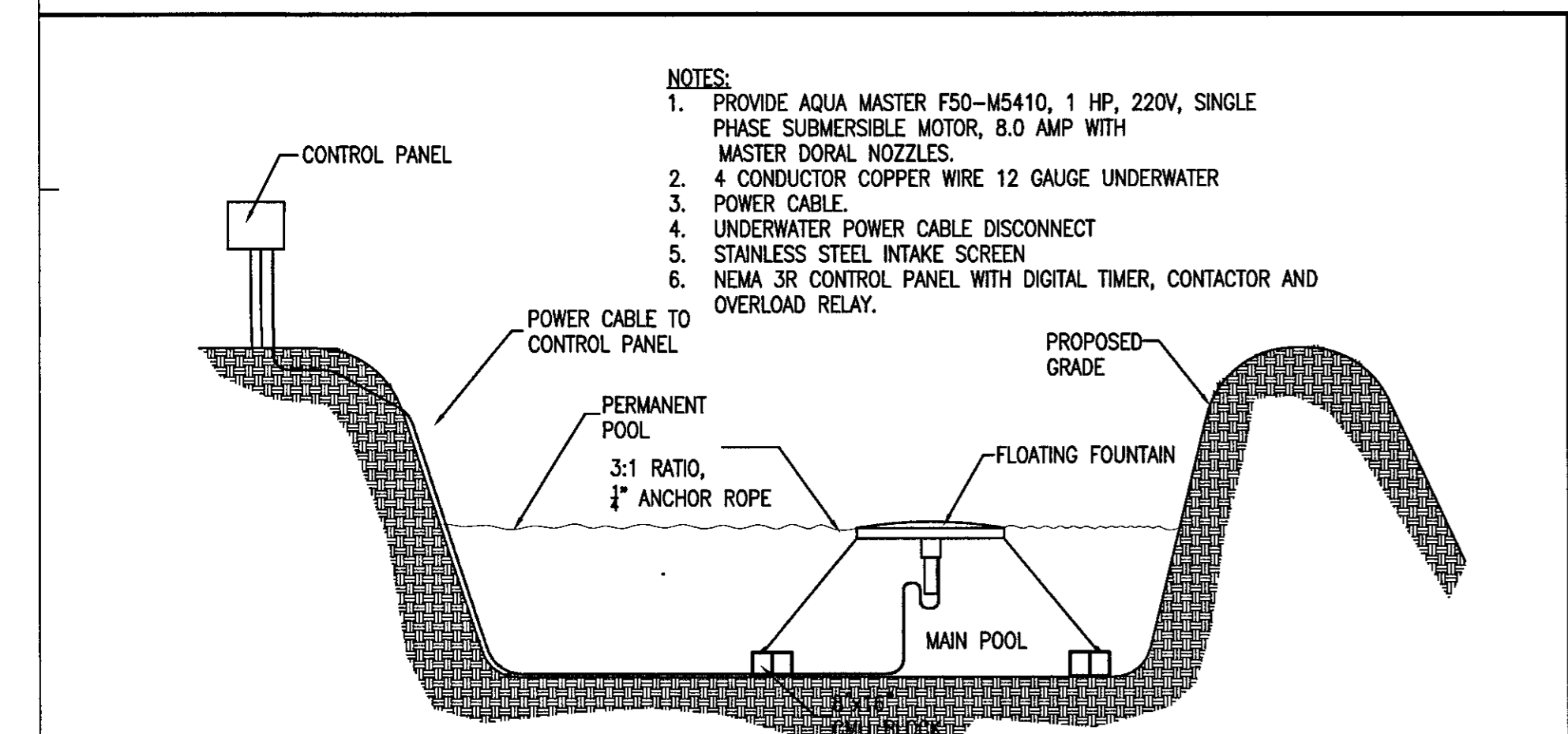
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**  
**PANERA BREAD KNIGHTDALE**  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD

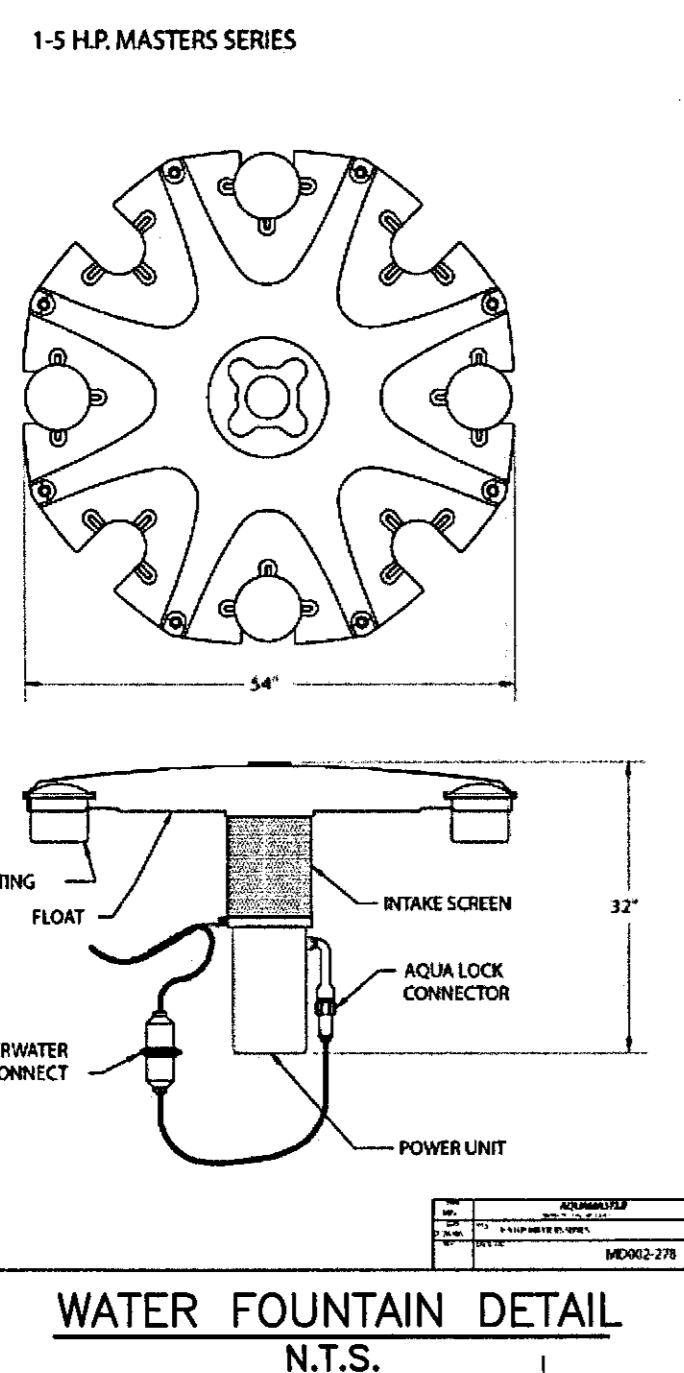
**PROJECT NUMBER**  
20211261.0

**SHEET TITLE**  
**POND PLAN**

**SHEET NUMBER**  
**C-4.2**



- NOTES:**
1. PROVIDE AQUA MASTER F50-M5410, 1 HP, 220V, SINGLE PHASE SUBMERSIBLE MOTOR, 8.0 AMP WITH MASTER DORAL NOZZLES.
  2. 4 CONDUCTOR COPPER WIRE 12 GAUGE UNDERWATER
  3. POWER CABLE
  4. UNDERWATER POWER CABLE DISCONNECT
  5. STAINLESS STEEL INTAKE SCREEN
  6. NEMA 3R CONTROL PANEL WITH DIGITAL TIMER, CONTACTOR AND OVERLOAD RELAY.



**Storm Sewer Tabulation 10 YEAR**

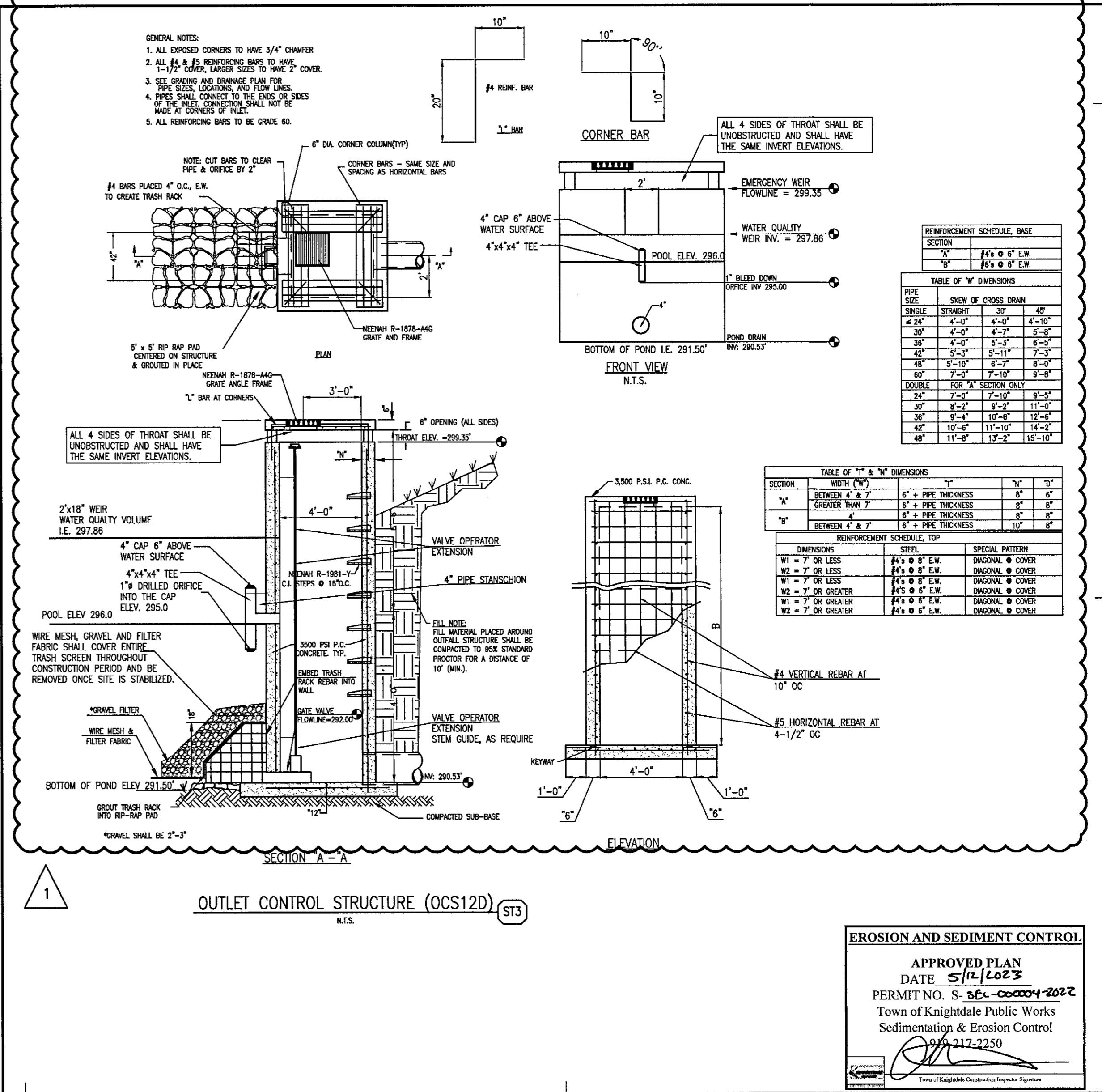
Station	Line To	Line From	Len (ft)	Incr (ft)	Drng Area (ac)	Root (ft)	Area x C (ac-ft)	Tc (min)	Tc (hr)	Rain (in)	Total Flow (cfs)	Cap (cfs)	Vel (ft/s)	Pipe Size (in)	Invert Elev (ft)	HGL Elev (ft)	Drnd / Rtn Elev (ft)	Line ID		
1	End	24.843	0.06	0.97	0.87	0.05	0.82	5.0	10.8	5.8	6.74	7.84	4.08	10	0.49	296.15	296.27	297.11	304.03	Pipe - (5)
2	1	58.427	0.05	0.26	0.76	0.04	0.30	5.0	8.6	6.0	1.22	8.01	2.39	10	0.50	296.46	296.74	297.11	304.03	Pipe - (4)
3	2	16.451	0.00	0.21	0.00	0.00	0.17	0.0	0.2	6.1	1.01	7.85	3.01	10	0.49	297.00	297.76	298.04	304.49	Pipe - (3)
4	3	29.515	0.00	0.19	0.20	0.00	0.12	0.0	0.2	6.8	0.19	8.09	2.96	10	0.51	297.76	298.04	298.32	304.75	Pipe - (2)
5	4	16.810	0.05	0.08	0.08	0.05	0.05	5.0	7.3	6.38	0.81	3.08	6	1.02	302.33	302.50	302.80	303.01	303.07	Pipe - (14)
6	4	43.278	0.11	0.11	0.82	0.07	0.07	5.0	7.3	0.50	11.34	2.81	10	0.88	299.28	299.71	299.48	300.01	304.33	Pipe - (1)
7	1	88.852	0.11	0.08	0.88	0.11	0.87	5.0	7.3	0.89	11.36	5.14	10	1.05	298.53	297.38	297.11	298.18	304.03	Pipe - (7)
8	7	77.467	0.54	0.54	0.85	0.46	0.46	5.0	7.3	3.33	8.84	4.59	10	0.75	298.14	298.72	298.74	298.42	303.00	Pipe - (8)
9	3	16.810	0.05	0.08	0.05	0.05	0.05	5.0	7.3	0.82	8.61	3.09	6	1.02	298.20	298.37	298.47	299.75	299.08	Pipe - (13)
10	End	32.316	0.05	0.29	0.78	0.04	0.18	5.0	7.3	1.23	8.72	3.11	10	0.89	296.50	296.69	296.92	299.24	301.06	Pipe - (10)
11	10	24.000	0.24	0.24	0.58	0.14	0.14	5.0	7.3	1.01	11.38	3.45	10	1.00	297.53	297.77	297.87	301.00	300.88	Pipe - (9)

Project File: 2022-04-22 STORM WITH CUT DOT PIPE.ssd  
Number of Lines: 11  
Run Date: 5/4/2022

**Storm Sewer Tabulation 100 YEAR**

Station	Line To	Line From	Len (ft)	Incr (ft)	Drng Area (ac)	Root (ft)	Area x C (ac-ft)	Tc (min)	Tc (hr)	Rain (in)	Total Flow (cfs)	Cap (cfs)	Vel (ft/s)	Pipe Size (in)	Invert Elev (ft)	HGL Elev (ft)	Drnd / Rtn Elev (ft)	Line ID		
1	End	24.843	0.06	0.97	0.87	0.05	0.82	5.0	10.8	5.8	6.74	7.84	4.08	10	0.49	296.15	296.27	297.11	304.03	Pipe - (5)
2	1	58.427	0.05	0.26	0.76	0.04	0.30	5.0	8.6	6.0	1.22	8.01	2.39	10	0.50	296.46	296.74	297.11	304.03	Pipe - (4)
3	2	16.451	0.00	0.21	0.00	0.00	0.17	0.0	0.2	6.1	1.01	7.85	3.01	10	0.49	297.00	297.76	298.04	304.49	Pipe - (3)
4	3	29.515	0.00	0.19	0.20	0.00	0.12	0.0	0.2	6.8	0.19	8.09	2.96	10	0.51	297.76	298.04	298.32	304.75	Pipe - (2)
5	4	16.810	0.05	0.08	0.08	0.05	0.05	5.0	7.3	6.38	0.81	3.08	6	1.02	302.33	302.50	302.80	303.01	303.07	Pipe - (14)
6	4	43.278	0.11	0.11	0.82	0.07	0.07	5.0	7.3	0.50	11.34	2.81	10	0.88	299.28	299.71	299.48	300.01	304.33	Pipe - (1)
7	1	88.852	0.11	0.08	0.88	0.11	0.87	5.0	7.3	0.89	11.36	5.14	10	1.05	298.53	297.38	297.11	298.18	304.03	Pipe - (7)
8	7	77.467	0.54	0.54	0.85	0.46	0.46	5.0	7.3	3.33	8.84	4.59	10	0.75	298.14	298.72	298.74	298.42	303.00	Pipe - (8)
9	3	16.810	0.05	0.08	0.05	0.05	0.05	5.0	7.3	0.82	8.61	3.09	6	1.02	298.20	298.37	298.47	299.75	299.08	Pipe - (13)
10	End	32.316	0.05	0.29	0.78	0.04	0.18	5.0	7.3	1.23	8.72	3.11	10	0.89	296.50	296.69	296.92	299.24	301.06	Pipe - (10)
11	10	24.000	0.24	0.24	0.58	0.14	0.14	5.0	7.3	1.01	11.38	3.45	10	1.00	297.53	297.77	297.87	301.00	300.88	Pipe - (9)

Project File: 2022-04-22 STORM WITH CUT DOT PIPE.ssd  
Number of Lines: 11  
Run Date: 5/4/2022







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	LDP SUBMITTAL
Δ 8/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
Δ 3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



Todd Fleming  
Professional Engineer License No. 055113, State of North Carolina, Expiration Date 03/31/2026

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
 HAMILTON WILLIAMS  
**QUALITY CONTROL**  
 WILLIAM LOTZ  
**DRAWN BY**  
 VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
 KNIGHTDALE  
 NORTH CAROLINA  
 6800 KNIGHTDALE BLVD

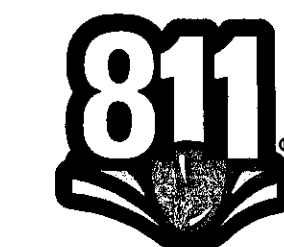
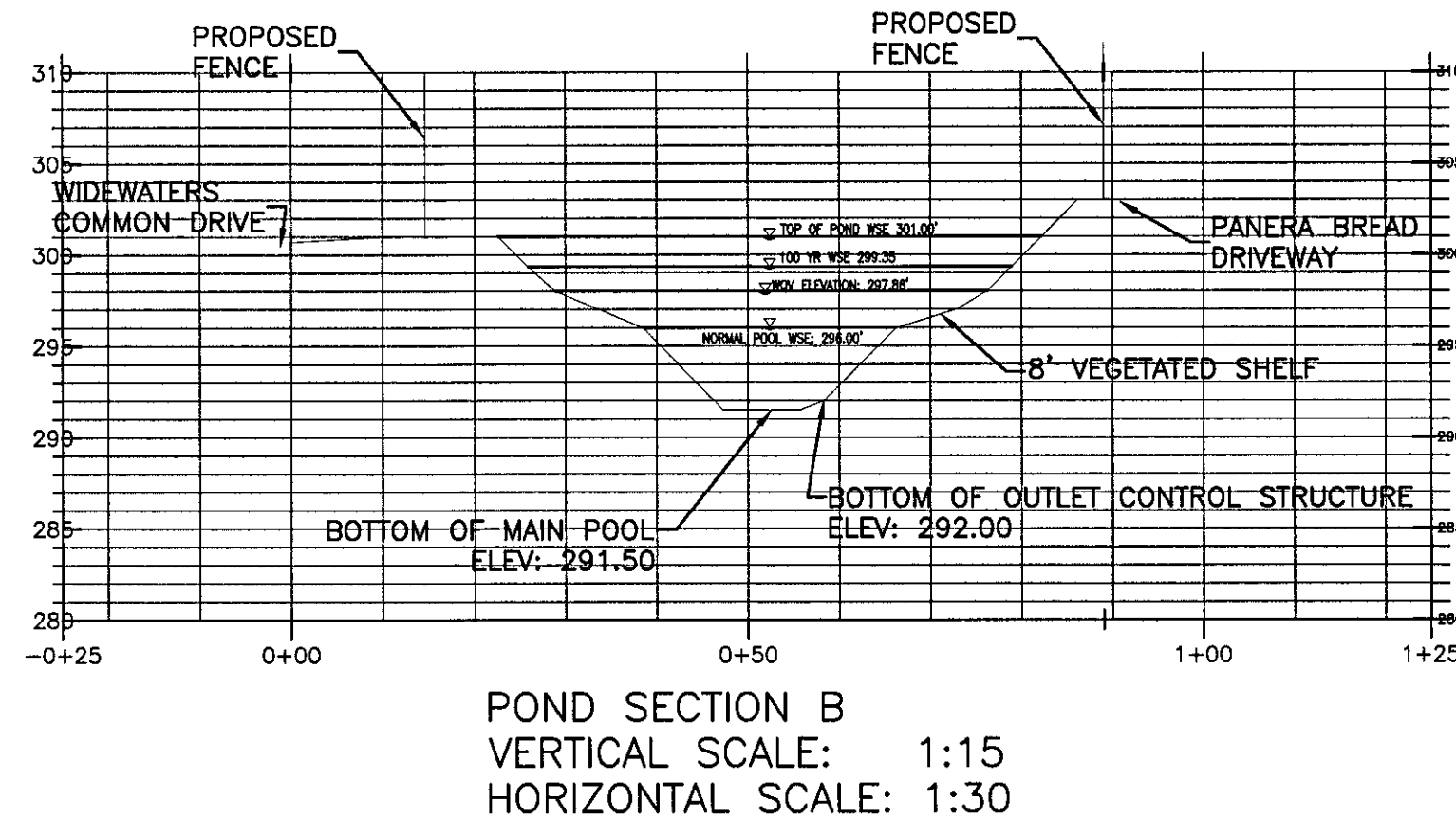
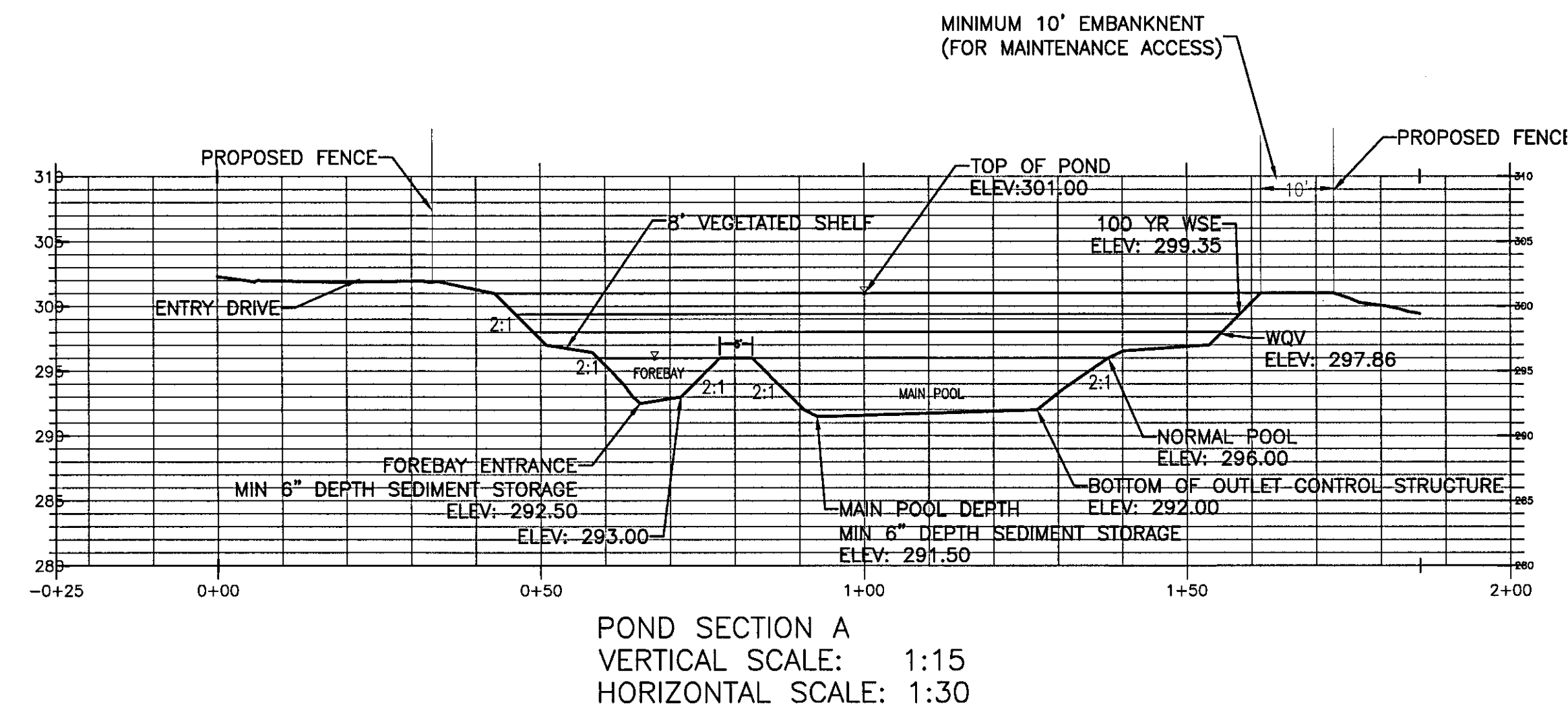


**PROJECT NUMBER**  
 20211261.0

**SHEET TITLE**  
**POND SECTIONS**

**SHEET NUMBER**

**C-4.3**



Know what's below.  
 Call before you dig.

**EROSION AND SEDIMENT CONTROL**  
 APPROVED PLAN  
 DATE 5/12/2023  
 PERMIT NO. S-SEL-000004-2022  
 Town of Knightdale Public Works  
 Sedimentation & Erosion Control  
 9-21-2250  
Town of Knightdale Construction Inspector Signature



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	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



Todd Fleming

**PROFESSIONAL IN CHARGE**

TODD FLEMING

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

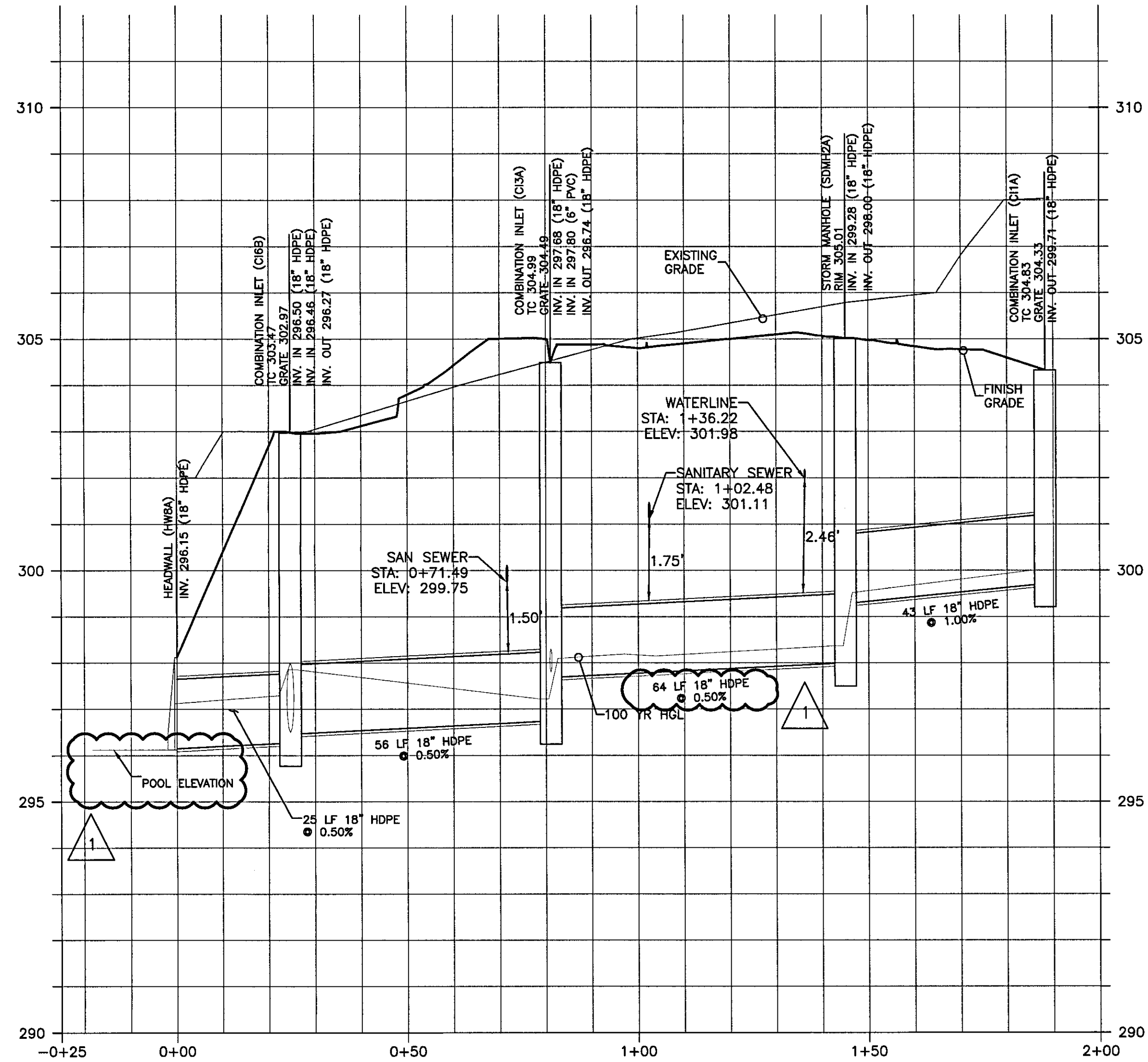
20211261.0

**SHEET TITLE**

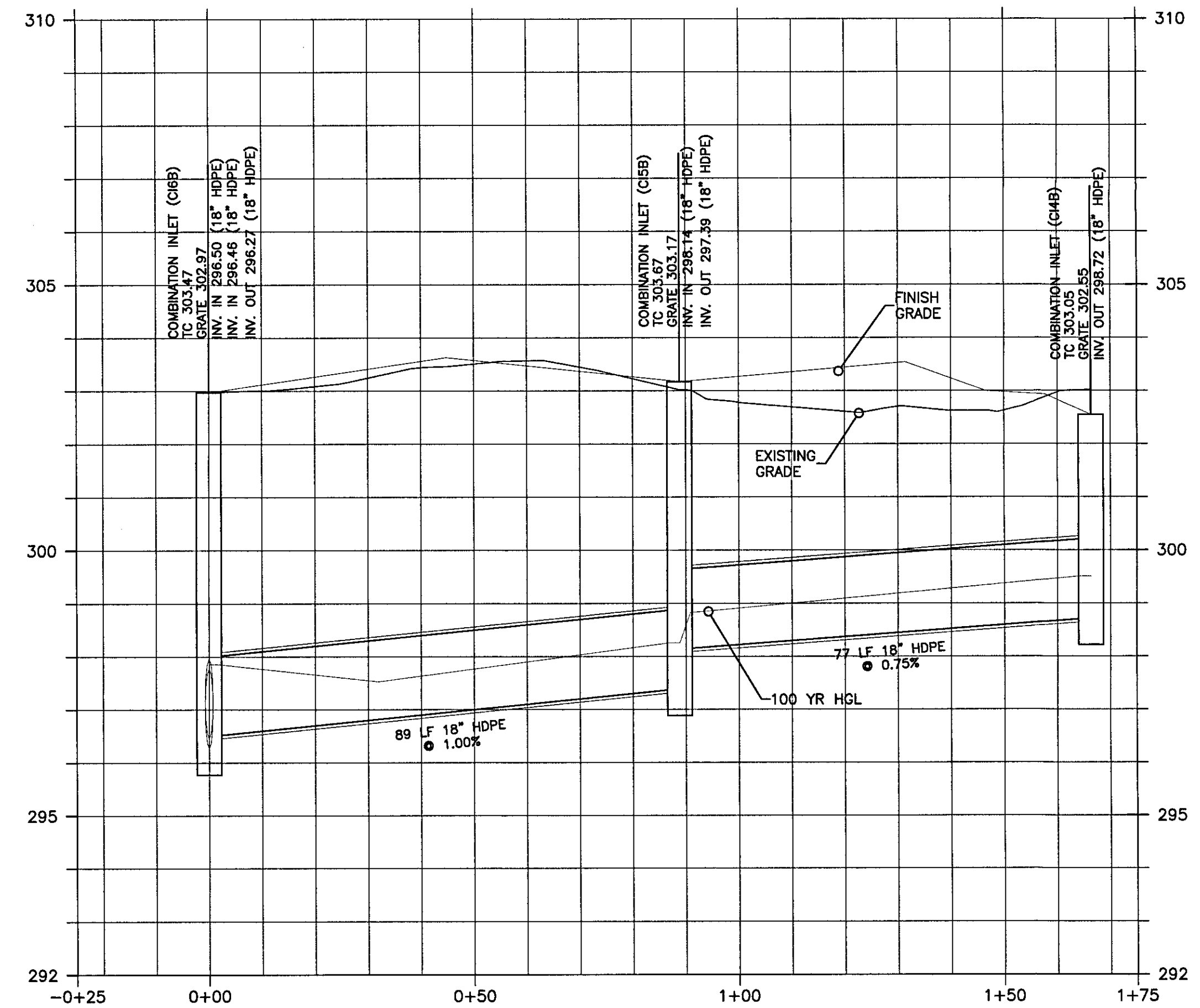
**STORM SEWER PROFILES**

**SHEET NUMBER**

**C-4.4**



STORM SEWER A PROFILE  
VERTICAL SCALE: 1"=3'  
HORIZONTAL SCALE: 1"=30'



STORM SEWER B PROFILE  
VERTICAL SCALE: 1"=3'  
HORIZONTAL SCALE: 1"=30'



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**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-SEC-00004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
219-217-2250





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	ADDENDUM 2
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4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**  
 TODD FLEMING  
**PROJECT MANAGER**  
 HAMILTON WILLIAMS  
**QUALITY CONTROL**  
 WILLIAM LOTZ  
**DRAWN BY**  
 VICTOR LU

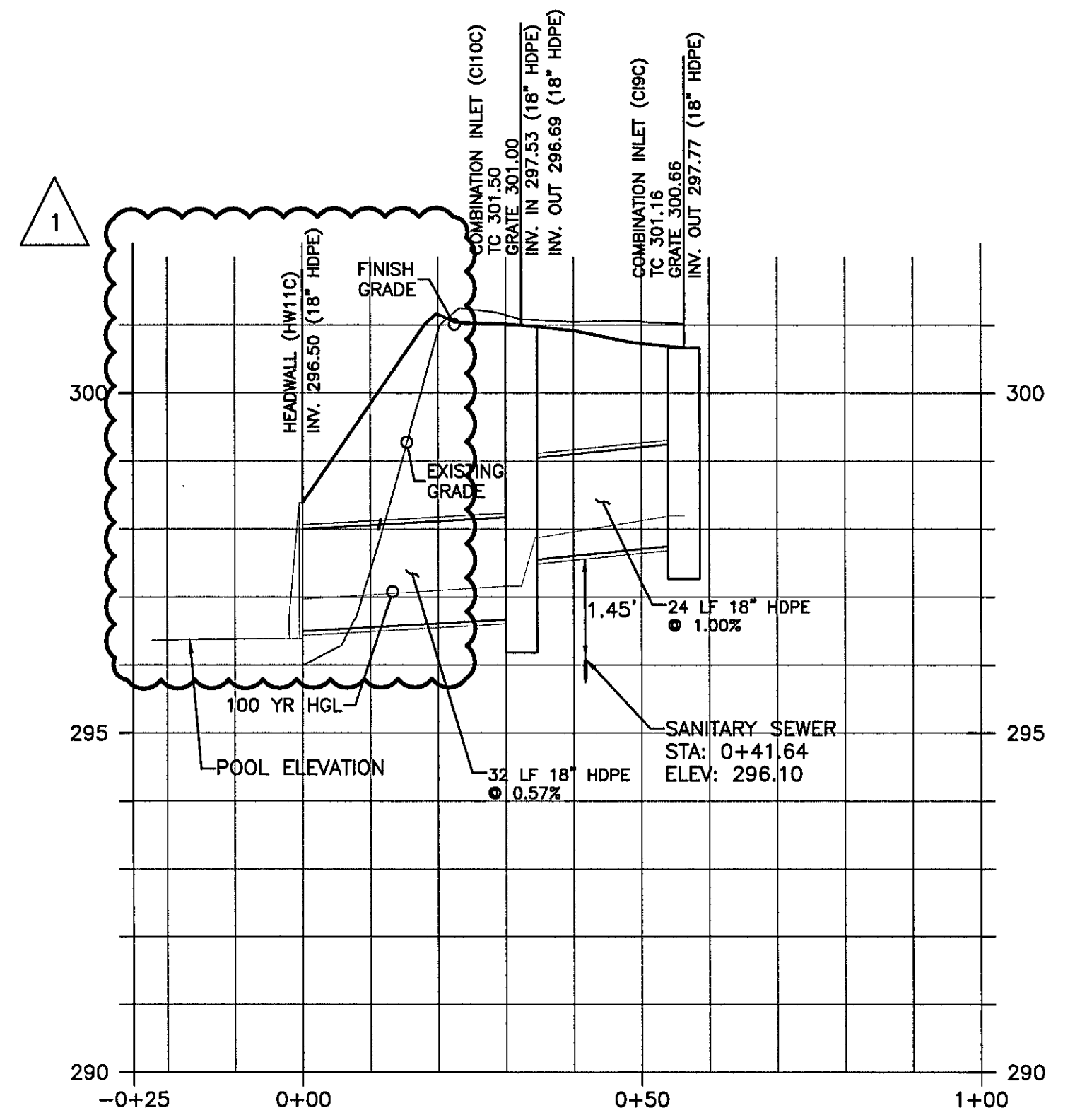
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**PANERA BREAD**  
 KNIGHTDALE  
 NORTH CAROLINA  
 6800 KNIGHTDALE BLVD

**PROJECT NUMBER**  
 20211261.0

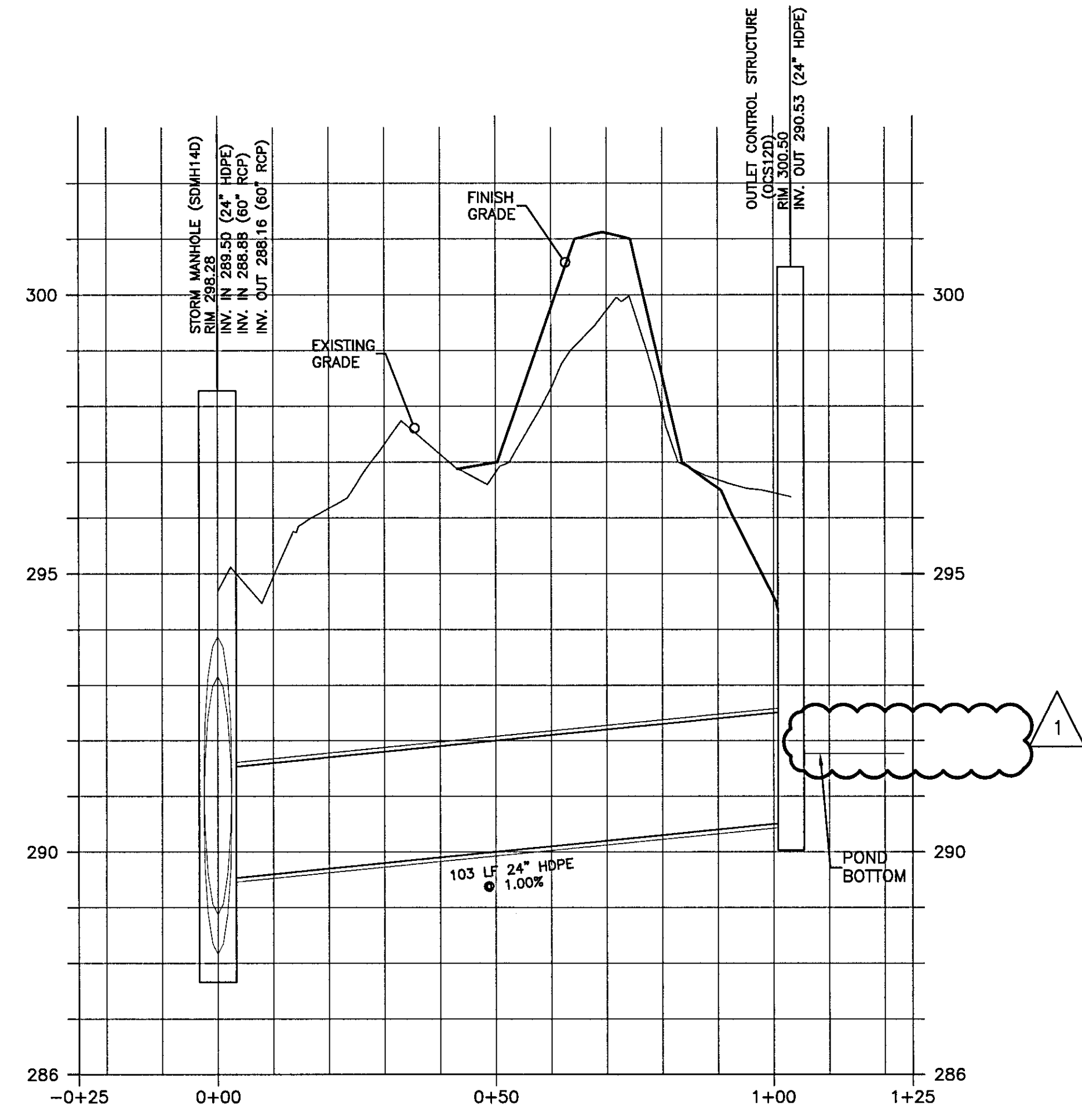
**SHEET TITLE**  
**STORM SEWER PROFILES**

**SHEET NUMBER**

**C-4.5**



STORM SEWER C PROFILE  
 VERTICAL SCALE: 1"=3'  
 HORIZONTAL SCALE: 1"=30'

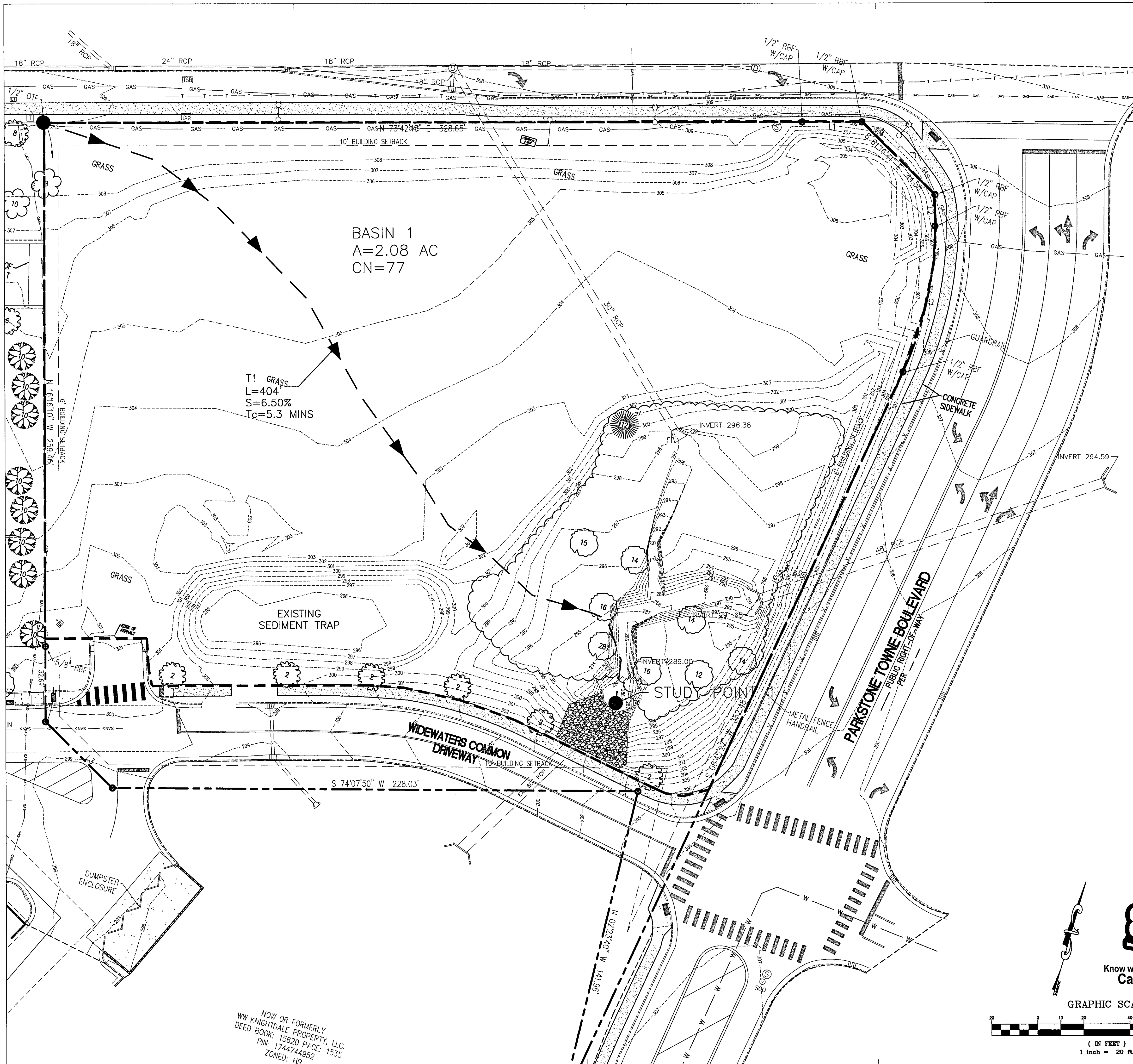


STORM SEWER D PROFILE  
 VERTICAL SCALE: 1"=3'  
 HORIZONTAL SCALE: 1"=30'



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**EROSION AND SEDIMENT CONTROL**  
 APPROVED PLAN  
 DATE 5/12/2023  
 PERMIT NO. S-SEC-00004-2023  
 Town of Knightdale Public Works  
 Sedimentation & Erosion Control  
 706-217-2250  
 Town of Knightdale Construction Inspector Signature



BASIN 1  
A=2.08 AC  
CN=77

T1 GRASS  
L=404'  
S=6.50%  
Tc=5.3 MINS

EXISTING  
SEDIMENT TRAP

STUDY POINT

WIDEWATERS COMMON  
DRIVEWAY

PARKSTONE TOWNE BOULEVARD  
PUBLIC RIGHT-OF-WAY

NOW OR FORMERLY  
WW KNIGHTDALE PROPERTY, LLC.  
DEED BOOK: 15620 PAGE: 1535  
PIN: 1744744952  
ZONED: HB

**811**  
Know what's below.  
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GRAPHIC SCALE  
( IN FEET )  
1 inch = 20 ft.

EROSION AND SEDIMENT CONTROL  
APPROVED PLAN  
DATE 6/12/2023  
PERMIT NO. S-SEL-000004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
19-217-2250

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	ADDENDUM 2
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4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



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TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**  
20211261.0

**SHEET TITLE**  
**PRE DEVELOPED DRAINAGE AREA MAP**

**SHEET NUMBER**

**C-4.6**



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Δ 3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
 HAMILTON WILLIAMS  
**QUALITY CONTROL**  
 WILLIAM LOTZ  
**DRAWN BY**  
 VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
 KNIGHTDALE  
 NORTH CAROLINA  
 6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

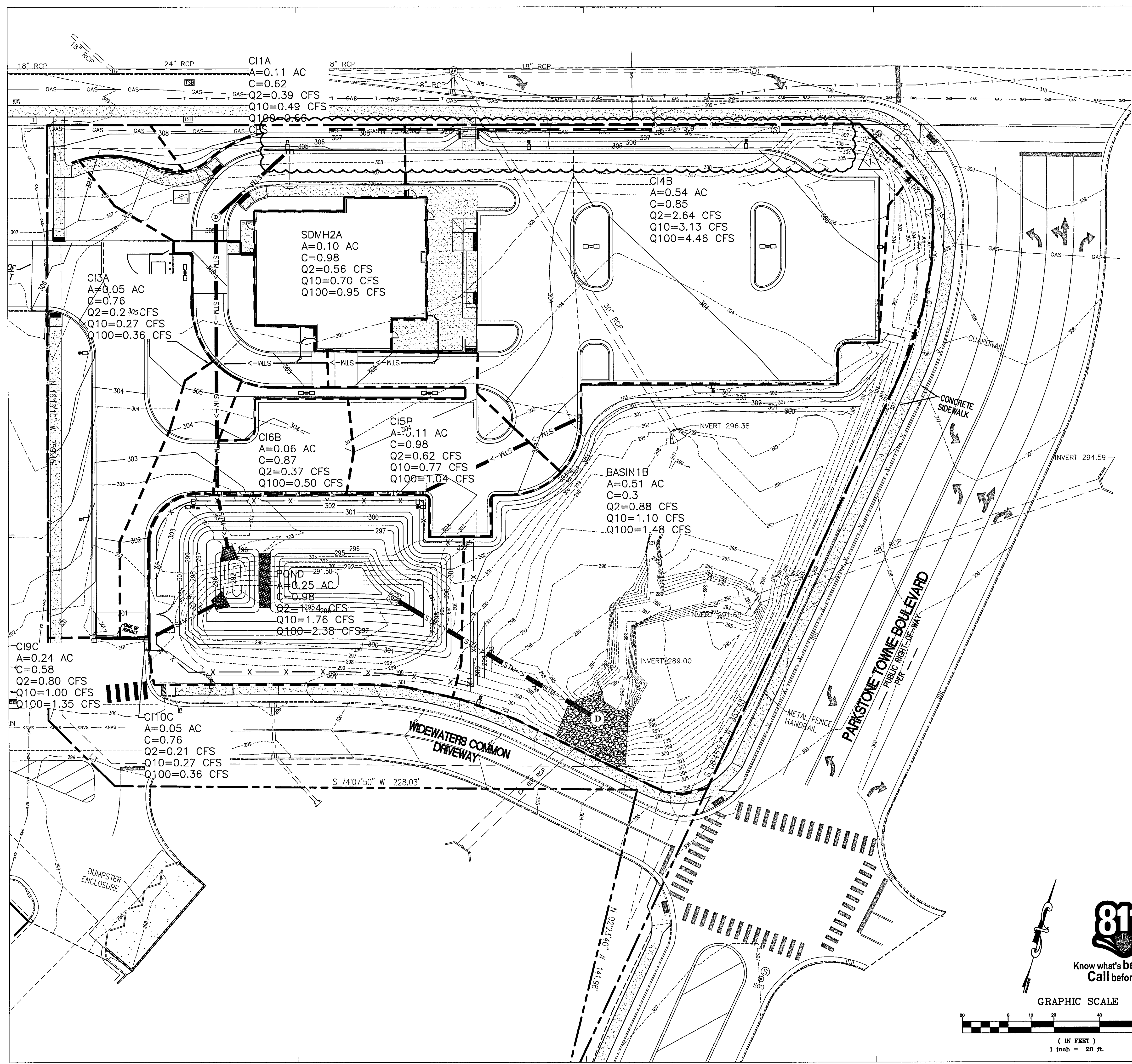
20211261.0

**SHEET TITLE**

**POST DEVELOPED DRAINAGE AREA MAP**

**SHEET NUMBER**

**C-4.7**



**811**  
 Know what's below.  
 Call before you dig.

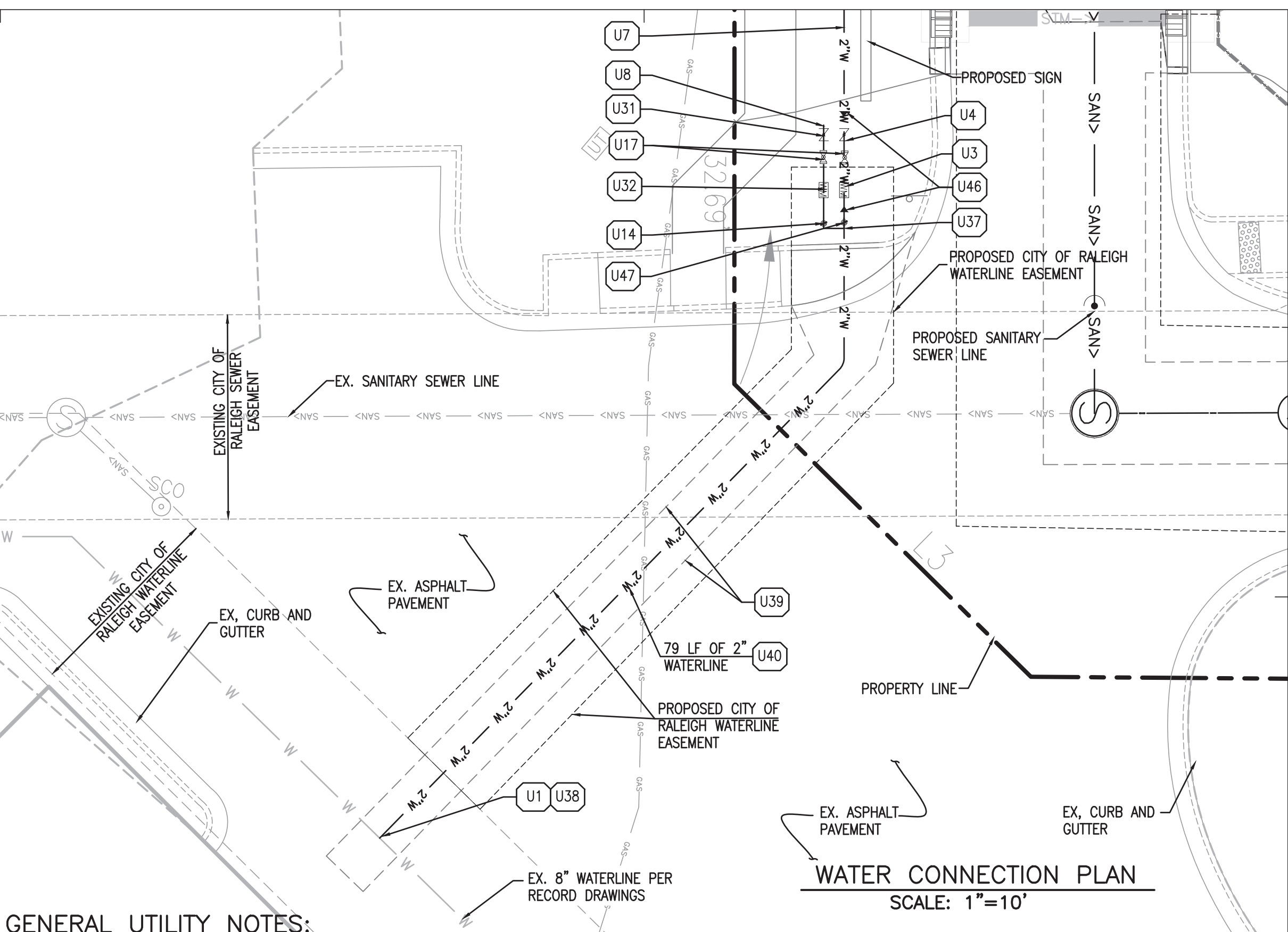
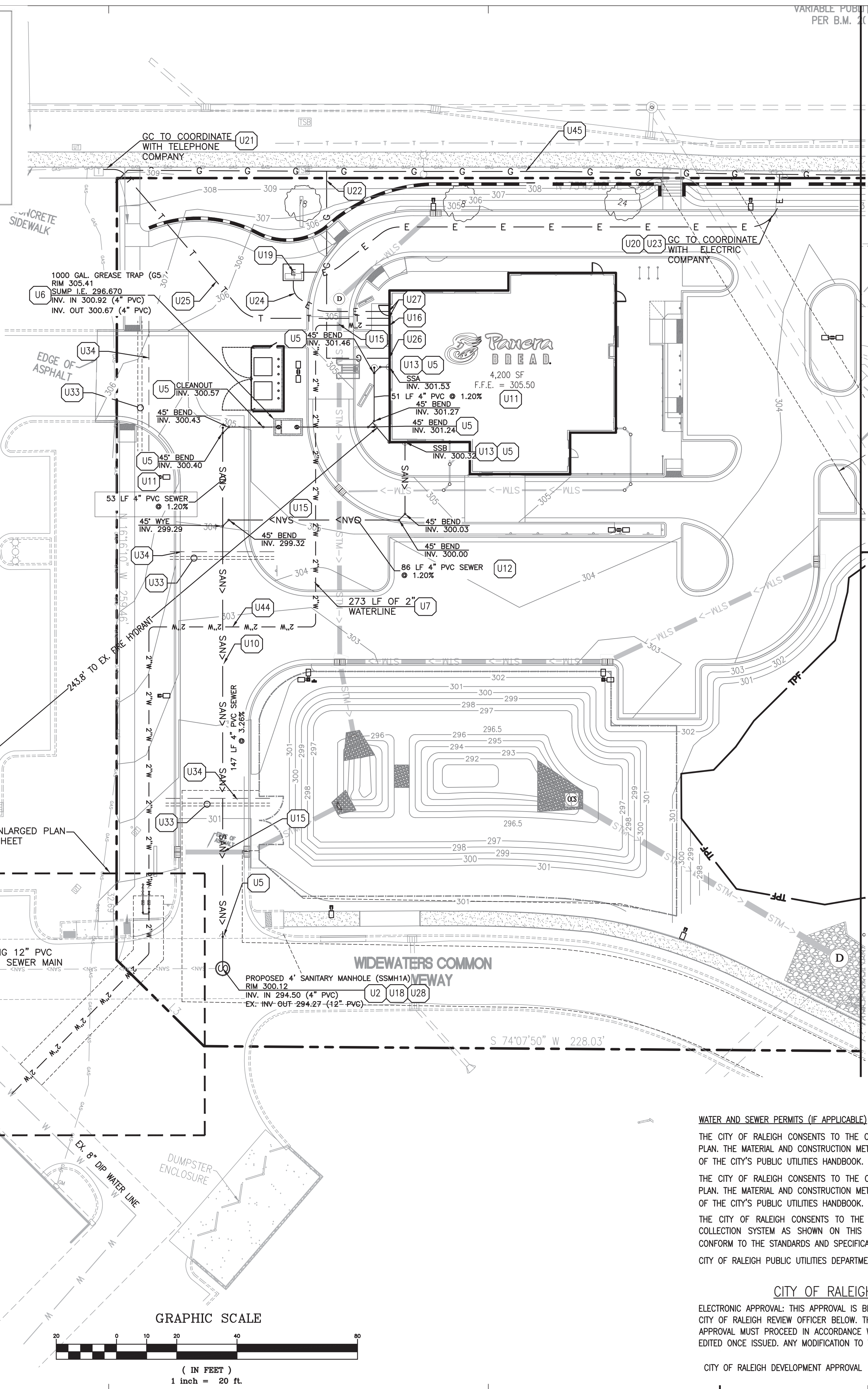
**GRAPHIC SCALE**  
 ( IN FEET )  
 1 inch = 20 ft.

**EROSION AND SEDIMENT CONTROL**  
 APPROVED PLAN  
 DATE 5/12/2023  
 PERMIT NO. S-566-000004-2022  
 Town of Knightdale Public Works  
 Sedimentation & Erosion Control  
 919-217-2250

**ATTENTION CONTRACTORS**  
 The Construction Contractor responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for contacting the Public Utilities Department at (919) 996-4340 at least twenty four hours prior to beginning any of their 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 Jobsite, 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.



**GENERAL UTILITY NOTES:**

- CONTRACTOR IS TO VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION AND ENSURE NO CONFLICTS EXIST WITH PROPOSED IMPROVEMENTS. NOTIFY ENGINEER IMMEDIATELY IF UTILITIES ARE LOCATED DIFFERENTLY THAN SHOWN. THE CONTRACTOR SHALL COORDINATE WITH EACH RESPECTIVE UTILITY COMPANY IN ORDER TO RELOCATE IF NEEDED IN CONFORMANCE WITH THEIR GUIDELINES.
- CONTRACTOR SHALL NOTIFY AND COORDINATE WITH THE APPROPRIATE UTILITY COMPANY PRIOR TO THE REMOVAL OF INDICATED UTILITIES ON SITE (SEE DEMOLITION PLAN). CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS REQUIRED FOR DEMOLITION AND HAUL OFF FROM THE APPROPRIATE AUTHORITIES.
- AUTHORIZATION MUST BE OBTAINED FROM THE (EDIT) WATER SYSTEM TO CONSTRUCT, ALTER OR MODIFY A WATER OR SEWER LINE. CONSTRUCTION OF WATER AND SEWER INFRASTRUCTURE WILL BE AUTHORIZED BY THE WATER SYSTEM UPON:
  - APPROVAL OF SUBMITTED PLANS.
  - NOTIFICATION OF THE WATER SYSTEM AT LEAST 24 HOURS PRIOR TO STARTING CONSTRUCTION.
- AT THE COMPLETION OF THE WATER AND/OR SEWER CONSTRUCTION AND PRIOR TO RECORDING THE FINAL PLAN, THE CONTRACTOR WILL FURNISH THE WATER SYSTEM INSPECTOR RECORD DRAWINGS OF THE PROJECT.
- BUILDING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE GAS COMPANY FOR THE CONSTRUCTION OF THE GAS LINE BETWEEN METER AND MAIN.
- BUILDING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE POWER COMPANY FOR THE CONSTRUCTION OF ELECTRICAL CONDUIT TO PROVIDE SERVICE TO THE TRANSFORMER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING, PRIOR TO CONSTRUCTION, ALL EXISTING LOCATIONS AND INVERT ELEVATIONS OF SANITARY SEWERS, STORM DRAINAGE, AND WATER MAINS. IF ANY INVERT ELEVATION VARIES MORE THAN 0.1 FT. FROM RECORD ELEVATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. WORK SHALL NOT PROCEED UNTIL THE CONTRACTOR IS NOTIFIED BY THE ENGINEER.
- CONNECT TO EXISTING UTILITIES AND INSTALL UTILITIES IN COMPLIANCE WITH REQUIREMENTS OF APPROPRIATE JURISDICTIONAL AGENCIES.
- COORDINATE WITH BUILDING PLANS TO ASSURE ACCURACY OF UTILITY CONNECTIONS AND COMPLIANCE WITH LOCAL CODES.
- ALL SEWERS TO BE MAINTAINED THROUGHOUT CONSTRUCTION, INCLUDING CLEANING OF ANY SILT OR DEBRIS ACCUMULATED IN STRUCTURES.
- ALL SURPLUS EXCAVATED MATERIAL FROM THE TRENCH SHALL BE DISPOSED OFF THE SITE BY CONTRACTOR.
- COORDINATE EXACT TRENCHING, ROUTING, AND POINT OF TERMINATION WITH ALL UTILITY COMPANIES.
- SEE GENERAL NOTES FOR ADDITIONAL INFORMATION.
- WATER MAIN SHALL BE A MINIMUM DEPTH OF 48 INCHES.

**UTILITY KEY NOTES**

- U1 POINT OF CONNECTION WATER SERVICE
- U2 POINT OF CONNECTION SEWER SERVICE. GC SHALL CONFIRM INVERT PRIOR TO CONSTRUCTION.
- U3 PROPOSED 1.5" DOMESTIC WATER METER PER CITY STD. W-23 & 4-31 (RALEIGH)
- U4 PROPOSED 1.5" REDUCED PRESSURE PRINCIPLE ASSEMBLY (WATTS: LFO09M2QT) PER CITY STD. W-36 (RALEIGH) WITH INSULATED HOTBOX ENCLOSURE
- U5 SANITARY SEWER CLEANOUT PER CITY STD. S-34 (RALEIGH)
- U6 GREASE TRAP PER CITY DETAIL STD. PER CITY STD. S-40 (RALEIGH)
- U7 2" DOMESTIC WATERLINE HIGH DENSITY POLYETHYLENE TUBING PER AWWA C901 IRRIGATION WATER LINE. SEE IRRIGATION PLAN FOR CONTINUATION.
- U8 SANITARY SEWER TRENCHING AND BEDDING PER CITY STD. S-5 (RALEIGH)
- U10 SSA SEE SHEET C-5-1 FOR PROFILES
- U11 SSB SEE SHEET C-5-1 FOR PROFILES
- U12 SANITARY SEWER SERVICE ENTRY (PER PLUMBING PLANS)
- U13 1" CURB STOP AND VALVE BOX
- U15 MAINTAIN 18" VERTICAL SEPARATION
- U16 DOMESTIC WATER SERVICE ENTRY (PER PLUMBING PLANS)
- U17 SERVICE VALVE AND VALVE BOX
- U18 SANITARY SEWER DOG HOUSE MANHOLE PER CITY STD. S-22 (RALEIGH)
- U19 PROPOSED ELECTRICAL TRANSFORMER PAD PER DUKE SPECIFICATIONS. TRANSFORMER INSTALLATION BY UTILITY.
- U20 POINT OF CONNECTION FOR UNDERGROUND ELECTRIC SERVICE
- U21 TELEPHONE SERVICE POINT OF CONNECTION (GC SHALL COORDINATE WITH LOCAL TELEPHONE COMPANY)
- U22 GAS SERVICE POINT OF CONNECTION (GC SHALL COORDINATE WITH LOCAL GAS COMPANY)
- U23 PROPOSED PRELIMINARY ELECTRICAL SERVICE ROUTE. PROVIDE (2) 4" CONDUITS PER DUKE ENERGY SPECIFICATIONS. PRIMARY CONDUCTORS BY UTILITY.
- U24 PROPOSED SECONDARY ELECTRICAL SERVICE ROUTE BY CONTRACTOR, SEE BUILDING PLANS.
- U25 GC SHALL PROVIDE (3)-2" CONDUITS FOR TELEPHONE/ELECTRIC
- U26 GAS SERVICE ENTRY (PER MECHANICAL PLANS)
- U27 ELECTRICAL/COMMUNICATION SERVICE ENTRY (PER MECHANICAL PLAN)
- U28 SANITARY SEWER MANHOLE PER CITY STD. S-20 (RALEIGH)
- U31 PROPOSED 1" IRRIGATION DOUBLE CHECK VALVE ASSEMBLY (WATTS: SS007M1QT) PER CITY STD. W-36 (RALEIGH) WITH INSULATED HOTBOX ENCLOSURE
- U32 PROPOSED 1" IRRIGATION METER PER CITY STD. W-32 (RALEIGH)
- U33 INSTALL (2) 4" PVC SLEEVES 30" BELOW FINAL GRADE UNDER DRIVEWAY. EXTEND SLEEVES 2 FEET BEYOND BACK OF PROPOSED CURB AND EDGE OF PAVEMENT. STAKE BOTH ENDS OF EACH SLEEVE WITH CAPPED VERTICAL PVC PIPE 12" ABOVE GRADE. DO NOT ALLOW SOIL OR WATER TO ENTER SLEEVES DURING OR AFTER CONSTRUCTION.
- U34 INSTALL (1) 4" PVC SLEEVES 30" BELOW FINAL GRADE UNDER DRIVEWAY. EXTEND SLEEVES 2 FEET BEYOND BACK OF PROPOSED CURB OR EDGE OF PAVEMENT. STAKE BOTH ENDS OF EACH SLEEVE WITH CAPPED VERTICAL PVC PIPE 12" ABOVE GRADE. DO NOT ALLOW SOIL OR WATER TO ENTER SLEEVES DURING OR AFTER CONSTRUCTION.
- U37 2"x1"x2" TEE
- U38 2" TAPPING SLEEVE AND CORPORATION STOP
- U39 OPEN CUT PAVEMENT INSTALLATION
- U40 2" DOMESTIC WATER SERVICE; SDR 9 POLYETHYLENE TUBING PER AWWA C901
- U44 WATER LINE TRENCHING AND BEDDING PER CITY STD. W-3 (RALEIGH)
- U45 NATURAL GAS MAIN RELOCATION BY DOMINION ENERGY
- U46 2" X 1-1/2" REDUCER
- U47 1-1/2" CURB STOP AND VALVE BOX

**SITE PERMITTING APPROVAL**

**WATER AND SEWER PERMITS (IF APPLICABLE)**

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 # \_\_\_\_\_

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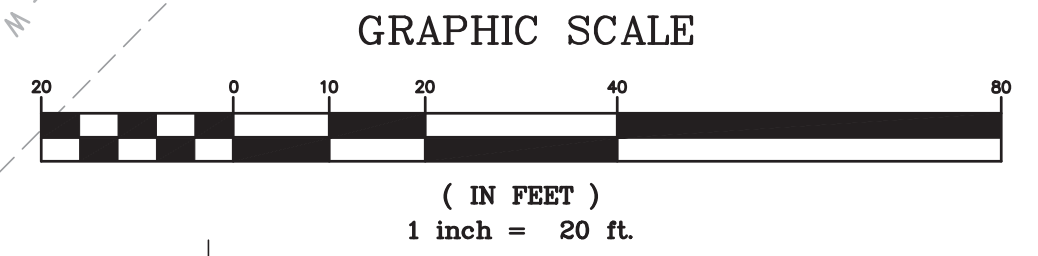
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**CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION**

ELECTRONIC APPROVAL: THIS APPROVAL IS BEING ISSUED ELECTRONICALLY. THIS APPROVAL IS VALID ONLY UPON THE SIGNATURE OF A CITY OF RALEIGH REVIEW OFFICER BELOW. THE CITY WILL RETAIN A COPY OF THE APPROVED PLANS. ANY WORK AUTHORIZED BY THIS APPROVAL MUST PROCEED IN ACCORDANCE WITH THE PLANS KEPT ON FILE WITH THE CITY. THIS ELECTRONIC APPROVAL MAY NOT BE EDITED ORCE ISSUED. ANY MODIFICATION TO THIS APPROVAL ONCE ISSUED WILL INVALIDATE THIS APPROVAL.

CITY OF RALEIGH DEVELOPMENT APPROVAL \_\_\_\_\_  
 RALEIGH WATER REVIEW OFFICER \_\_\_\_\_

Know what's below.  
 Call before you dig.



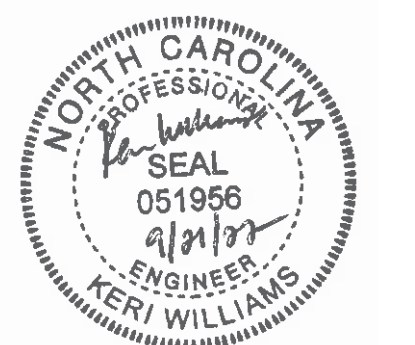
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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

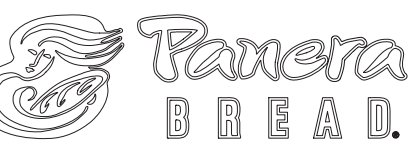
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2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**  
 KERI WILLIAMS, PE  
**PROJECT MANAGER**  
 HAMILTON WILLIAMS  
**QUALITY CONTROL**  
 WILLIAM LOTZ  
**DRAWN BY**  
 VICTOR LU

**PROJECT NAME**  
**PANERA BREAD**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD**



**PROJECT NUMBER**  
 20211261.0  
**SHEET TITLE**  
**UTILITY PLAN**

**SHEET NUMBER**  
**C-5.0**  
 NOT ISSUED FOR CONSTRUCTION

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: \_\_\_\_\_  
 TOWN ENGINEER

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

Digitally signed by Samuel A. MacDermis  
 Reason: I am approving these documents  
 Date: 2022.10.31 16:44:45 -0400

By: \_\_\_\_\_ DATE: \_\_\_\_\_  
 ADMINISTRATOR



www.greenbergfarrow.com  
 1230 Peachtree Street, NE  
 Suite 2900  
 Atlanta, GA 30309  
 t: 404 601 4000

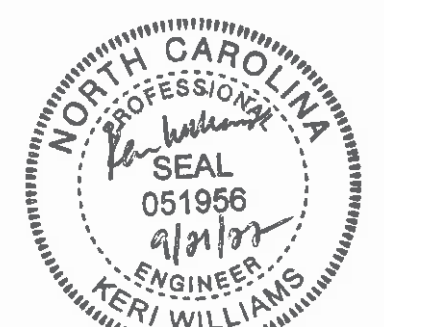
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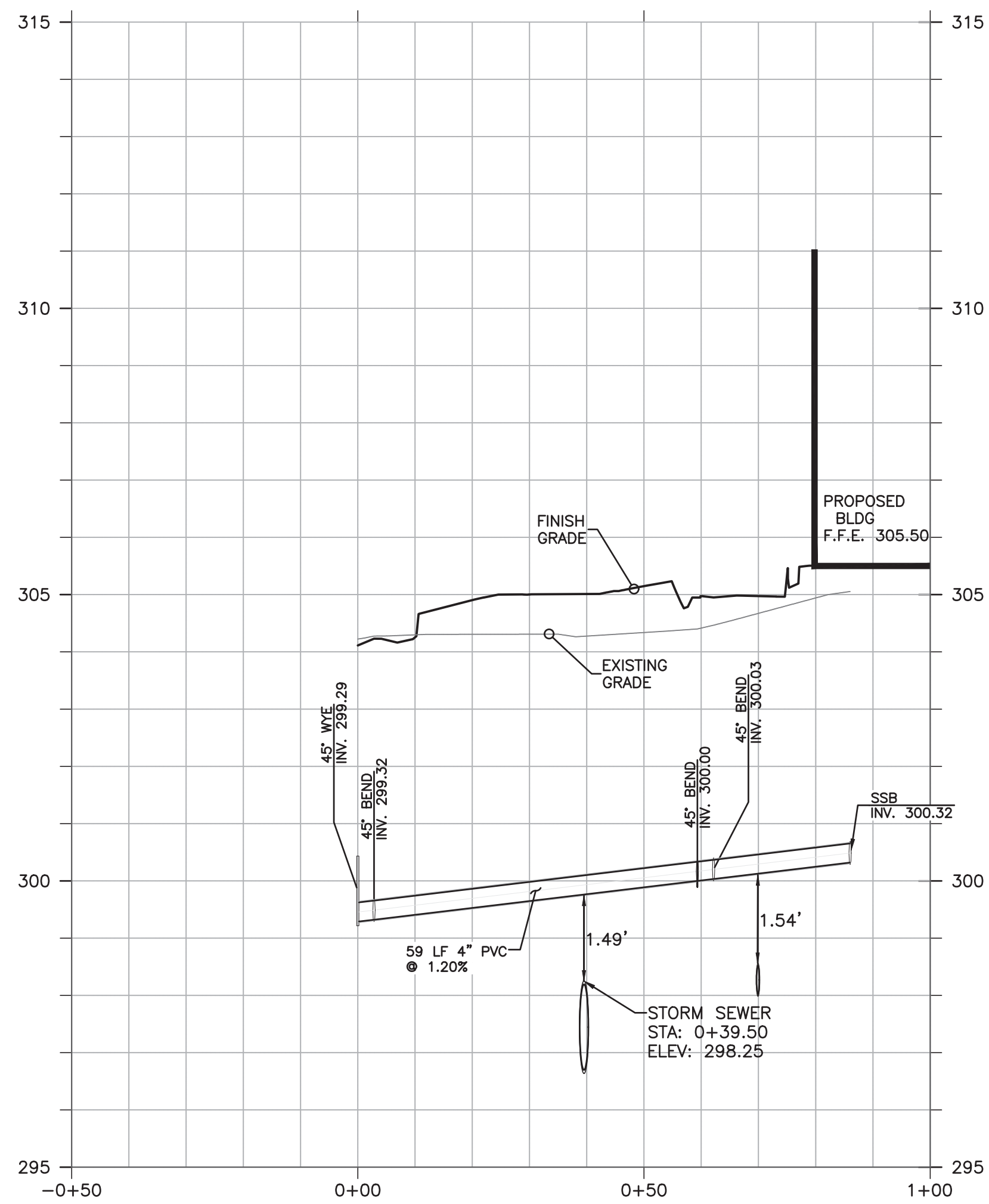
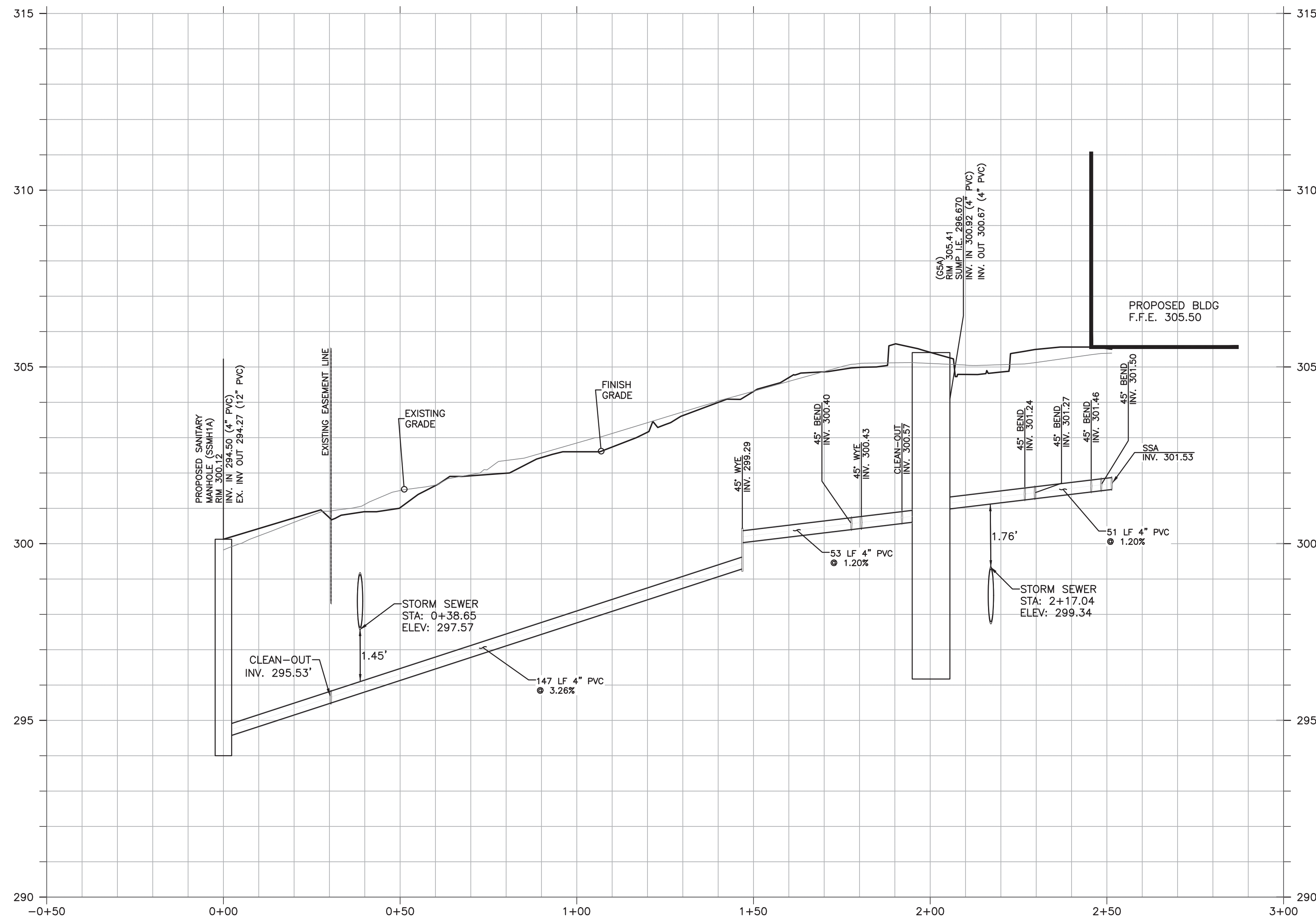
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**SANITARY SEWER PROFILES**

**SHEET NUMBER**

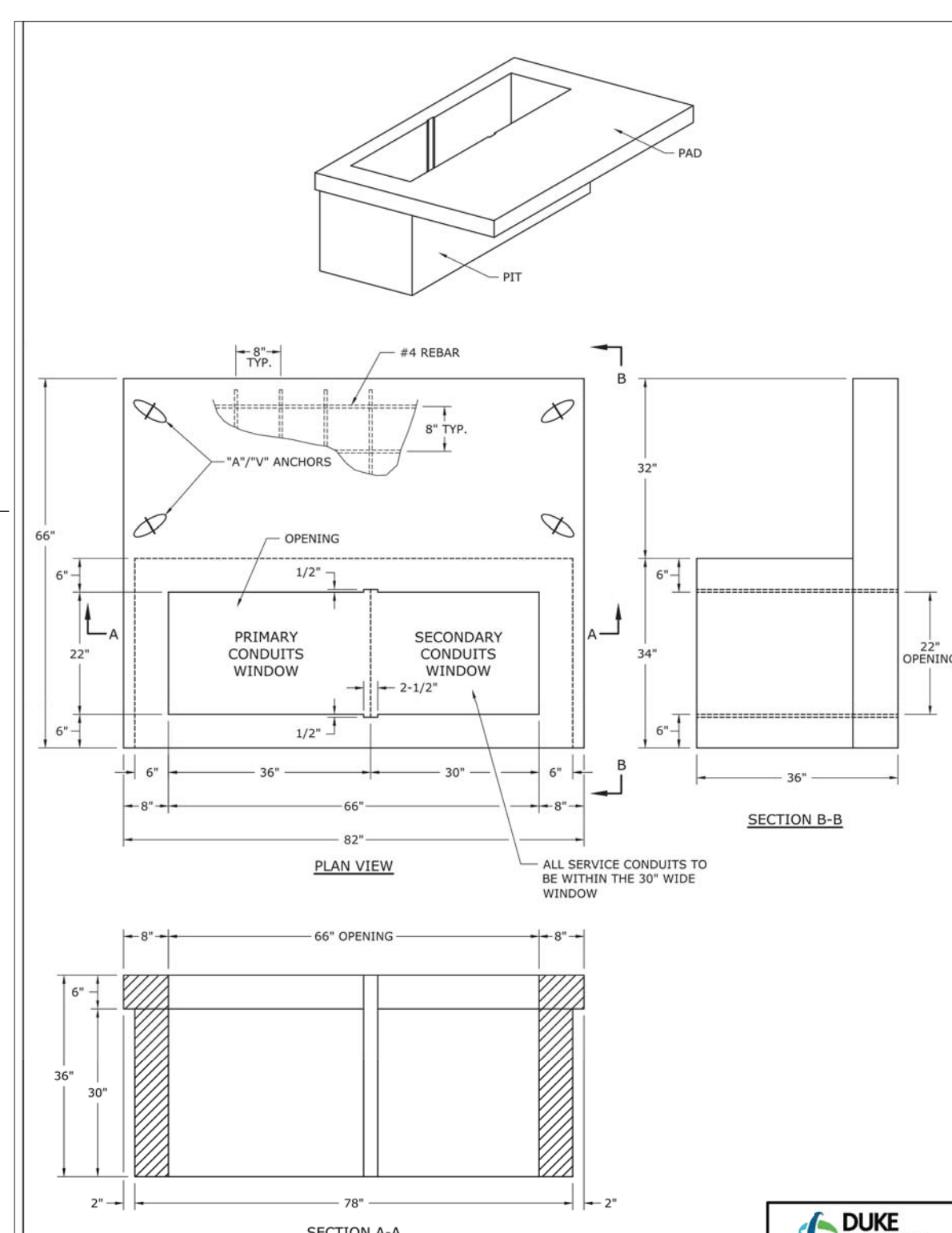
**C-5.1**

NOT ISSUED FOR CONSTRUCTION



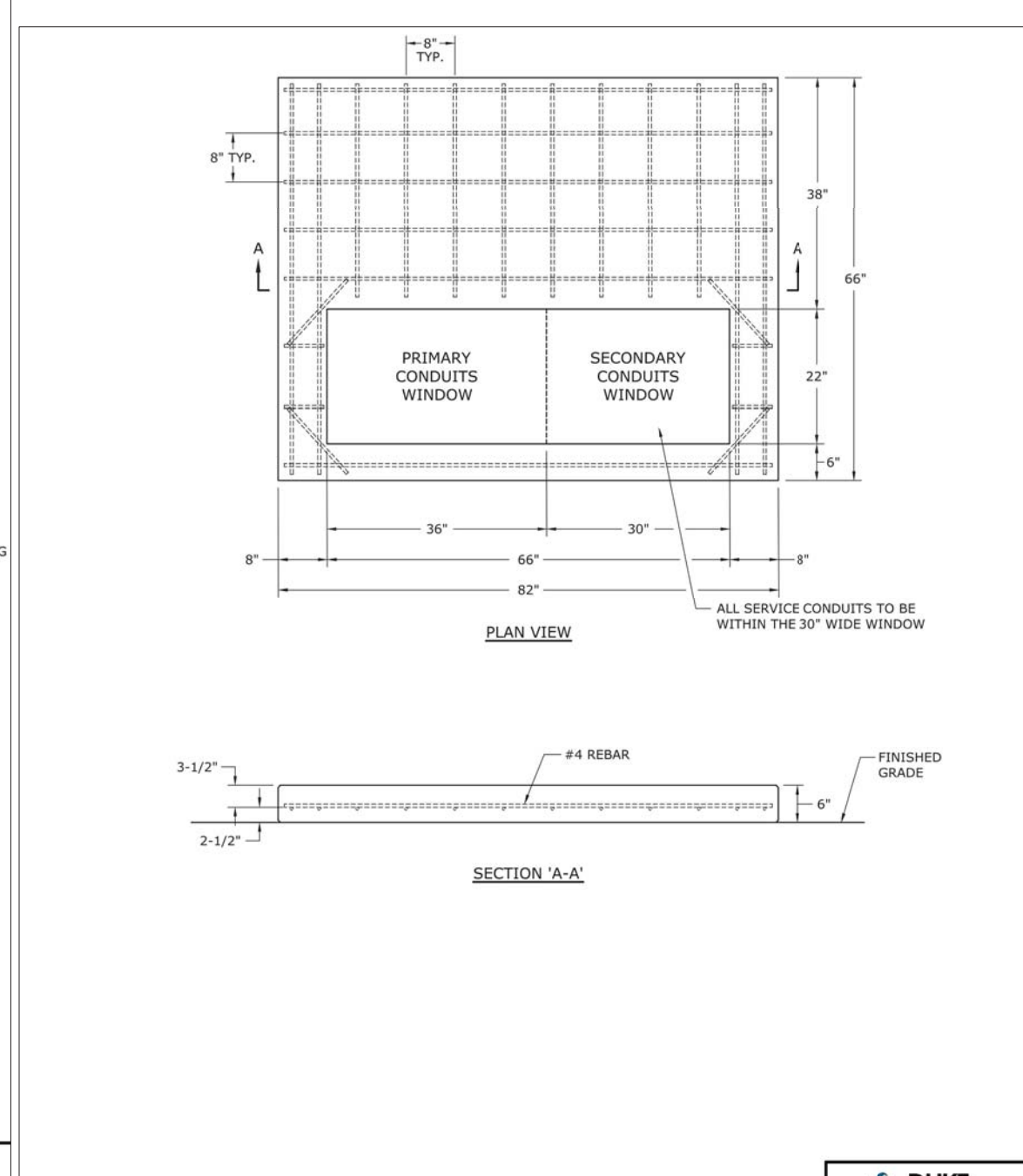
SANITARY SERVICE LATERAL SSB  
 VERTICAL SCALE: 1"=2'  
 HORIZONTAL SCALE: 1"=20'

SANITARY SERVICE LATERAL SSA  
 VERTICAL SCALE: 1"=2'  
 HORIZONTAL SCALE: 1"=20'



NO.	REVISION	BY	CHK'D	APPR.
1				
2				
3				

SMALL PIT PAD SPECIFICATIONS



NO.	REVISION	BY	CHK'D	APPR.
1				
2				
3				

SMALL FLAT PAD SPECIFICATIONS

**WATER AND SEWER PERMITS (IF APPLICABLE)**  
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 RALEIGH WATER REVIEW OFFICER: \_\_\_\_\_

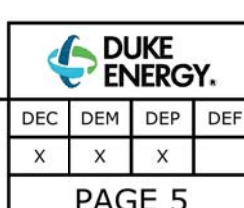
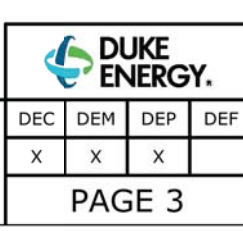
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By: \_\_\_\_\_ DATE: \_\_\_\_\_  
 TOWN ENGINEER

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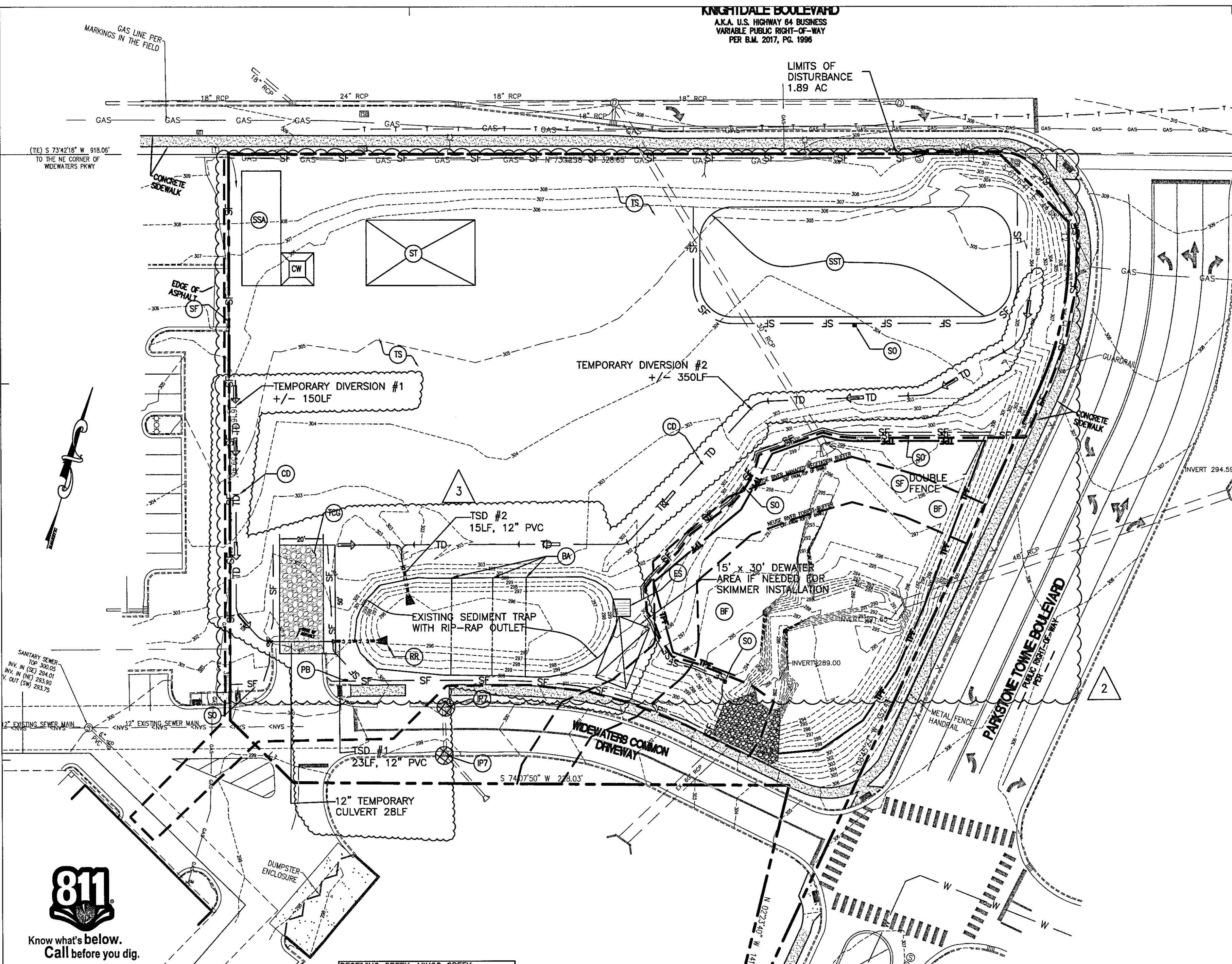
Digitally signed by \_\_\_\_\_  
 Date: 2022.10.31 16:45:54-0400

By: \_\_\_\_\_ DATE: \_\_\_\_\_  
 ADMINISTRATOR



**KNIGHTDALE BOULEVARD**  
A.K.A. U.S. HIGHWAY 84 BUSINESS  
VARIABLE PUBLIC RIGHT-OF-WAY  
PER S.M. 2017, PG. 1899

LIMITS OF DISTURBANCE  
1.89 AC



**EXISTING LEGEND:**

- EXISTING BUILDING
- LAND LOT LINE (LLL)
- PROPERTY LINE
- UTILITY POLE (LP), OVERHEAD LINES & GUY
- FIBER OPTIC CABLE
- TREE LINE
- SANITARY SEWER MANHOLE
- SANITARY CLEAN-OUT (SCO)
- SANITARY SEWER STUB OUT
- TELEPHONE MANHOLE/PEDESTAL
- STORM DRAIN PIPE WITH HEADWALL
- DOUBLE-WING CATCH BASIN
- SINGLE-WING CATCH BASIN
- JUNCTION BOX (JB)
- DROP OR CURB INLET (DI OR CI)
- FENCE
- DRAINAGE DITCH OR SWALE
- EXISTING 10 FOOT CONTOUR
- EXISTING 2 FOOT CONTOUR
- EXISTING GRADE SPOT ELEVATION
- DIRECTION OF SURFACE FLOW
- RECORDED DATA
- PARKING SPACE COUNT
- ELECTRICAL TRANSFORMER BOX
- ELECTRICAL METER
- ELECTRICAL STUB OUT
- UNKNOWN UTILITY STUB OUT
- WATER STUB OUT
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- GAS METER
- MONITORING WELL
- POST INDICATOR VALVE
- MAILBOX
- STREET SIGN
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL BOX
- BACKFLOW PREVENTER
- FIRE DEPT CONNECTION
- FIBER OPTIC BOX
- IRRIGATION CONTROL VALVE
- DRAINAGE MANHOLE
- R/W RIGHT-OF-WAY
- RFB REBAR PIN FOUND
- OTF OPEN TOP PIPE FOUND
- CMP CORRUPTED METAL PIPE
- CNF CONCRETE MONUMENT FOUND
- BDF BRASS DISK FOUND
- AXF AXLE FOUND
- RBS REBAR PIN SET
- CMP CORRUPTED METAL PIPE
- RCP REINFORCED CONC. PIPE
- HDPE HIGH-DENSITY POLYETHYLENE PIPE
- DIP DUCTILE IRON PIPE

- PROPOSED**
- BOUNDARY LINE
  - CONTOUR ELEVATIONS
  - LIMIT OF DISTURBED AREA
  - TPF TREE PROTECTION FENCING
  - SF SILT FENCE

**PROJECT INFORMATION**

THE PROPOSED PROJECT CONSIST OF THE CONSTRUCTION A PANERA BREAD RESTAURANT WITH ITS ASSOCIATED HARDSCAPE ITEMS AND UTILITIES. THE BUILDING AREA IS 4,200 S.F.  
THE ACRES OF SITE IS 2.35 ACRES.  
THE DISTURBED ACRES OF SITE (INCLUDING OFF-SITE WORK) IS 1.89 ACRES.  
THE ANTICIPATED CONSTRUCTION START DATE IS MAY 2023 AND COMPLETION DATE IS OCTOBER 2023.  
THE STORMWATER WILL FLOW FROM THE NORTHWEST TO THE SOUTHWEST OF THE SITE INTO AN WET DETENTION POND LOCATED ON THE SOUTH SIDE OF THE PROJECT SITE. THE STORM DRAINAGE WILL THEN FLOW SOUTH ALONG AN EXISTING DRAINAGE WAY. THE EXISTING DRAINAGE WAY EVENTUALLY TIENS INTO MINGO CREEK WHICH IS APPROXIMATELY 4.2 MILES SOUTHWEST OF THE PROJECT SITE.  
PANERA BREAD CONTRACTOR TO TAKE APPROPRIATE MEASURES TO KEEP SEDIMENT FROM ESCAPING SITE AND ALL ACCUMULATED SEDIMENT SHALL BE CLEANED OUT AND REMOVED FROM SITE.

**SEQUENCE OF CONSTRUCTION**

- PHASE I**
- SCHEDULE AN INITIAL PRE-CONSTRUCTION CONFERENCE WITH THE TOWN OF KNIGHTDALE. OBTAIN A LAND-DISTURBANCE PERMIT.
  - INSTALL PERIMETER SILT FENCE AND TREE PROTECTION FENCE AS SHOWN ON THE APPROVED PLANS.
  - SCHEDULE AN ON-SITE PRE-CONSTRUCTION MEETING WITH TOWN OF KNIGHTDALE TO INSPECT INSTALLED PERIMETER CONTROLS.
  - IF APPROVED, INSTALL GRAVEL CONSTRUCTION PAD, INLET FILTER INSERTS OR OTHER MEASURES AS SHOWN ON THE APPROVED PLANS. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES.
  - INSPECT, RECONSTRUCT AND RESEED EXISTING SEDIMENT BASIN.
  - INSTALL TEMPORARY CONCRETE WASH OUT.
  - INSTALL TEMPORARY STOCKPILE AREA SILT FENCE AT THE END OF THE STOCKPILE.
  - CALL TOWN OF KNIGHTDALE EROSION CONTROL INSPECTOR TO SCHEDULE AN ON-SITE INSPECTION AND OBTAIN A CERTIFICATE OF COVERAGE.
  - BEAN CLEARING AND GRUBBING, STOCKPILE TOPSOIL, AND MAINTAIN DEVICES AS NEEDED.
  - CONSTRUCT TEMPORARY DIVERSIONS, SEDIMENT TRAP OR OTHER MEASURES AS SHOWN ON THE APPROVED PLANS. SEED TEMPORARY DIVERSIONS, BERMS, AND TRAP IMMEDIATELY AFTER CONSTRUCTION.
  - INSTALL SLOPE DRAIN WITH INLET PROTECTION AND RIPRAP OUTFALL.
  - CONTRACTOR SHALL RELOCATE/REMOVE THE CONCRETE WASHOUT AREA AS CONSTRUCTION PROGRESS SO THAT CONSTRUCTION TRAFFIC IS NOT NEGATIVELY IMPACTED.
  - DEWATER SEDIMENT TRAP WITH USING PORTABLE SUMP PUMPS AND DOWATERING FILTER BAG.
  - PROVIDE CONTINUOUS MONITORING DURING ALL DEWATERING.
- PHASE II**
- ROUGH GRADE SITE. CONSTRUCT SEDIMENT BASIN, INCLUDING SKIMMER AND BAFFLES.
  - INSTALL UTILITIES, STORM SEWERS, AND INLETS.
  - INSTALL TEMPORARY INLET PROTECTION
  - INSTALL ROLLED EROSION CONTROL PRODUCT.
  - GRADE BUILDING PAD AND STRUCTURES.
  - TEMPORARILY SEED DENuded AREAS.
  - PREPARE SITE FOR PAVING.
- PHASE III**
- PAVE SITE.
  - STABILIZE SITE AS AREAS ARE FINISH GRADED. PAVE, SITE SEED, SOO AND/OR LANDSCAPE AND MULCH DENuded AREAS PER GROUND STABILIZATION.
  - WHEN CONSTRUCTION IS COMPLETE AND FINISH GRADED AREAS ARE STABILIZED COMPLETELY, CALL FOR EROSION CONTROL INSPECTION.
  - IF SITE IS APPROVED, REMOVE TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS, SEED OR STABILIZE ANY RESULTING BARE AREAS. INSTALL ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS VELOCITY DISSIPATORS.
  - REMOVE SEDIMENT BASIN PER SEQUENCE NOTES SHEET C-4.2. DEWATER MAIN POOL USING FLOATING SKIMMER, DEWATER BASIN FOREBAY WITH USING PORTABLE SUMP PUMP AND DEWATERING FILTER BAG.
  - PROVIDE CONTINUOUS MONITORING DURING ALL DEWATERING.
  - WHEN VEGETATION HAS BECOME ESTABLISHED (80% GERMINATION), CALL FOR A FINAL INSPECTION BY THE EROSION CONTROL INSPECTOR. OBTAIN A CERTIFICATE OF COMPLETION.

**BEST MANAGEMENT PRACTICE LEGEND**

- CD CHECK DAM
- TCG TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
- SF SEDIMENTATION FENCE
- CW CONCRETE WASHOUT AREA
- ST TEMPORARY STORAGE AREA
- SSA STABILIZED STORAGE AREA
- SST SOIL STOCKPILE AREA PER NCDEQ (6.04)
- IP7 DANDY SACK
- IP6 HARDWARE CLOTH AND GRAVEL INLET PROTECTION
- TD DIVERSION DITCH
- TSD SLOPE DRAIN
- SSB SKIMMER
- ES EMERGENCY SPILLWAY
- SO SILT FENCE OUTLET
- PB PERMIT CARD AND NCGIM INSPECTION RECORDS BOX
- BF BUFFER AREA PER NCDEQ. (6.74)
- RR RIP RAP OUTFALL PROTECTION PER NCDEQ. (6.15)
- RECP ROLLED EROSION CONTROL PRODUCT
- BA BAFFLES

**SOIL EROSION/SEDIMENTATION CONTROL OPERATION TIME SCHEDULE**

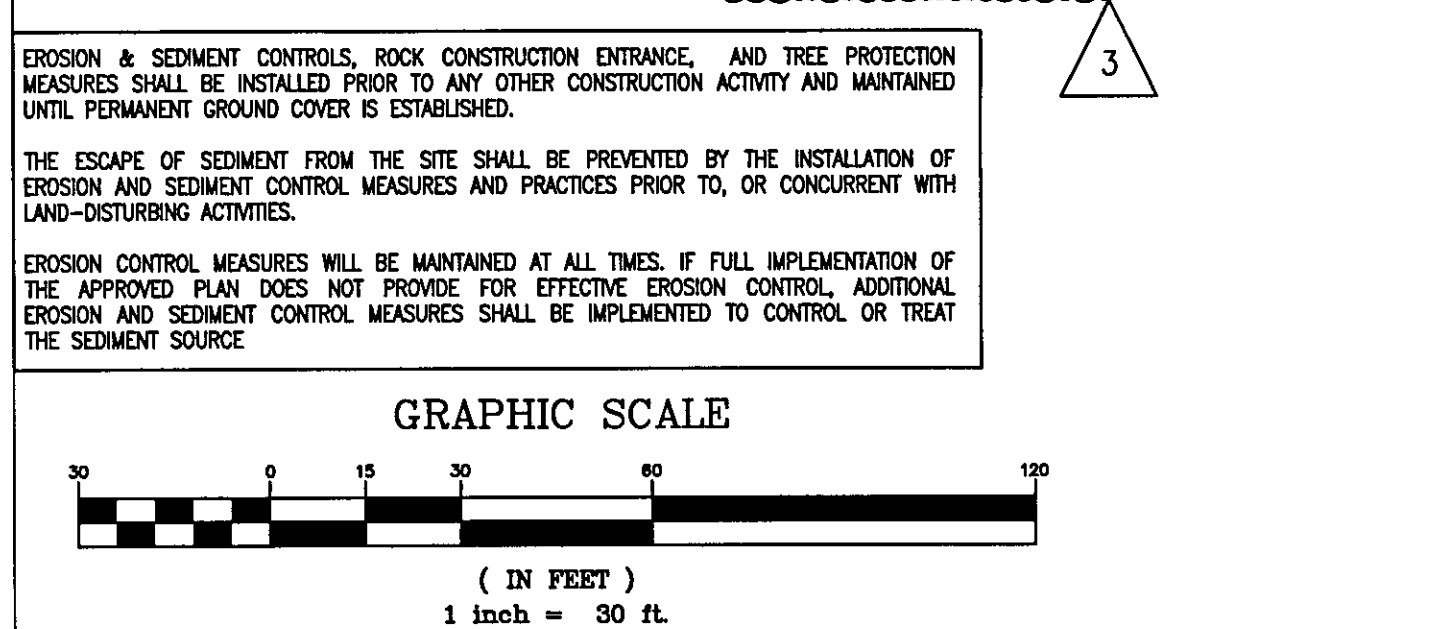
NOTE: GENERAL CONTRACTOR TO COMPLETE TABLE WITH THEIR SPECIFIC PROJECT SCHEDULE

CONSTRUCTION SEQUENCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPORARY CONTROL MEASURES				X	X	X	X	X	X	X	X													
STRIP & STOCKPILE TOPSOIL				X	X	X	X	X	X	X	X													
STORM FACILITIES				X	X	X	X	X	X	X	X													
TEMPORARY CONSTRUCTION ROADS				X	X	X	X	X	X	X	X													
FOUNDATION / BUILDING CONSTRUCTION				X	X	X	X	X	X	X	X													
SITE CONSTRUCTION				X	X	X	X	X	X	X	X													
PERMANENT CONTROL STRUCTURES				X	X	X	X	X	X	X	X													
FINISH GRADING				X	X	X	X	X	X	X	X													
LANDSCAPING/SEED/FINAL STABILIZATION				X	X	X	X	X	X	X	X													
VEGETATED SHELF PLANTING				X	X	X	X	X	X	X	X													

**EROSION & SEDIMENT CONTROLS, ROCK CONSTRUCTION ENTRANCE, AND TREE PROTECTION MEASURES SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION ACTIVITY AND MAINTAINED UNTIL PERMANENT GROUND COVER IS ESTABLISHED.**

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH LAND-DISTURBING ACTIVITIES.

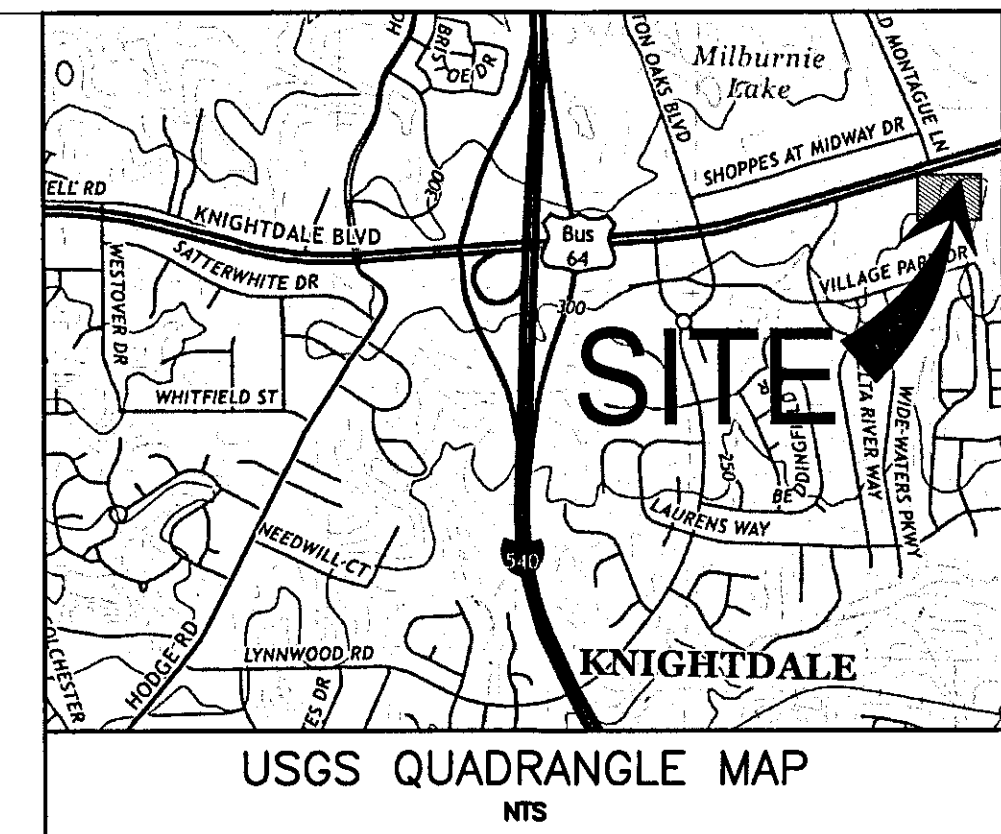
EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.



**SITE SOILS**

Rpd - RAWLINGS-IRON COMPLEX 10 TO 15 PERCENT SLOPES.  
Ur - URBAN LAND  
Voc - VANCE SANDY LOAM, 6 TO 10 PERCENT SLOPES

**24 HR EMERGENCY CONTACT:**  
JENNA SAMPLES - (630)306-6256



**GENERAL EROSION NOTES**

- ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN AND THE STATE OF NORTH CAROLINA GENERAL PERMIT FOR STORM WATER DISCHARGES AND BECOME FAMILIAR WITH THEIR CONTENTS.
- THE TEMPORARY PARKING AND STORAGE AREA SHALL ALSO BE USED AS THE EQUIPMENT MAINTENANCE AREA, EQUIPMENT CLEANING AREA, EMPLOYEE BREAK AREA, AND AREA FOR LOCATING PORTABLE FACILITIES, OFFICE TRAILERS, AND TOILET FACILITIES. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNERS CONSTRUCTION MANAGER.
- ALL WASH WATER (CONCRETE TRUCKS, VEHICLE CLEANING, EQUIPMENT CLEANING, ETC.) SHALL BE DISPOSED OF IN A MANNER THAT PREVENTS CONTACT BETWEEN THESE MATERIALS AND STORM WATER THAT IS DISCHARGED FROM THE SITE.
- MAINTAIN ON THE SITE OR HAVE READILY AVAILABLE SUFFICIENT OIL AND GREASE ABSORBING MATERIALS AND FLOTATION BOOMS TO CONTAIN AND CLEAN-UP FUEL OR CHEMICAL SPILLS AND LEAKS.
- DUST ON THE SITE SHALL BE CONTROLLED BY SPRAYING WATER ON DRY AREAS OF THE SITE. THE USE OF MOTOR OILS AND OTHER PETROLEUM BASED OR TOXIC LIQUIDS FOR DUST SUPPRESSION OPERATIONS IS PROHIBITED.
- NO RUBBISH, TRASH, GARBAGE, OR OTHER SUCH MATERIALS SHALL BE DISCHARGED INTO DRAINAGE DITCHES OR WATERS OF THE STATE.
- ALL STORM WATER POLLUTION PREVENTION MEASURES PRESENTED ON THIS PLAN, AND IN THE STORM WATER POLLUTION PREVENTION PLAN, SHALL BE INITIATED AS SOON AS PRACTICABLE.
- NEW OR AFFECTED CUT OR FILLED SLOPES MUST BE AT AN ANGLE THAT CAN BE RETAINED BY THE VEHICLES ENTER A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNERS CONSTRUCTION MANAGER.
- A PERMANENT GROUND COVER, SUFFICIENT RESTRAIN EROSION, MUST BE PROVIDED WITHIN THE SHORTER OF 15 WORKING OR 90 CALENDAR DAYS (IF IN A HIGH QUALITY ZONE, THE SHORTER OF 15 WORKING OR 60 CALENDAR DAYS) AFTER COMPLETION OF CONSTRUCTION OR DEVELOPMENT ON ANY PORTION OF THE TRACT.
- IF THE ACTION OF VEHICLES TRAVELING OVER THE GRAVEL CONSTRUCTION ENTRANCES IS NOT SUFFICIENT TO REMOVE THE MAJORITY OF DIRT OR MUD, THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLES ENTER A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNERS CONSTRUCTION MANAGER.
- ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.
- CONTRACTORS OR SUBCONTRACTORS WILL BE RESPONSIBLE FOR REMOVING SEDIMENT IN THE DETENTION POND AFTER THE STABILIZATION OF THE SITE AND ANY SEDIMENT THAT MAY HAVE COLLECTED IN THE STORM SEWER DRAINAGE SYSTEMS. CONTRACTORS OR SUBCONTRACTORS WILL ALSO BE RESPONSIBLE TO CLEAN THE SWALE FROM ANY SEDIMENT IF NECESSARY.
- IF SOIL STOCKPILING IS EMPLOYED ON THE SITE, SILT FENCES SHALL BE USED TO HELP CONTAIN THE SEDIMENT.
- SLOPES SHALL BE LEFT IN A ROUGHENED CONDITION DURING THE GRADING PHASE TO REDUCE RUNOFF VELOCITIES AND EROSION.
- SEDIMENT BASINS ARE ATTRACTIVE TO CHILDREN AND CAN BE VERY DANGEROUS. IN ALL CASES, LOCAL ORDINANCES AND REGULATIONS REGARDING HEALTH AND SAFETY MUST BE ADHERED TO.
- ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE DISPOSED OF WITHIN 30 DAYS AFTER FINAL STABILIZATION. FINAL STABILIZATION HAS OCCURRED WHEN ALL SOIL DISTURBING ACTIVITIES ARE COMPLETED AND A UNIFORM PERENNIAL VEGETATIVE COVER WITH A DENSITY OF 70% OF THE COVER FOR UNPAVED AREAS AND AREAS NOT COVERED BY PERMANENT STRUCTURES HAS BEEN EMPLOYED.
- DUE TO THE GRADE CHANGES DURING THE DEVELOPMENT OF THE PROJECT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING THE EROSION CONTROL MEASURES (SILT FENCES, SILT DIKES, ETC.) TO HELP PREVENT EROSION AND STORM WATER POLLUTION.
- ALL OFF-SITE CONSTRUCTION SHALL BE STABILIZED AT THE END OF EACH WORKING DAY, THIS INCLUDES BACKFILLING OF TRENCHES FOR STORM DRAINS & UTILITY CONSTRUCTION AND PLACEMENT OF GRAVEL OR BITUMINOUS PAVING FOR ROAD CONSTRUCTION.
- IF AN OFF-SITE SPOIL OR BORROW SITE IS UTILIZED, THEN THE DISTURBED AREA FOR THE SPOIL/BORROW SITE MUST BE INCLUDED IN THE LAND DISTURBANCE PLAN AND PERMIT, UNLESS THE SITE ALREADY HAS A SEPARATE LAND-DISTURBING PERMIT.
- PROVIDE DUST CONTROL FOR DISTURBED AREAS OF OFF-SITE SURFACE DUST MOVEMENT AND AS REQUIRED TO PREVENT DUST FROM LEAVING SITE.

**BMP MAINTENANCE NOTES**

REFER TO EROSION CONTROL DETAIL SHEETS C-6.3, C-6.4, AND C-6.5 FOR MAINTENANCE NOTES PER NCDEQ EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

**SURFACE STABILIZATION MEASURES**

KEY	PRACTICE	DESCRIPTION	NOTES
(M)	DISTURBED AREA STABILIZATION (W/ MULCHING ONLY)	Temporary protection for disturbed areas; as an erosion retardant cover when temporary grazing is inapplicable.	Straw (1-2 tons/acre), Wood chips (5-8 tons/acre), Wood fiber (0.5-1 tons/acre), Bark (35 cy/acre), Corn stalks (4-8 tons / acre), or Neta/Mulch/Chemical stabilizers applicable
(TS)	DISTURBED AREA STABILIZATION (W/ TEMP. SEEDING)	Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.	May-Aug: German millet (40 lbs./ac), Aug-Dec: Rye grain (120 lbs./ac), Jan-May: 750 (1000 lbs.-for Fall) lbs./ac of 10-10-10 fertilizer
(PS)	DISTURBED AREA STABILIZATION (W/ PERM. SEEDING)	Controlling runoff and preventing erosion by establishing a permanent vegetative cover with seed.	Mixture of Tall fescue (80 lbs./ac) and Kiba lespedeza (40 lbs./ac) with 1000 lbs./ac of 10-10-10 fertilizer and 4,000 lbs./ac of lime. May-Aug: Add 10 lbs./ac Rye grain OR Sod, shrubs and mulch per landscape plan.
(LS)	DISTURBED AREA STABILIZATION (W/ LANDSCAPING)	Planting or transplanting vegetative sections of plant materials to promptly stabilize areas that are subject to erosion.	
(RECP)	ROLLED EROSION CONTROL PRODUCT	Erosion or straw matting or other material manufactured especially for erosion control use.	Place matting immediately following seeding; unroll in direction of water flow. Overlap roll ends minimum 6"; overlap a minimum of 4" where 2 or more widths are laid side by side. Bury top of slope end of each piece of matting a minimum of 6". Staple edge of matting and down the center maximum of 3" apart. Staple at ends.

**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-561-00004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
119-217-2250



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**PROJECT TEAM**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**ISSUE/REVISION RECORD**

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**PROFESSIONAL SEAL**



Todd Fleming  
Professional Engineer  
119-217-2250  
www.greenbergfarrow.com

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD KNIGHTDALE NORTH CAROLINA 6800 KNIGHTDALE BLVD**



**PROJECT NUMBER**

20211261.0

**SHEET TITLE**

**EROSION & SEDIMENT CONTROL PLAN PHASE 1**

**SHEET NUMBER**

**C-6.0**





www.greenbergfarrow.com  
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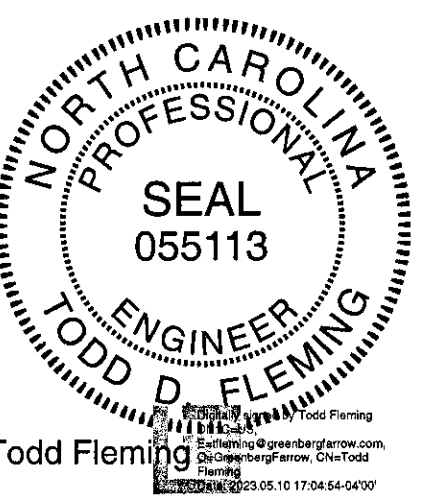
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**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**

TODD FLEMING

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
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**PROJECT NUMBER**

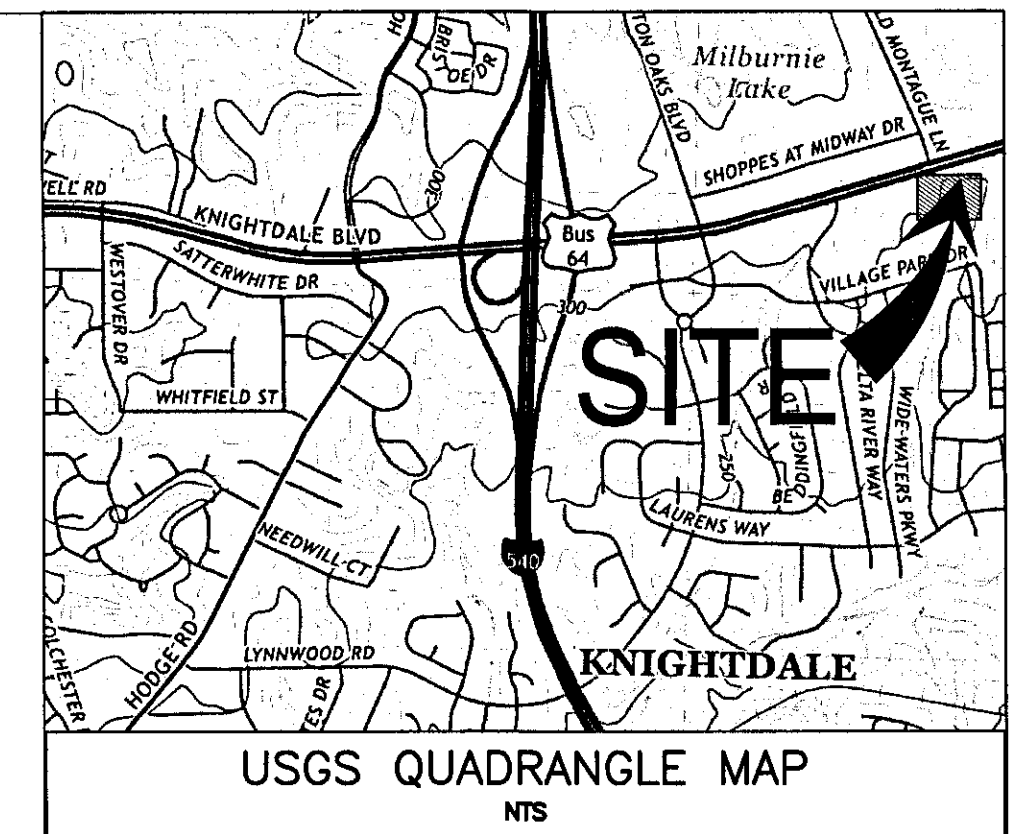
20211261.0

**SHEET TITLE**

**EROSION & SEDIMENT CONTROL PLAN**  
PHASE 2

**SHEET NUMBER**

**C-6.1**



**GENERAL EROSION NOTES**

- ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN AND THE STATE OF NORTH CAROLINA NPDES GENERAL PERMIT FOR STORM WATER DISCHARGES AND BECOME FAMILIAR WITH THEIR CONTENTS.
- THE TEMPORARY PARKING AND STORAGE AREA SHALL ALSO BE USED AS THE EQUIPMENT MAINTENANCE AREA, EQUIPMENT CLEANING AREA, EMPLOYEE BREAK AREA, AND AREA FOR LOCATING PORTABLE FACILITIES, OFFICE TRAILERS, AND TOILET FACILITIES. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNER'S CONSTRUCTION MANAGER.
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- ALL STORM WATER POLLUTION PREVENTION MEASURES PRESENTED ON THIS PLAN, AND IN THE STORM WATER POLLUTION PREVENTION PLAN, SHALL BE INITIATED AS SOON AS PRACTICABLE.
- NEW OR AFFECTED DIRT OR FILLED SLOPES MUST BE AT AN ANGLE THAT CAN BE RETAINED BY VEGETATIVE COVER, AND MUST BE PROVIDED WITH A GROUND COVER SUFFICIENT TO RETAIN EROSION WITHIN 21 CALENDAR DAYS OF COMPLETION OF ANY PHASE (ROUGH OR FINAL) OF GRADING.
- A PERMANENT GROUND COVER, SUFFICIENT TO RESTRAIN EROSION, MUST BE PROVIDED WITHIN THE SHORTER OF 15 WORKING OR 30 CALENDAR DAYS (IF IN A HIGH QUALITY ZONE, THE SHORTER OF 15 WORKING OR 60 CALENDAR DAYS) AFTER COMPLETION OF CONSTRUCTION OR DEVELOPMENT ON ANY PORTION OF THE TRACT.
- IF THE ACTION OF VEHICLES TRAVELING OVER THE GRAVEL CONSTRUCTION ENTRANCES IS NOT SUFFICIENT TO REMOVE THE MAJORITY OF DIRT OR MUD, THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLES ENTER A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNER'S CONSTRUCTION MANAGER.
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- DUE TO THE GRADE CHANGES DURING THE DEVELOPMENT OF THE PROJECT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING THE EROSION CONTROL MEASURES (SILT FENCES, SILT DIKES, ETC.) TO HELP PREVENT EROSION AND STORM WATER POLLUTION.
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- PROVIDE DUST CONTROL FOR DISTURBED AREAS OF OFF-SITE SURFACE DUST MOVEMENT AND AS REQUIRED TO PREVENT DUST FROM LEAVING SITE.

**BMP MAINTENANCE NOTES**

REFER TO EROSION CONTROL DETAIL SHEETS C-6.3, C-6.4, AND C-6.5 FOR MAINTENANCE NOTES PER NCDOT EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.

**EXISTING LEGEND:**

- |  |   |  |                                     |
|--|---|--|-------------------------------------|
|  | EXISTING BUILDING                             |  | WATER STUB OUT                      |
|  | LAND LOT LINE (LL)                            |  | FIRE HYDRANT                        |
|  | PROPERTY LINE                                 |  | WATER VALVE                         |
|  | UTILITY POLE (UP), OVERHEAD LINES & GUY WIRES |  | GAS VALVE                           |
|  | TREE LINE                                     |  | WATER METER                         |
|  | SANITARY SEWER MANHOLE                        |  | GAS METER                           |
|  | SANITARY SEWER STUB OUT (SSO)                 |  | MONITORING WELL                     |
|  | TELEPHONE MANHOLE/PEDESTAL                    |  | POST INDICATOR VALVE                |
|  | STORM DRAIN PIPE WITH HEADWALL                |  | MAILBOX                             |
|  | DOUBLE-WING CATCH BASIN                       |  | STREET SIGN                         |
|  | SINGLE-WING CATCH BASIN                       |  | TRAFFIC SIGNAL POLE                 |
|  | JUNCTION BOX (JB)                             |  | TRAFFIC SIGNAL BOX                  |
|  | DROP OR CURB INLET (DI OR CI)                 |  | BACKFLOW PREVENTER                  |
|  | FENCE   |  | FIRE DEPT. CONNECTION               |
|  | DRAINAGE DITCH OR SWALE                       |  | FIBER OPTIC BOX                     |
|  | EXISTING 10 FOOT CONTOUR                      |  | IRRIGATION CONTROL VALVE            |
|  | EXISTING 2 FOOT CONTOUR                       |  | DRAINAGE MANHOLE                    |
|  | EXISTING GRADE SPOT ELEVATION                 |  | R/W RIGHT-OF-WAY                    |
|  | DIRECTION OF SURFACE FLOW                     |  | OTF OPEN TOP PIPE FOUND             |
|  | RECORDED DATA                                 |  | CTF CRIMP TOP PIPE FOUND            |
|  | PARKING SPACE COUNT                           |  | CMF CONCRETE MONUMENT FOUND         |
|  | LIGHT POLE (LP)                               |  | BSDF BRASS DISK FOUND               |
|  | ELECTRICAL TRANSFORMER BOX                    |  | AXF AXLE FOUND                      |
|  | ELECTRICAL METER                              |  | RBS REBAR PIN SET                   |
|  | ELECTRICAL STUB OUT                           |  | CMP CORRUGATED METAL PIPE           |
|  | UNKNOWN UTILITY STUB OUT                      |  | RCP REINFORCED CONCRETE PIPE        |
|  |   |  | HDPE HIGH-DENSITY POLYETHYLENE PIPE |
|  |   |  | DIP DUCTILE IRON PIPE               |

**PROPOSED**

- |  |                         |  |                         |
|--|-------------------------|--|-------------------------|
|  | BOUNDARY LINE           |  | CONTOUR ELEVATIONS      |
|  | LIMIT OF DISTURBED AREA |  | TREE PROTECTION FENCING |
|  | TPF                     |  | SILT FENCE              |

**PROJECT INFORMATION**

THE PROPOSED PROJECT CONSIST OF THE CONSTRUCTION A PANERA BREAD RESTAURANT WITH ITS ASSOCIATED HARDSHIP SCAPES ITEMS AND UTILITIES. THE BUILDING AREA IS 4,200 S.F. THE ACREAGE OF SITE IS 2.35 ACRES.  
THE DISTURBED ACREAGE OF SITE (INCLUDING OFF-SITE WORK) IS 1.89 ACRES.  
THE ANTICIPATED CONSTRUCTION START DATE IS MAY 2023 AND COMPLETION DATE IS OCTOBER 2023.  
THE STORMWATER WILL FLOW FROM THE NORTHWEST TO THE SOUTHWEST OF THE SITE INTO AN WET DETENTION POND LOCATED ON THE SOUTH SIDE OF THE PROJECT SITE. THE STORM DRAINAGE WILL THEN FLOW SOUTH ALONG AN EXISTING DRAINAGE WAY. THE EXISTING DRAINAGE WAY EVENTUALLY TIES INTO MINGO CREEK WHICH IS APPROXIMATELY 4.2 MILES SOUTHWEST OF THE PROJECT SITE.  
PANERA BREAD CONTRACTOR TO TAKE APPROPRIATE MEASURES TO KEEP SEDIMENT FROM ESCAPING SITE AND ALL ACCUMULATED SEDIMENT SHALL BE CLEANED OUT AND REMOVED FROM SITE.

**SEQUENCE OF CONSTRUCTION**

- PHASE I**
- SCHEDULE AN INITIAL PRE-CONSTRUCTION CONFERENCE WITH THE TOWN OF KNIGHTDALE. OBTAIN A LAND-DISTURBANCE PERMIT.
  - INSTALL PERIMETER SILT FENCE AND TREE PROTECTION FENCE AS SHOWN ON THE APPROVED PLANS.
  - SCHEDULE AN ON-SITE PRE-CONSTRUCTION MEETING WITH TOWN OF KNIGHTDALE TO INSPECT INSTALLED PERIMETER CONTROLS.
  - IF APPROVED, INSTALL GRAVEL CONSTRUCTION PAD, INLET FILTER, INSERTS OR OTHER MEASURES AS SHOWN ON THE APPROVED PLANS. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES.
  - INSPECT, RECONDITION AND RESEED EXISTING SEDIMENT BASIN.
  - INSTALL TEMPORARY CONCRETE WASH OUT.
  - INSTALL TEMPORARY STOCKPILE AREA BLADE SILT FENCE AT TOP OF SLOPE.
  - CALL TOWN OF KNIGHTDALE EROSION CONTROL INSPECTOR TO SCHEDULE AN ON-SITE INSPECTION AND OBTAIN A CERTIFICATE OF COVERAGE.
  - BEFORE CLEARING AND GRUBBING, STOCKPILE TOPSOIL, AND MAINTAIN DEVICES AS NEEDED.
  - CONSTRUCT TEMPORARY DIVERSIONS, SEDIMENT TRAP OR OTHER MEASURES AS SHOWN ON THE APPROVED PLANS. SEED TEMPORARY DIVERSIONS, BERMS, AND TRAP IMMEDIATELY AFTER CONSTRUCTION.
  - INSTALL SLOPE DRAIN WITH INLET PROTECTION AND RIPRAP OUTFALL.
  - CONTRACTOR SHALL RELOCATE/REMOVE THE CONCRETE WASHOUT AREA AS CONSTRUCTION PROGRESS SO THAT CONSTRUCTION TRAFFIC IS NOT NEGATIVELY IMPACTED.
  - DEWATER SEDIMENT TRAP WITH USING PORTABLE SUMP PUMPS AND DEWATERING FILTER BAG.
  - PROVIDE CONTINUOUS MONITORING DURING ALL DEWATERING.
- PHASE II**
- ROUGH GRADE SITE. CONSTRUCT SEDIMENT BASIN, INCLUDING SKIMMER AND BAFFLES.
  - INSTALL UTILITIES, STORM SEWERS, AND INLETS.
  - INSTALL TEMPORARY INLET PROTECTION.
  - INSTALL ROLLED EROSION CONTROL PRODUCT.
  - GRADE BUILDING PAD AND STRUCTURES.
  - TEMPORARILY SEED DENuded AREAS.
  - PREPARE SITE FOR PAVING.
- PHASE III**
- PAVE SITE.
  - STABILIZE SITE AS AREAS ARE FINISH GRADED. PAVE, SITE SEED, SOO AND/OR LANDSCAPE AND MULCH DENuded AREAS PER GROUND STABILIZATION TIME FRAMES.
  - WHEN CONSTRUCTION IS COMPLETE AND FINISH GRADED AREAS ARE STABILIZED COMPLETELY, CALL FOR EROSION CONTROL INSPECTION.
  - IF SITE IS APPROVED, REMOVE TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS, SEED OR STABILIZE ANY RESULTING BARE AREAS. INSTALL ALL REMAINING PERMANENT EROSION CONTROL DEVICES SUCH AS VELOCITY DISSIPATORS.
  - REMOVE SEDIMENT BASIN PER SEQUENCE NOTES SHEET C-4.2. DEWATER MAIN POOL USING FLOATING SKIMMER, DEWATER BASIN FOREBAY WITH USING PORTABLE SUMP PUMP AND DEWATERING FILTER BAG.
  - PROVIDE CONTINUOUS MONITORING DURING ALL DEWATERING.
  - WHEN VEGETATION HAS BECOME ESTABLISHED (90% GERMINATION), CALL FOR A FINAL INSPECTION BY THE EROSION CONTROL INSPECTOR. OBTAIN A CERTIFICATE OF COMPLETION.

**BEST MANAGEMENT PRACTICE LEGEND**

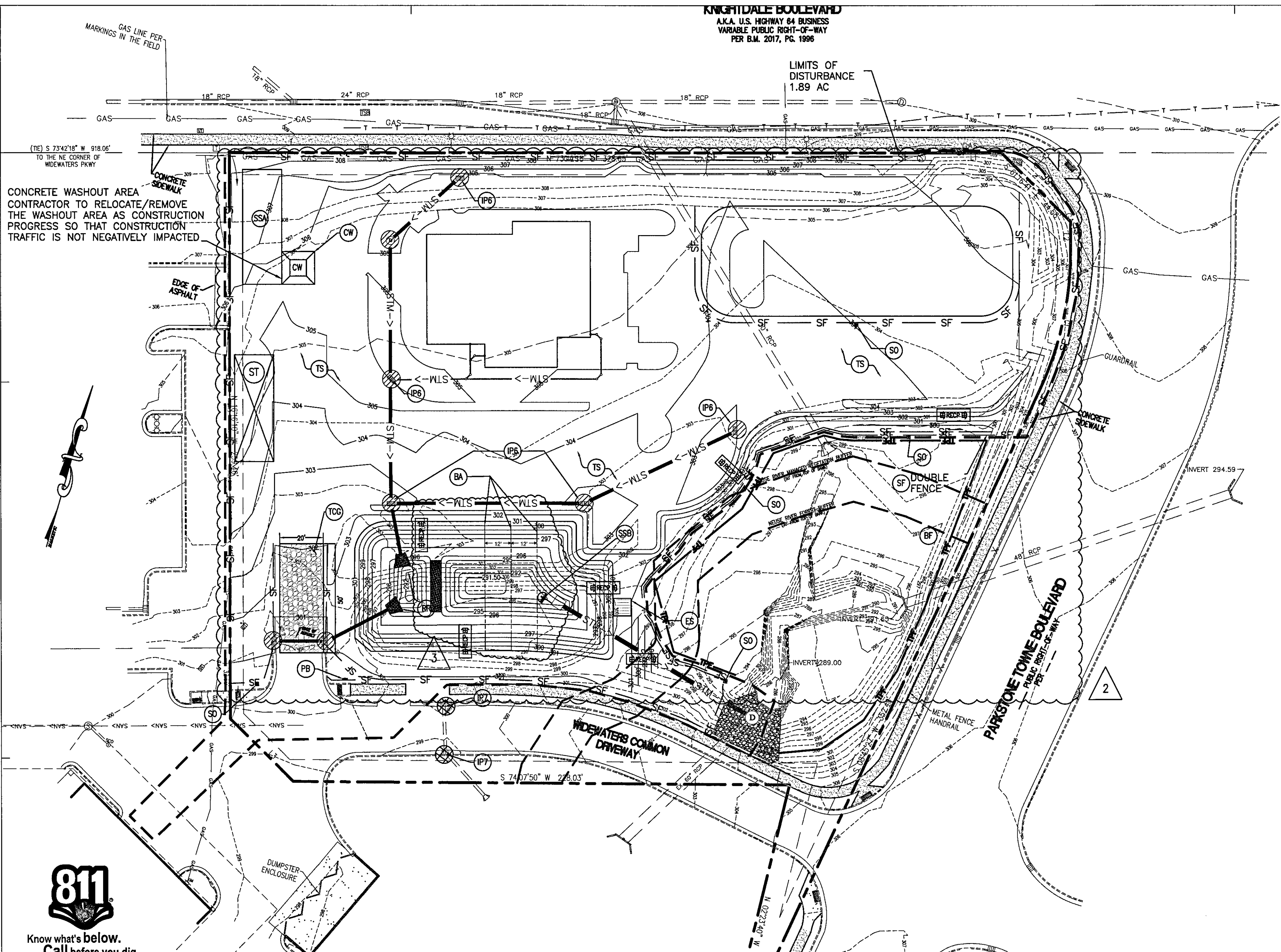
- |  |   |  |   |
|--|---|--|---|
|  | CD CHECK DAM                                    |  | IP7 DANDY SACK                                  |
|  | TCG TEMPORARY GRAVEL CONSTRUCTION ENTRANCE      |  | IP6 HARDWARE CLOTH AND GRAVEL INLET PROTECTION  |
|  | SF SEDIMENTATION FENCE                          |  | TD DIVERSION DITCH                              |
|  | CW CONCRETE WASHOUT AREA                        |  | TSD SLOPE DRAIN                                 |
|  | ST TEMPORARY STORAGE AREA                       |  | SSB SKIMMER                                     |
|  | SSA STABILIZED STAGING AREA                     |  | ES EMERGENCY SPILLWAY                           |
|  | SST SOIL STOCKPILE AREA PER NCDOT (6.04)        |  | SO SILT FENCE OUTLET                            |
|  | IP7 DANDY SACK                                  |  | PB PERMIT CARD AND NCCOI INSPECTION RECORDS BOX |
|  | IP6 HARDWARE CLOTH AND GRAVEL INLET PROTECTION  |  | BF BUFFER AREA PER NCDOT (6.74)                 |
|  | TD DIVERSION DITCH                              |  | RR RIP RAP OUTFALL PROTECTION PER NCDOT (6.15)  |
|  | TSD SLOPE DRAIN                                 |  | RECP ROLLED EROSION CONTROL PRODUCT             |
|  | SSB SKIMMER                                     |  | BA BAFFLES                                      |
|  | ES EMERGENCY SPILLWAY                           |  |   |
|  | SO SILT FENCE OUTLET                            |  |   |
|  | PB PERMIT CARD AND NCCOI INSPECTION RECORDS BOX |  |   |
|  | BF BUFFER AREA PER NCDOT (6.74)                 |  |   |
|  | RR RIP RAP OUTFALL PROTECTION PER NCDOT (6.15)  |  |   |
|  | RECP ROLLED EROSION CONTROL PRODUCT             |  |   |
|  | BA BAFFLES                                      |  |   |

**SURFACE STABILIZATION MEASURES**

KEY	PRACTICE	DESCRIPTION	NOTES
M	DISTURBED AREA STABILIZATION (W/ MULCHING ONLY)	Temporary protection for disturbed areas; as an erosion retardant cover when temporary grassing is inapplicable.	Straw (1-2 tons/acre), Wood chips (5-6 tons/acre), Wood fiber (0.5-1 tons/acre), Bark (35 cy/acre), Corn stalks (4-6 tons / acre), or Nets/Mats/Chemical stabilizers applicable
TS	DISTURBED AREA STABILIZATION (W/ TEMP. SEEDING)	Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.	May-Aug: German millet (40 lbs./ac), Aug-Dec: Rye grain (120 lbs./ac), Jan-May: Mixture of Rye grain (120 lbs./ac) and Kobs lespedeza (50 lbs./ac) 750 (1000 lbs.-for Fall) lbs./ac of 10-10-10 fertilizer
PS	DISTURBED AREA STABILIZATION (W/ PERM. SEEDING)	Controlling runoff and preventing erosion by establishing a perennial vegetative cover with seed.	Mixture of Tall fescue (80 lbs./ac) and Kobs lespedeza (40 lbs./ac) with 1000 lbs./ac of 10-10-10 fertilizer and 4,000 lbs./ac of lime. May-Aug: Add 10 lbs./ac German millet AND Oct.-Feb.: Add 40 lbs./ac Rye grain
LS	DISTURBED AREA STABILIZATION (W/ LANDSCAPING)	Planting or transplanting vegetative sections of plant materials to promptly stabilize areas that are subject to erosion.	Sod, shrubs and mulch per landscape plan.
RECP	ROLLED EROSION CONTROL PRODUCT	Excelsior or straw matting or other material manufactured especially for erosion control use.	Place matting immediately following seeding; unroll in direction of water flow. Overlap roll ends minimum 8"; overlap a minimum of 4" where 2 or more widths are laid side by side. Bury top of slope end of each piece of matting a minimum of 6". Staple edge of matting and down the center maximum of 3' apart. Staple at ends.

**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 4/12/2023  
PERMIT NO. S-2023-0004-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
919-217-2250  
[Signature]



RECEIVING CREEK: MINGO CREEK  
RIVER BASIN: NELUSE RIVER  
TYPE: ARTIFICIAL PATH

**SOIL EROSION/SEDIMENTATION CONTROL OPERATION TIME SCHEDULE**

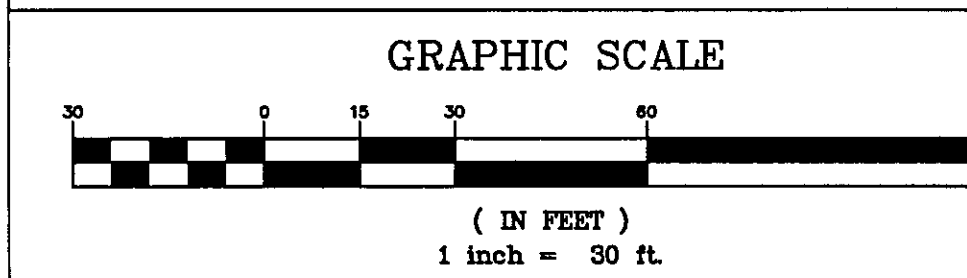
NOTE: GENERAL CONTRACTOR TO COMPLETE TABLE WITH THEIR SPECIFIC PROJECT SCHEDULE

CONSTRUCTION SEQUENCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPORARY CONTROL MEASURES			X	X	X	X	X	X	X	X	X	X												
STRIP & STOCKPILE TOPSOIL			X	X	X	X	X	X	X	X	X	X												
STORM FACILITIES			X	X	X	X	X	X	X	X	X	X												
TEMPORARY CONSTRUCTION ROADS			X	X	X	X	X	X	X	X	X	X												
FOUNDATION / BUILDING CONSTRUCTION			X	X	X	X	X	X	X	X	X	X												
SITE CONSTRUCTION			X	X	X	X	X	X	X	X	X	X												
PERMANENT CONTROL STRUCTURES			X	X	X	X	X	X	X	X	X	X												
FINISH GRADING			X	X	X	X	X	X	X	X	X	X												
LANDSCAPING/SEED/FINAL STABILIZATION			X	X	X	X	X	X	X	X	X	X												
VEGETATED SHELF PLANTING			X	X	X	X	X	X	X	X	X	X												

EROSION & SEDIMENT CONTROLS, ROCK CONSTRUCTION ENTRANCE, AND TREE PROTECTION MEASURES SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION ACTIVITY AND MAINTAINED UNTIL PERMANENT GROUND COVER IS ESTABLISHED.  
THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH LAND-DISTURBING ACTIVITIES.  
EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.

**SITE SOILS**  
RgD - RAWLINGS-RION COMPLEX 10 TO 15 PERCENT SLOPES.  
Ur - URBAN LAND  
Voc - VANCE SANDY LOAM, 6 TO 10 PERCENT SLOPES

24 HR EMERGENCY CONTACT:  
JENNA SAMPLES - (630)306-6256





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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



Todd Fleming

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
PROJECT MANAGER  
HAMILTON WILLIAMS  
QUALITY CONTROL  
WILLIAM LOTZ  
DRAWN BY  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD KNIGHTDALE NORTH CAROLINA 6800 KNIGHTDALE BLVD**



**PROJECT NUMBER**

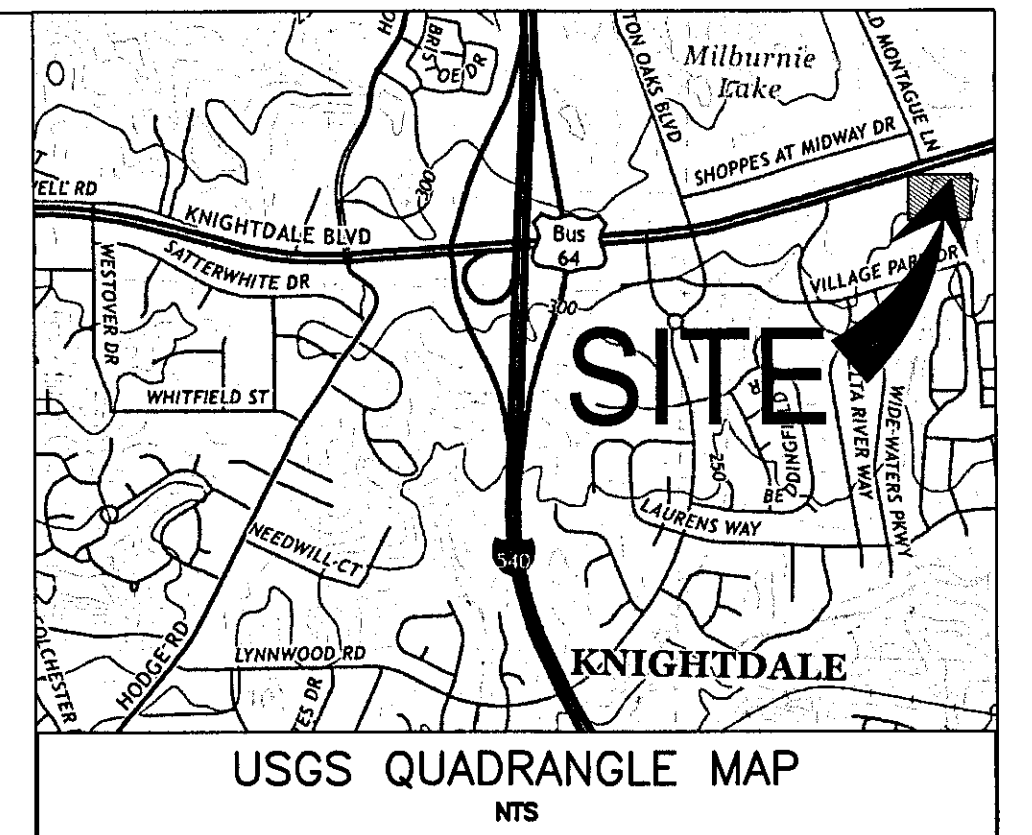
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**SHEET TITLE**

**EROSION & SEDIMENT CONTROL PLAN PHASE 3**

**SHEET NUMBER**

**C-6.2**



**EXISTING LEGEND:**

- EXISTING BUILDING
- LAND LOT LINE (LL)
- PROPERTY LINE
- UTILITY POLE (UP), OVERHEAD LINES & GUY
- FIBER OPTIC CABLE
- TREE LINE
- SEWER MANHOLE
- SANITARY CLEAN-OUT (SCO)
- SANITARY SEWER STUB OUT
- TELEPHONE MANHOLE/PEDESTAL
- STORM DRAIN PIPE WITH HEADWALL
- DOUBLE-WING CATCH BASIN
- SINGLE-WING CATCH BASIN
- JUNCTION BOX (JB)
- DROP OR CURB INLET (DI OR CI)
- FENCE
- DRAINAGE DITCH OR SWALE
- EXISTING 10 FOOT CONTOUR
- EXISTING 2 FOOT CONTOUR
- RECORDED DATA
- DIRECTION OF SURFACE FLOW
- RECORDED SPACE COUNT
- LIGHT POLE (LP)
- ELECTRICAL TRANSFORMER BOX
- ELECTRICAL METER
- ELECTRICAL STUB OUT
- UNKNOWN UTILITY STUB OUT
- WATER STUB OUT
- FIRE HYDRANT
- WATER VALVE
- WATER METER
- GAS METER
- MONITORING WELL
- POST INDICATOR VALVE
- MAILBOX
- STREET SIGN
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL BOX
- BACKFLOW PREVENTER
- PIPE DEPTH CONNECTION
- FIBER OPTIC BOX
- IRRIGATION CONTROL VALVE
- DRAINAGE MANHOLE
- HAZARDOUS
- R/W RIGHT-OF-WAY
- RBF REBAR PIN FOUND
- OIF OPEN TOP PIPE FOUND
- CIF CRIMP TOP PIPE FOUND
- CMF CONCRETE MONUMENT FOUND
- BDP BRASS DISK FOUND
- AXF AXLE FOUND
- RFS REBAR PIN SET
- CMPT CORRUGATED METAL PIPE
- RCP REINFORCED CONG. PIPE
- HDPE HIGH-DENSITY POLYETHYLENE PIPE
- DIP DUCTILE IRON PIPE

**PROPOSED**

- BOUNDARY LINE
- CONTOUR ELEVATIONS
- LIMIT OF DISTURBED AREA
- TFF TREE PROTECTION FENCING
- SF SILT FENCE

**PROJECT INFORMATION**

THE PROPOSED PROJECT CONSIST OF THE CONSTRUCTION A PANERA BREAD RESTAURANT WITH ITS ASSOCIATED HARDSCAPE ITEMS AND UTILITIES. THE BUILDING AREA IS 4,200 SF.

THE ACREAGE OF SITE IS 2.35 ACRES.

THE DISTURBED ACREAGE OF SITE (INCLUDING OFF-SITE WORK) IS 1.89 ACRES.

THE ANTICIPATED CONSTRUCTION START DATE IS MAY 2023 AND COMPLETION DATE IS OCTOBER 2023.

THE STORMWATER WILL FLOW FROM THE NORTHWEST TO THE SOUTHWEST OF THE SITE INTO AN WET DETENTION POND LOCATED ON THE SOUTH SIDE OF THE PROJECT SITE. THE STORM DRAINAGE WILL THEN FLOW SOUTH ALONG AN EXISTING DRAINAGE WAY. THE EXISTING DRAINAGE WAY EVENTUALLY TIES INTO MINGO CREEK WHICH IS APPROXIMATELY 4.2 MILES SOUTHWEST OF THE PROJECT SITE.

PANERA BREAD CONTRACTOR TO TAKE APPROPRIATE MEASURES TO KEEP SEDIMENT FROM ESCAPING SITE AND ALL ACCUMULATED SEDIMENT SHALL BE CLEANED OUT AND REMOVED FROM SITE.

**SEQUENCE OF CONSTRUCTION**

- PHASE I**
- SCHEDULE AN INITIAL PRE-CONSTRUCTION CONFERENCE WITH THE TOWN OF KNIGHTDALE. OBTAIN A LAND-DISTURBANCE PERMIT.
  - INSTALL PERMITTER SILT FENCE AND TREE PROTECTION FENCE AS SHOWN ON THE APPROVED PLANS.
  - SCHEDULE AN ON-SITE PRE-CONSTRUCTION MEETING WITH TOWN OF KNIGHTDALE TO INSPECT INSTALLED PERMITTER CONTROLS
  - IF APPROVED, INSTALL GRAVEL CONSTRUCTION PAD, INLET FILTER INSERTS OR OTHER MEASURES AS SHOWN ON THE APPROVED PLANS. CLEAR ONLY AS NECESSARY TO INSTALL THESE DEVICES.
  - INSPECT, RECONSTRUCT AND RESEED EXISTING SEDIMENT BASIN.
  - INSTALL TEMPORARY CONCRETE WASH OUT.
  - INSTALL TEMPORARY STOCKPILE AREA PLACE SILT FENCE AT THE OF SLOPE
  - CALL TOWN OF KNIGHTDALE EROSION CONTROL INSPECTOR TO SCHEDULE AN ON-SITE INSPECTION AND OBTAIN A CERTIFICATE OF COVERAGE.
  - BEGIN CLEARING AND GRUBBING, STOCKPILE TOPSOIL, AND MAINTAIN DEVICES AS NEEDED.
  - CONSTRUCT TEMPORARY DIVERSIONS, SEDIMENT TRAP OR OTHER MEASURES AS SHOWN ON THE APPROVED PLANS. SEED TEMPORARY DIVERSIONS, BERMS, AND TRAP IMMEDIATELY AFTER CONSTRUCTION.
  - INSTALL SLOPE DRAIN WITH INLET PROTECTION AND RIPRAP OUTFALL.
  - CONTRACTOR SHALL RELOCATE/REMOVE THE CONCRETE WASHOUT AREA AS CONSTRUCTION PROGRESS SO THAT CONSTRUCTION TRAFFIC IS NOT NEGATIVELY IMPACTED.
  - DEWATER SEDIMENT TRAP WITH USING PORTABLE SUMP PUMPS AND DEWATERING FILTER BAG.
  - PROVIDE CONTINUOUS MONITORING DURING ALL DEWATERING.
- PHASE II**
- ROUGH GRADE SITE. CONSTRUCT SEDIMENT BASIN, INCLUDING SKIMMER AND BAFFLES.
  - INSTALL UTILITIES, STORM SEWERS, AND INLETS.
  - INSTALL TEMPORARY INLET PROTECTION
  - INSTALL ROLLED EROSION CONTROL PRODUCT.
  - GRADE BUILDING PAD AND STRUCTURES.
  - TEMPORARILY SEED DISTURBED AREAS.
  - PREPARE SITE FOR PAWING.
- PHASE III**
- PAVE SITE.
  - STABILIZE SITE AS AREAS ARE FINISH GRADED. PAVE, SITE SEED, SOG AND/OR LANDSCAPE AND MULCH DENAZED AREAS PER GROUND STABILIZATION TIME FRAMES.
  - WHEN CONSTRUCTION IS COMPLETE AND FINISH GRADED AREAS ARE STABILIZED COMPLETELY, CALL FOR EROSION CONTROL INSPECTION.
  - IF SITE IS APPROVED, REMOVE TEMPORARY DIVERSIONS, SILT FENCE, SEDIMENT BASINS, SEED OR STABILIZE ANY RESULTING BARE AREAS. INSTALL ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS VELOCITY DISSIPATORS.
  - REMOVE SEDIMENT BASIN PER SEQUENCE NUMBER SHEET C-6.3. DEWATER MAIN POOL USING FLOATING SKIMMER, DEWATER BASIN FOREBAY WITH USING PORTABLE SUMP PUMP AND DEWATERING FILTER BAG.
  - PROVIDE CONTINUOUS MONITORING DURING ALL DEWATERING.
  - WHEN VEGETATION HAS BECOME ESTABLISHED (90% GERMINATION), CALL FOR A FINAL INSPECTION BY THE EROSION CONTROL INSPECTOR. OBTAIN A CERTIFICATE OF COMPLETION.

**BEST MANAGEMENT PRACTICE LEGEND**

- CD CHECK DAM
- TCG TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
- SF SEDIMENTATION FENCE
- CW CONCRETE WASHOUT AREA
- ST TEMPORARY STORAGE AREA
- SSA STABILIZED STAGING AREA
- SST SOIL STOCKPILE AREA PER NCDCE (6.04)
- IP7 DANDY SACK
- IP6 HARDWARE CLOTH AND GRAVEL INLET PROTECTION
- TD DIVERSION DITCH
- TSD SLOPE DRAIN
- SSB SKIMMER
- ES EMERGENCY SPILLWAY
- SO SILT FENCE OUTLET
- PB PERMIT CARD AND NCC01 INSPECTION RECORDS BOX
- BF BUFFER AREA PER NCDCE (6.74)
- RR RIP RAP OUTFALL PROTECTION PER NCDCE (6.15)
- RECP ROLLED EROSION CONTROL PRODUCT

**SURFACE STABILIZATION MEASURES**

KEY	PRACTICE	DESCRIPTION	NOTES
M	DISTURBED AREA STABILIZATION (W/ MULCHING ONLY)	Temporary protection for disturbed areas; as an erosion retardant cover when temporary grassing is inapplicable.	Straw (1-2 tons/acre), Wood chips (5-8 tons/acre), Wood fiber (0.5-1 tons/acre), Bark (35 cy/acre), Corn stalks (4-8 tons / acre), or Nats/Mets/Chemical stabilizers applicable
TS	DISTURBED AREA STABILIZATION (W/ TEMP. SEEDING)	Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.	May-Aug: German millet (40 lbs./ac), Aug-Dec: Rye grain (120 lbs./ac), Jan-May: Mixture of Rye grain (120 lbs./ac) and Kobs lespedeza (50 lbs./ac) 750 (1000 lbs.-for Fall) lbs./ac of 10-10-10 fertilizer
PS	DISTURBED AREA STABILIZATION (W/ PERM. SEEDING)	Controlling runoff and preventing erosion by establishing a perennial vegetative cover with seed.	Mixture of Tall fescue (80 lbs./ac) and Kobs lespedeza (40 lbs./ac) with 1000 lbs./ac of 10-10-10 fertilizer and 4,000 lbs./ac of lime. May-Aug: Add 10 lbs./ac German millet AND Oct-Feb: Add 40 lbs./ac Rye grain
LS	DISTURBED AREA STABILIZATION (W/ LANDSCAPING)	Planting or transplanting vegetative sections of plant materials to promptly stabilize areas that are subject to erosion.	Sod, shrubs and mulch per landscape plan.
RECP	ROLLED EROSION CONTROL PRODUCT	Excelsior or straw matting or other material manufactured especially for erosion control use.	Place matting immediately following seeding; unroll in direction of water flow. Overlap roll ends minimum 6"; overlap a minimum of 4" where 2 or more widths are laid side by side. Bury top of slope end of each piece of matting a minimum of 6". Stipple edge of matting and down the center maximum of 3' apart. Stipple at ends.

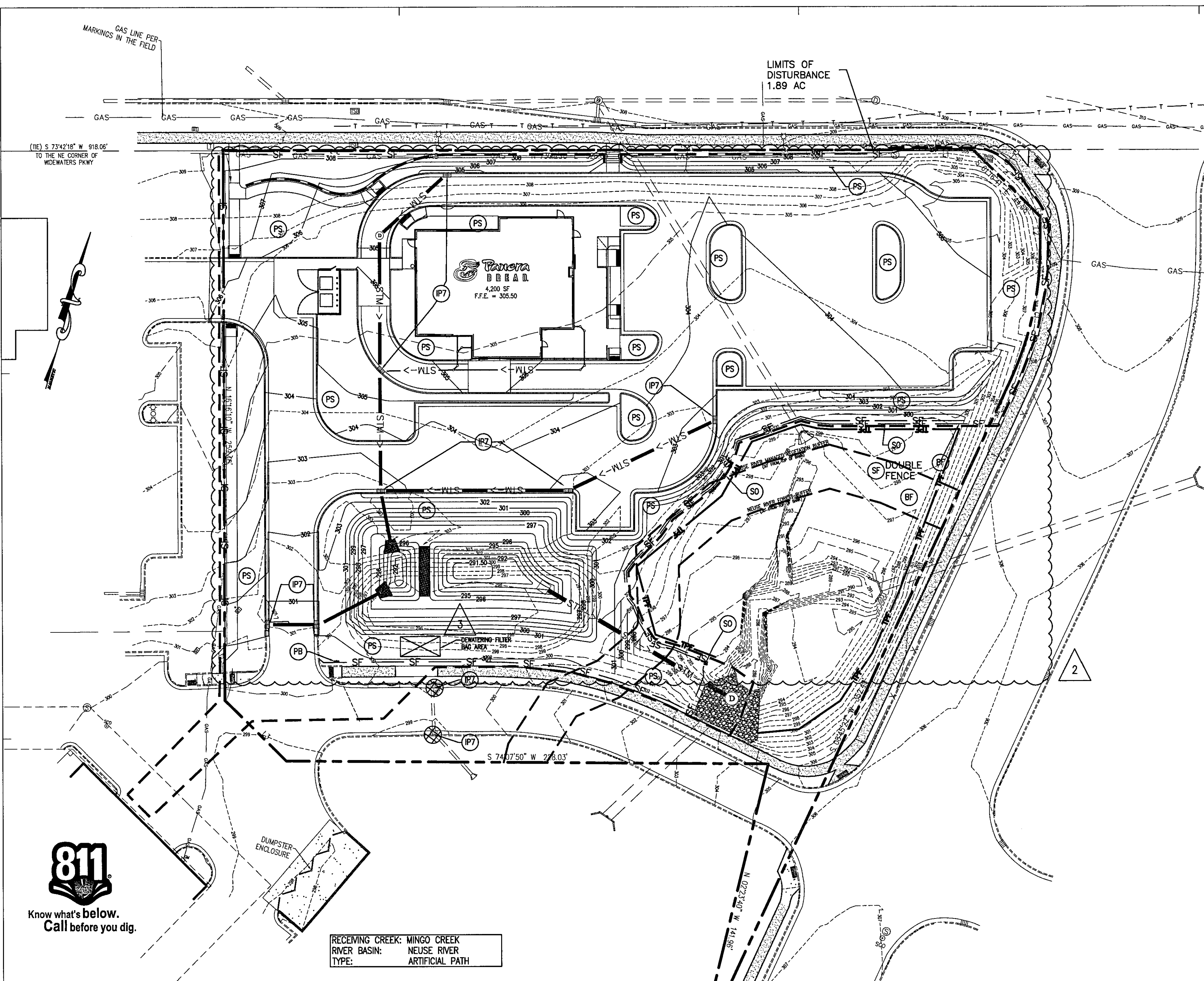
**SITE SOILS**

- Rgd - RAWLINGS-RON COMPLEX 10 TO 15 PERCENT SLOPES.
- Ur - URBAN LAND
- Voc - VANCE SANDY LOAM, 6 TO 10 PERCENT SLOPES

24 HR EMERGENCY CONTACT:  
JENNA SAMPLES - (630)306-6256

**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 5/16/23  
PERMIT NO. S-22-000001-2022  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
5/17-2250



**SOIL EROSION/SEDIMENTATION CONTROL OPERATION TIME SCHEDULE**

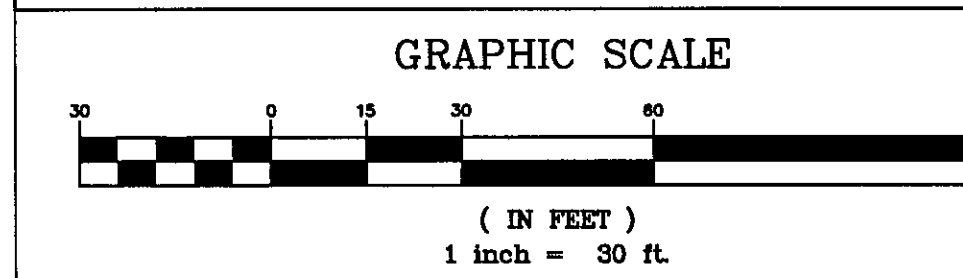
NOTE: GENERAL CONTRACTOR TO COMPLETE TABLE WITH THEIR SPECIFIC PROJECT SCHEDULE

CONSTRUCTION SEQUENCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPORARY CONTROL MEASURES		X	X	X	X	X	X	X	X	X		
STRIP & STOCKPILE TOPSOIL		X	X	X	X	X	X	X	X	X		
STORM FACILITIES		X	X	X	X	X	X	X	X	X		
TEMPORARY CONSTRUCTION ROADS		X	X	X	X	X	X	X	X	X		
FOUNDATION / BUILDING CONSTRUCTION		X	X	X	X	X	X	X	X	X		
SITE CONSTRUCTION		X	X	X	X	X	X	X	X	X		
PERMANENT CONTROL STRUCTURES		X	X	X	X	X	X	X	X	X		
FINISH GRADING		X	X	X	X	X	X	X	X	X		
LANDSCAPING/SEED/FINAL STABILIZATION		X	X	X	X	X	X	X	X	X		
VEGETATED SHELF PLANTING		X	X	X	X	X	X	X	X	X		

EROSION & SEDIMENT CONTROLS, ROCK CONSTRUCTION ENTRANCE, AND TREE PROTECTION MEASURES SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION ACTIVITY AND MAINTAINED UNTIL PERMANENT GROUND COVER IS ESTABLISHED.

THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH LAND-DISTURBING ACTIVITIES.

EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES, IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE





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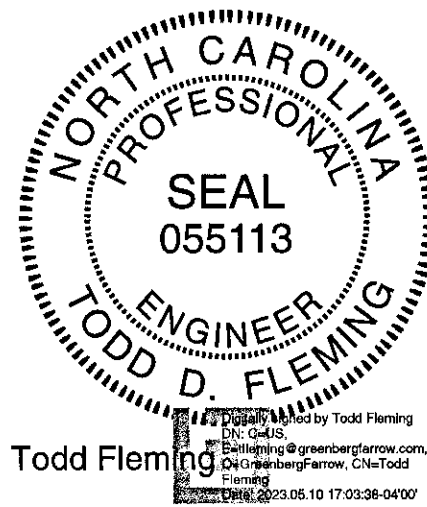
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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

20211281.0

**SHEET TITLE**

**EROSION & SEDIMENT CONTROL DETAILS**

**SHEET NUMBER**

**C-6.3**

**EROSION AND SEDIMENT CONTROL**

APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-SEC-00004-2027  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
919-217-2250



**For Shoulders, Side Ditches, Slopes (3:1 to 2:1)**

Date	Type	Planting Rate
Mar 1 - Jun 1	Sericea Lespedeza (scarified) and use the following combinations:	50 lbs/acre (Sericea Lespedeza);
Mar 1 - Apr 15	Add Tall Fescue	120 lbs/acre
Mar 1 - Jun 30	Or add Weeping Love grass	10 lbs/acre
Mar 1 - Jun 30	Or add Hulled Common Bermudagrass	25 lbs/acre
Jun 1 - Sept 1	Tall Fescue AND Browtop Mullet or Sorghum-Sudan Hybrids**	120 lbs/acre (Tall Fescue); 35 lbs/acre (Browtop Mullet); 30 lbs/acre (Sorghum-Sudan Hybrids)
Sept 1 - Mar 1	Sericea Lespedeza (unhulled) - unscarified) AND Tall Fescue	70 lbs/acre (Sericea Lespedeza); 120 lbs/acre (Tall Fescue)
Nov 1 - Mar 1	AND Abruzzi Rye	25 lbs/acre

Consult Wake County Soil & Water Conservation District or NC State Cooperative Extension for additional information concerning other alternatives for vegetation of denuded areas. The above vegetation rates are those that do well under local conditions; other seeding rate combinations are possible.

\*\* TEMPORARY: Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow more than 12" in height before mowing; otherwise, fescue may be shaded out.

**Seeding Specifications**

NPDES Stormwater Discharge Permit for Construction Activities (NCGO1 - 41/19)  
NCDEQ/Division of Energy, Mineral and Land Resources

Mixture	Application Rate
Agricultural Limestone	2 tons/acre (3 tons/acre in clay soils)
Fertilizer	1,000 lbs/acre - 10-10-10
Superphosphate	500 lbs/acre - 20% analysis
Mulch	2 tons/acre - small grain straw
Anchor	Asphalt emulsion at 400 gals/acre

**Seeding Schedule For Shoulders, Side Ditches, Slopes (Max 3:1)**

Date	Type	Planting Rate
Aug 15 - Nov 1	Tall Fescue	300 lbs/acre
Nov 1 - Mar 1	Tall Fescue & Abruzzi Rye	300 lbs/acre
Mar 1 - Apr 15	Tall Fescue	300 lbs/acre
Apr 15 - Jun 30	Hulled Common Bermudagrass	25 lbs/acre
Jul 1 - Aug 15	Tall Fescue AND Browtop Mullet or Sorghum-Sudan Hybrids**	125 lbs/acre (Tall Fescue); 35 lbs/acre (Browtop Mullet); 30 lbs/acre (Sorghum-Sudan Hybrids)

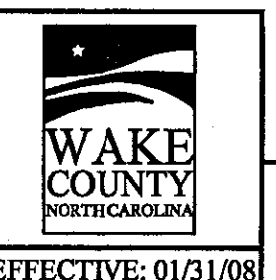
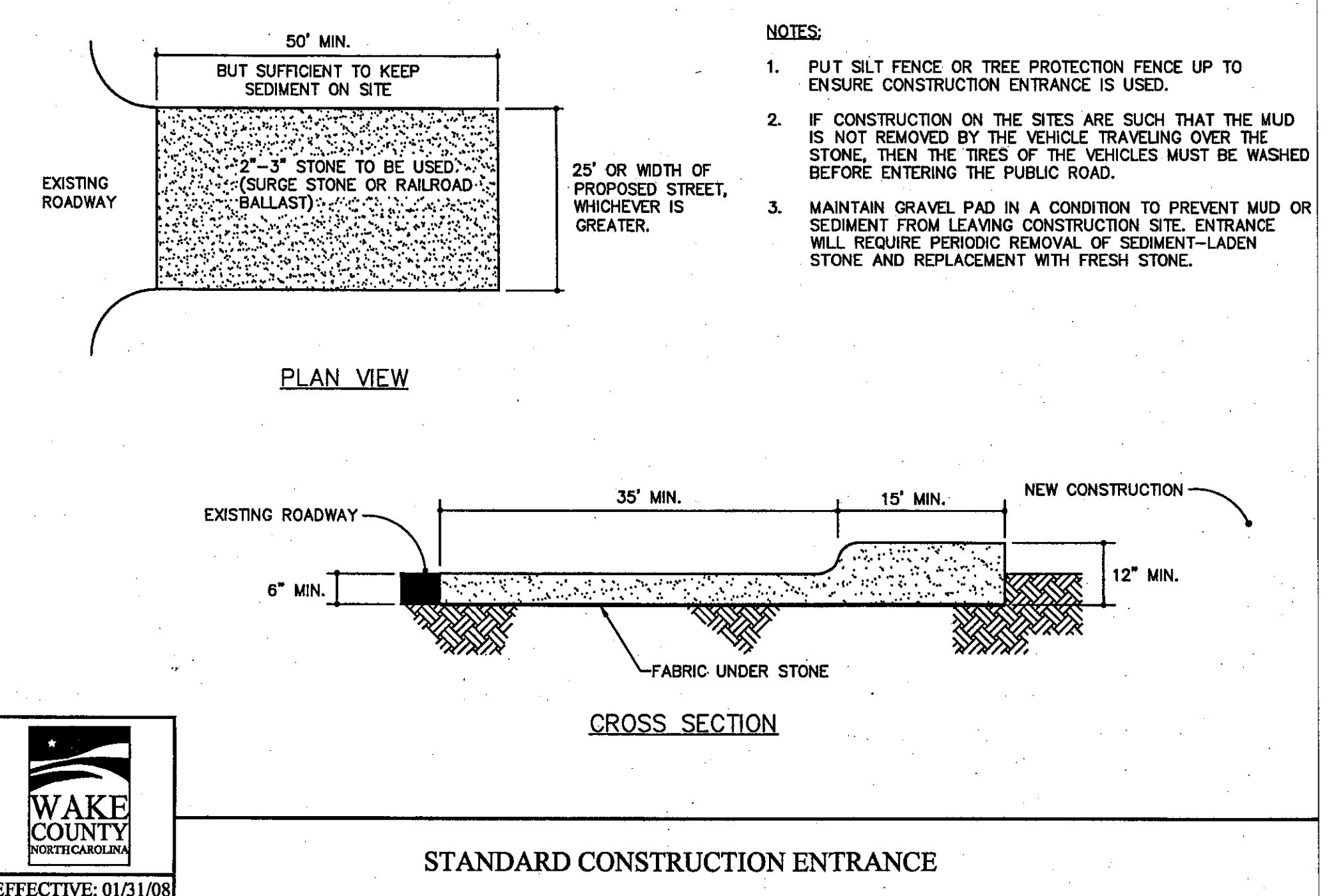
**Seeding Specifications**

NPDES Stormwater Discharge Permit for Construction Activities (NCGO1 - 41/19)  
NCDEQ/Division of Energy, Mineral and Land Resources

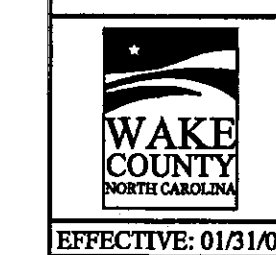
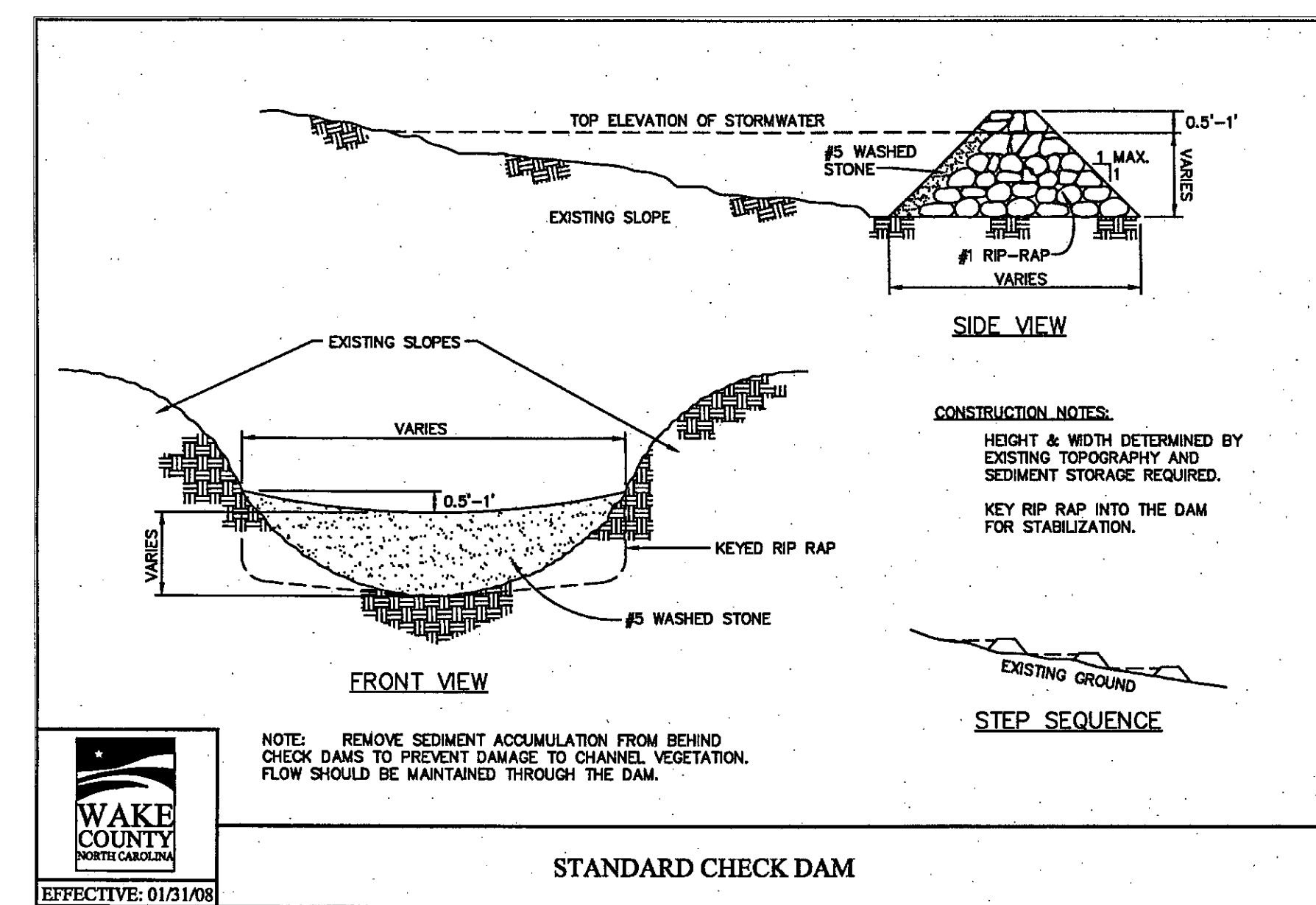
Soil Type	Application Rate
Clay	2 tons/acre
Silt	1.5 tons/acre
Sand	1.0 tons/acre

**Seedbed Preparation:**

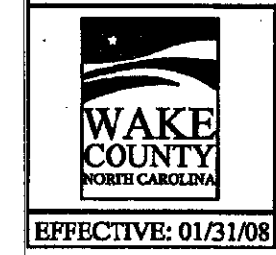
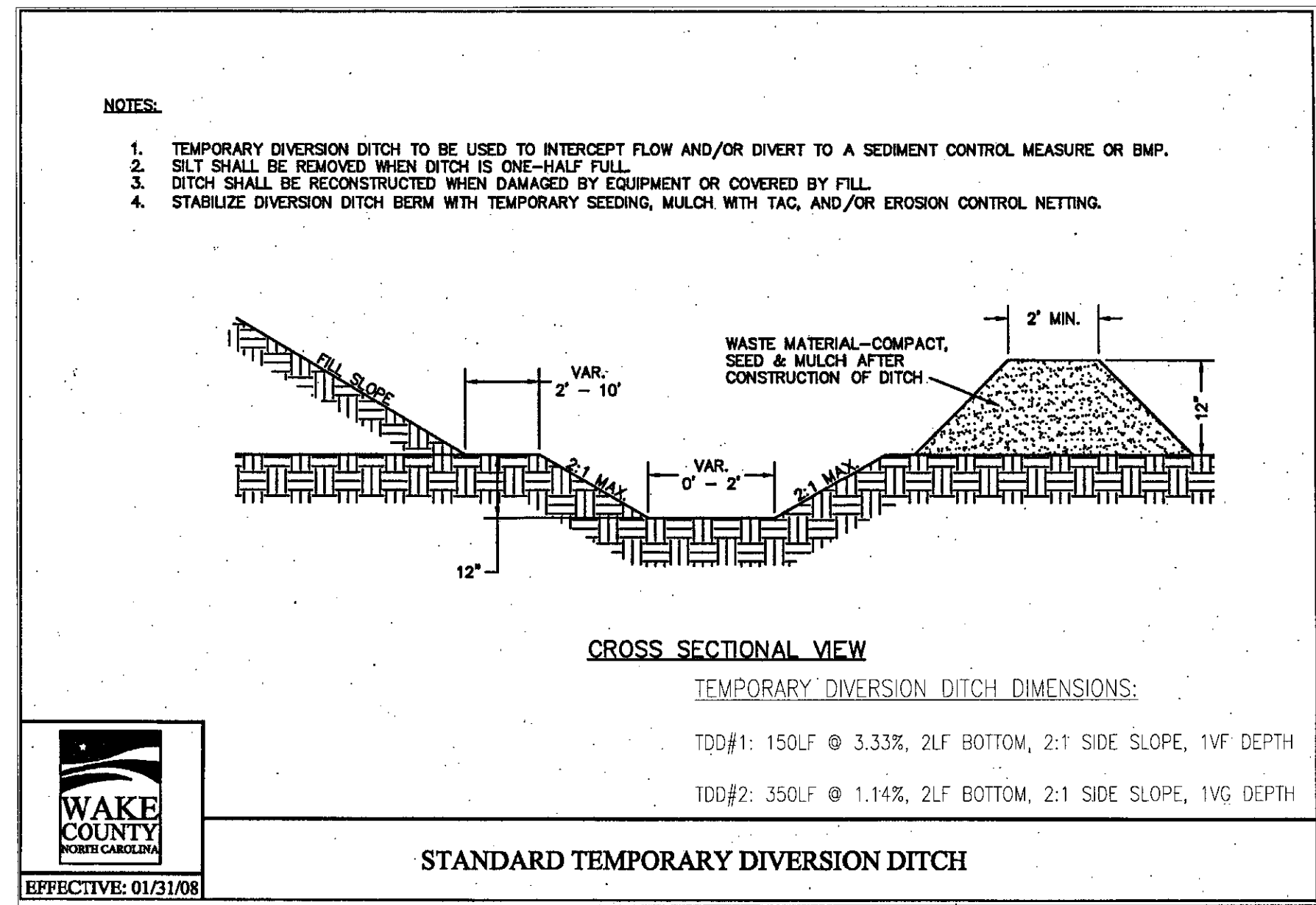
- Chisel compacted areas and spread topsoil three inches deep over adverse soil conditions, if available.
- Rip the entire area to six inches deep.
- Remove all loose rock, roots and other obstructions, leaving surface reasonably smooth and uniform.
- Apply agricultural lime, fertilizer and superphosphate uniformly and mix with soil (see mixture below).
- Continue tillage until a well-pulverized, firm, reasonably uniform seedbed is prepared four to six inches deep.
- Seed on a freshly prepared seedbed and cover seed lightly with seeding equipment or cultipack after seeding.
- Mulch immediately after seeding and anchor mulch.



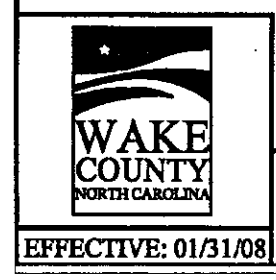
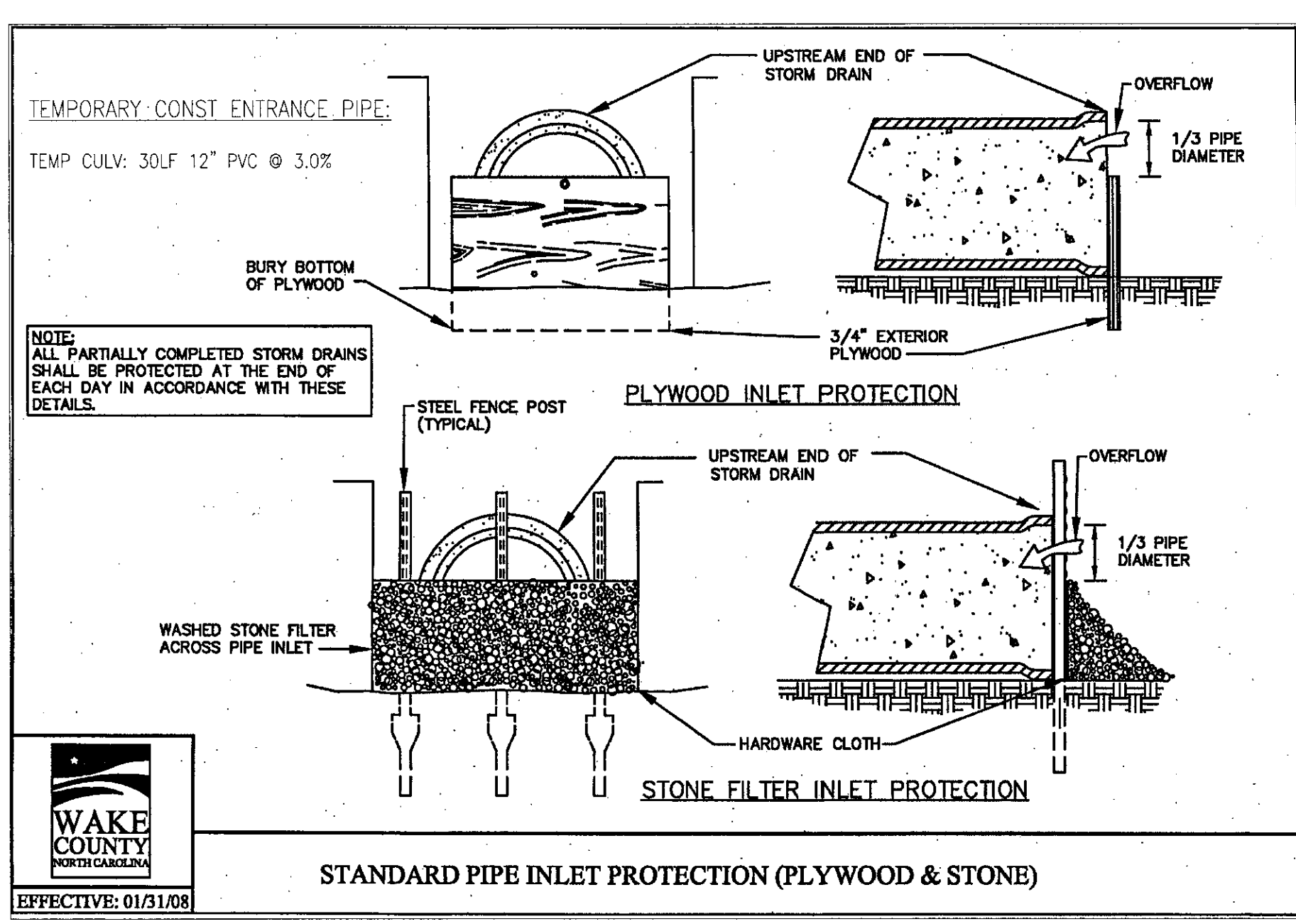
EFFECTIVE: 01/31/08



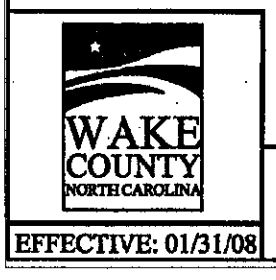
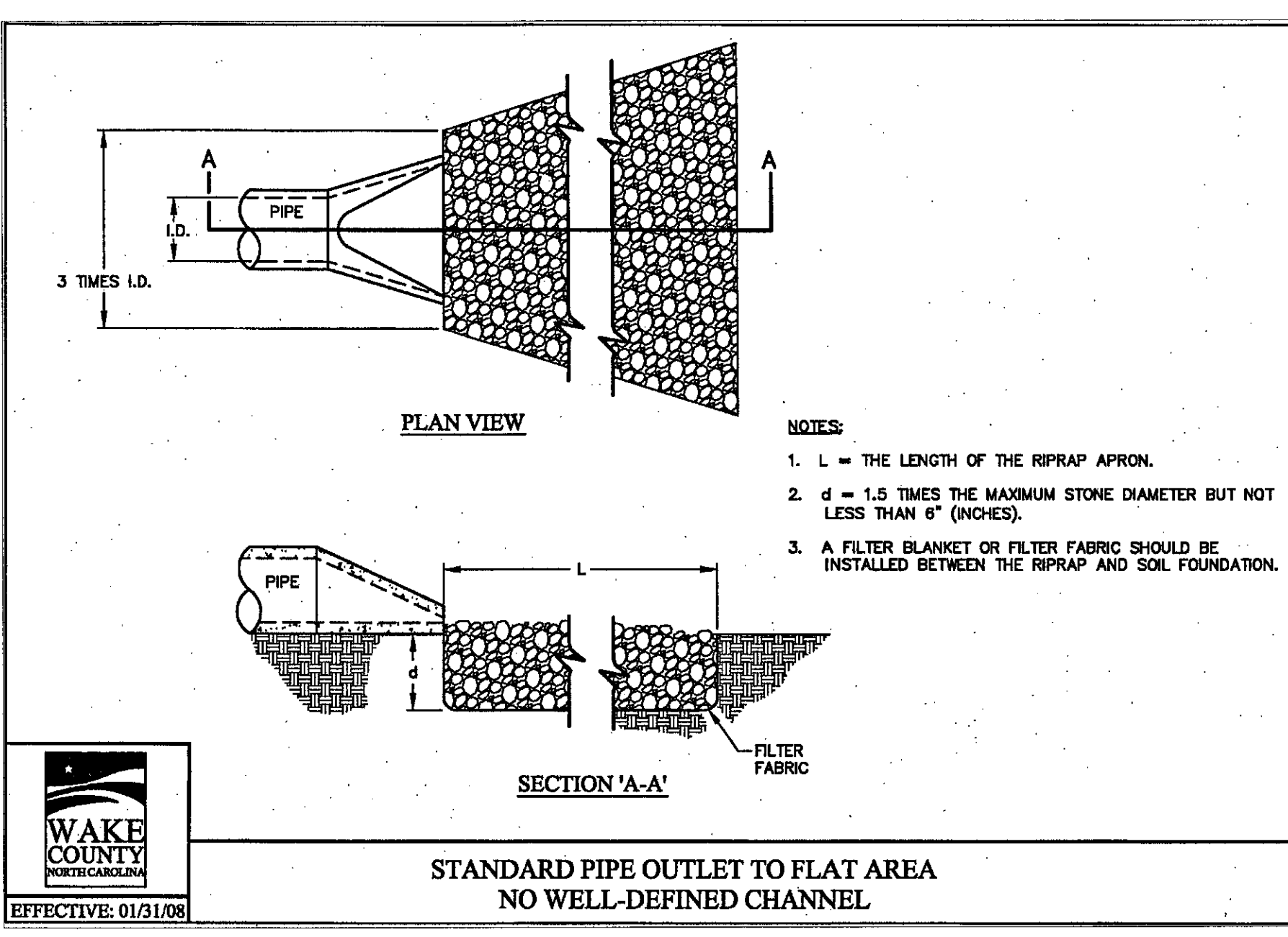
EFFECTIVE: 01/31/08



EFFECTIVE: 01/31/08



EFFECTIVE: 01/31/08



EFFECTIVE: 01/31/08

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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



Todd Fleming  
Professional Engineer  
No. 055113

**PROFESSIONAL IN CHARGE**

TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU  
**PROJECT NAME**

**PANERA BREAD KNIGHTDALE**  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**  
20211261.0

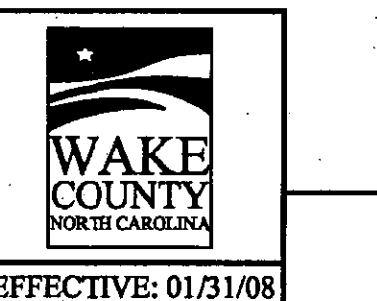
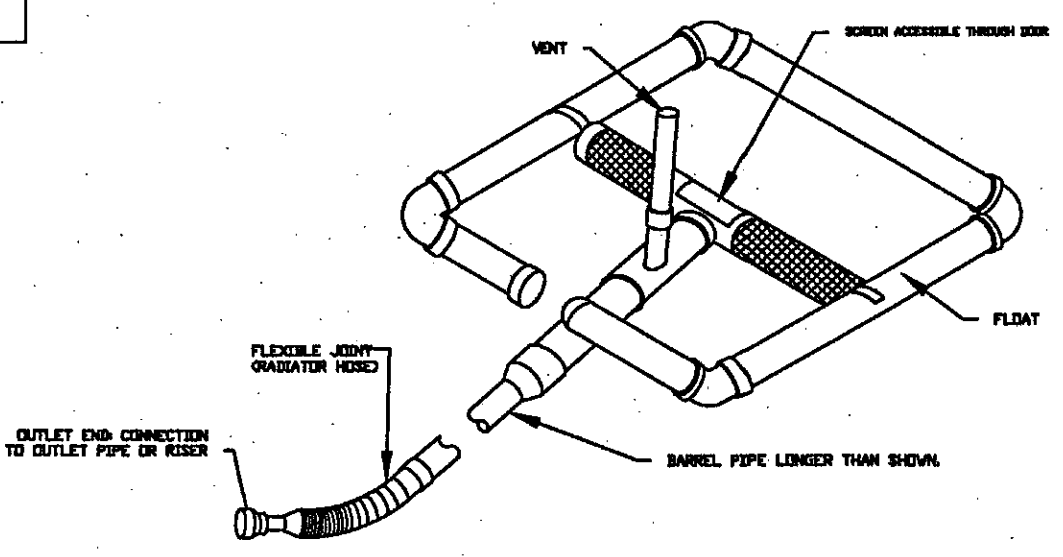
**SHEET TITLE**

**EROSION & SEDIMENT CONTROL**  
**CONTROL DETAILS**

**SHEET NUMBER**

**C-6.4**

SKIMMER DIMENSIONS:  
SKIMMER SIZE: 1.5 INCHES  
ORIFICE SIZE: 1 INCH  
DEWATER TIME: 3.46 DAYS



**STANDARD SKIMMER DETAIL**

**Practice Standards and Specifications**

**6.17 ROLLED EROSION CONTROL PRODUCTS**

**Definition** Rolled erosion control products are manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment and protection of vegetation. Examples of RECP's are blankets, nets, and matting.

**Purpose** Erosion control mats and blankets are intended to protect soil and hold seed and mulch in place on slopes and in channels so that vegetation can become well established. Turf reinforcement mats can be used to permanently reinforce grass in drainage ways during high flows. Mats are made of high tensile material woven into an open net which overlays mulch materials. Blankets are made of interlocking fibers, typically held together by a biodegradable or photodegradable netting (for example, excelsior or straw blankets). They generally have lower tensile strength than mats, but cover the ground more completely. Coir (coconut fiber) fabric comes as both mats and blankets.

**Conditions Where Practice Applies** Rolled Erosion Control Products (RECP's) should be used to aid permanent vegetative stabilization of slopes 2:1 or greater and with more than 10 feet of vertical relief. RECP's should also be used when mulch cannot be adequately tacked and where immediate ground cover is required to prevent erosion damage.

**Planning Considerations**

- RECP's should be used to aid in permanent stabilization of vegetated channels when runoff velocity will exceed 2 ft/sec on bare earth during the 2-year rainfall event that produces peak runoff. The product selected must have a permissible shear stress that exceeds the shear stress of the design runoff event.
- Good ground contact is critical to the effectiveness of these products. If good ground contact is not achieved, runoff can concentrate under the product, resulting in significant erosion.
- Nets must be used in conjunction with mulch. Excelsior, woven straw blankets and coir (coconut fiber) blankets may be installed without mulch. There are many other types of erosion control mats and blankets on the market that may be appropriate in certain circumstances. In general, most mats (e.g. jute matting) require mulch in order to prevent erosion because they have a fairly open structure. Blankets typically do not require mulch because they usually provide complete protection of the surface.
- Most netting used with blankets is photodegradable, meaning they break down under sunlight (not UV stabilized). However, this process can take months or years even under bright sun. Once vegetation is established, sunlight does not reach the mesh. It is not uncommon to find non-degraded netting still in place several years after the installation. This can be a problem if maintenance requires the use of mowers or ditch cleaning equipment. In addition, birds and small animals can become trapped in the netting.

**Practice Standards and Specifications**

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**6**

**Design Criteria**

Biodegradable blankets are available for use in sensitive areas. These organic blankets are usually held together with a fiber mesh and stitching which may last up to a year.

The following discussion and examples of design are adapted from "Green Engineering, Design Principles and Applications Using Rolled Erosion Control Products" by C. Joel Sprague.

**Slope Protection: Reducing rainfall and overlaid flow erosion.** The Revised Universal Soil Loss Equation (RUSLE), as shown below, is commonly used to estimate erosion due to rainfall and sheet runoff.

$$A = R \cdot K \cdot LS \cdot C \cdot P$$

where:

- A = soil loss in tons/acre/year
- R = rain factor
- K = soil erodibility
- LS = topographic factor
- C = cover factor
- P = practice factor

The United States Department of Agriculture's handbook, "Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE), 1997," provides agriculture-oriented values for all of these variables. Yet, when the equation is used to estimate construction-related erosion, the following unique C- and P-factors developed specifically for these applications should be used.

The C-Factor—C-factors are equal to the reduction in soil loss when using a specific erosion control system when compared to the comparable bare soil (control) condition. The designer will require C-factors representing various conditions from unvegetated to fully vegetated, including vegetation, which has been mulched or, alternatively, protected by an RECP, in order to determine an appropriate factor to be used to represent the design condition. (See Table 6.17a for a range of C-factors.)

The P-Factor—when examining erosion by itself, it is commonly taken as 1.0, since this assumes that no special "practices" (i.e. terracing, contouring, etc.) will be used. Yet, the use of all fences or other storm water management/ sediment control practices may be integrated into the RUSLE using a P-factor that is less than 1.0, which reflects the effectiveness of the sediment control practice in removing sediment from runoff.

**William Lotz**

From: Summers, Kimberly M <kimberly.summers@ncdcm.gov>  
Sent: Wednesday, February 22, 2023 3:20 PM  
To: William Lotz  
Cc: The Archer, Jenna Samples; Paul Wilson; Levi Ottwell (levi.ottwell@panerabread.com); Almon Williams; Josh Buono  
Subject: RE: [External] Panera (66153) - Knightdale, NC sediment basin de-watering

**EXTERNAL SENDER - Do not click links or open attachments unless you recognize the sender**

Thanks for the notification. Plan any conversion with consideration given to the weather forecast so that the conversion process is done in the dry. All dewatering should occur using a silt bag located within the limits of disturbance. Please ensure that the intake to the pump is situated near the top of the water column (i.e., floating intake) in the skimmer cell and that the silt bag is properly used. If excessive turbidity is an issue, we recommend the use of flocculants (such as polyacrylamides) to address the turbidity. The pumping operation should be continually monitored to reduce the potential for unforeseen problems such as silt bag failure. Please continue to work with Ike to ensure compliance during the conversion.

**Kimberly Summers**  
Environmental Program Consultant  
Division of Energy, Mineral and Land Resources  
North Carolina Department of Environmental Quality  
Phone: (919) 701-4200  
FAX: (919) 571-4718  
Email: kimberly.summers@ncdcm.gov  
Physical Address: 3920 Barwell Drive  
Raleigh, NC 27609  
Mailing Address: 1628 Mail Service Center  
Raleigh, NC 27605-1612

From: William Lotz <wlotz@greenbergfarrow.com>  
Sent: Wednesday, February 22, 2023 2:53 PM  
To: Summers, Kimberly M <kimberly.summers@ncdcm.gov>  
Cc: The Archer <ike.archer@knightdalenc.gov>; Jenna Samples <jenna.samples@panerabread.com>; Paul Wilson <paul.wilson@panerabread.com>; Levi Ottwell <levi.ottwell@panerabread.com>; Almon Williams <awilliams@panerabread.com>; Josh Buono <jbuono@greenbergfarrow.com>  
Subject: [External] Panera (66153) - Knightdale, NC sediment basin de-watering

**CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to Report-Scams.**

Hi Kimberly,  
Thanks for speaking with me today regarding the proposed sediment basin removal and corresponding de-watering requirements. The following preliminary project information is provided for your files.

**Erosion and Sediment Control Jurisdiction:**  
Wake County

**Wake County Project Identification:**  
Project Name (from permit card)  
Project Number (from permit card)

**Location:**  
Panera #6153  
6800 Knightdale Boulevard  
Knightdale Commons Shopping Center  
Knightdale, NC 27545

**Environmental Consultant:**  
John Stover

**Reason for Removal:**  
Convert temporary sediment basin to permanent stormwater management control facility

**Dewatering Method:**  
To be identified by contractor

Additional information will be provided by Panera's contractor once the various permit has been issued and construction contract has been awarded. Please review and let us know if there are further technical requirements and/or state approvals associated with this aspect of the project.

Thank you again and we look forward to working with you on this project.

**Practice Standards and Specifications**

**Table 6.17a C-Factor for Various Slope Treatments**

Treatment	Dry Mulch Rate kg/m <sup>2</sup>	C-Factor for Growing Period*				
		Slope %	<6 Weeks	1.5-6 Months	6-12 Months	Annualized**
No mulching or seeding	all	1.00	1.00	1.00	1.00	
	none	0.70	0.10	0.05	0.15	
	0.22	<10	0.20	0.07	0.03	0.07
	0.34	<10	0.12	0.05	0.02	0.05
	0.45	<10	0.09	0.05	0.02	0.04
Seeded grass	0.45	11-15	0.07	0.05	0.02	0.04
	0.45	16-20	0.11	0.05	0.02	0.04
	0.45	21-25	0.14	0.05	0.02	0.05
	0.45	26-33	0.17	0.05	0.02	0.05
	0.45	34-50	0.20	0.05	0.02	0.05
Second-year grass	all	0.01	0.01	0.01	0.01	
Organic and Synthetic Blankets	all	0.07	0.01	0.005	0.02	
Composite Mats	all	0.07	0.01	0.005	0.02	
Synthetic Mats	all	0.14	0.02	0.005	0.03	
Fully Vegetated Mats	all	0.005	0.005	0.005	0.005	

\* Approximate time periods for humid climates. Conversion: kg/m<sup>2</sup> x 4.45 = tons/acre.  
\*\* Annualized C-Factor = (+6 weeks value x 6/52) + (1.5-6 months value x 20/52) + (6-12 months value x 26/52).

**Table 6.17b Permissible Shear Stress, τ<sub>v</sub>, of Various RECP's**

Category	Product Type	Max. Permissible Shear Stress (lb/ft <sup>2</sup> )	Slopes* Up To
Degradable RECP's (Unvegetated)	Nets and Mulch	0.1 - 0.2	20:1
	Coir Mesh	0.4 - 3.0	3:1
	Blanket - Single Net	1.55 - 2.0	2:1
	Blanket - Double Net	1.65 - 3.0	1:1
Nondegradable RECP's	Unvegetated TRM*	2 - 4	1:1
	Partially Vegetated TRM	4 - 6	>1:1
	Fully Vegetated	5 - 10	>1:1

\* Steeper slope limits may apply. For further information, contact the manufacturer.  
\*\* Turf Reinforcement Mat.

**6**

**Sample Problem 6.17a**

A steep slope is to be protected from erosion using RECP. The 3H:1V slope is 100 feet long and comprised of silty loam. The RUSLE will be used to evaluate the effectiveness of RECP in limiting annual soil loss. Following are the inputs to the RUSLE equation from the U.S. Department of Agriculture:

R = 250  
K = 0.33  
LS = 0.2  
P = 1.0 (assuming no sediment control)

From Table 6.17a:  
C<sub>unvegetated</sub> = 1.00  
C<sub>compos</sub>, year 1 = 0.03  
C<sub>compos</sub>, year 2+ = 0.005

A<sub>unvegetated</sub> = 250 x 0.33 x 6.2 x 1.0 x 1.0 = 511 tons/acre/year  
A<sub>compos, year 1</sub> = 250 x 0.33 x 6.2 x 0.03 x 1.0 = 15 tons/acre/year  
A<sub>compos, year 2+</sub> = 250 x 0.33 x 6.2 x 0.005 x 1.0 = 3 tons/acre/year

This example shows that vegetation, protected by an RECP, is 97 percent effective in reducing erosion in the first year and 99.5 percent effective in the longer-term.

Table 6.17b aids in selecting an appropriate type of RECP for the project-specific slope.

**Drainage Channels Concepts**—Permissible shear design is commonly used to determine if a channel liner is stable. This method requires the input of an appropriate expected flow rate (discharge) as well as the determination of flow depth. A breaker presentation of channel design is located in Appendix 8.05, Design of Stable Channels and Diversions.

The design flow rate will be based on local storm frequency design standards and flow depth is calculated, commonly using Manning's equation. With these inputs the designer can then perform a permissible shear design, which compares the permissible shear of the prospective liner materials to the expected flow-induced shear as calculated using the equation below.

$$\tau_v = YDS$$

where:  
Y = unit weight of water (62.4lb/ft<sup>3</sup>)  
D = depth of flow (ft)  
S = channel slope (ft/ft)

**Practice Standards and Specifications**

If the permissible shear stress, τ<sub>v</sub>, is greater than the computed shear, τ<sub>c</sub>, the lining is considered acceptable. Values for permissible shear stress, τ<sub>v</sub>, for linings are based on research conducted at laboratory facilities and in the field. Typical values are given in Table 6.17b. The permissible shear stress, τ<sub>v</sub>, indicates the force per unit area resulting from flowing water required to create instability of the lining material and/or adjacent soil.

Manning's Equation and Roughness Coefficient, n—The condition of uniform, steady flow in a channel at a known discharge is computed using the Manning's Equation below. Numerous computer programs are available to facilitate the use of this equation since a trial-and-error solution relating channel width, B, and depth, D, is required.

$$Q = (1.49n) (A) (R)^{2/3} (S)^{1/2}$$

$$V = (1.49n) (R)^{2/3} (S)^{1/2}$$

where:  
Q = discharge (cfs)  
V = average velocity in cross section (ft/s)  
n = Manning's roughness coefficient  
A = cross-sectional area (ft<sup>2</sup>)  
R = hydraulic radius = A/P (ft)  
P = wetted perimeter (ft)  
S = energy gradient (commonly taken as equivalent to the channel bed slope, ft/ft)

The appropriate Manning's "n" to use when designing with RECP's depends on whether one is designing for bare soil retention and vegetation establishment (short-term) or for fully grassed conditions (long term), or both. The "n" values for RECP's can vary significantly with material type and flow depth, but they typically range from 0.02 to 0.04 and are usually provided by the manufacturer.

In lieu of product-specific information, the following values can be used as approximations:

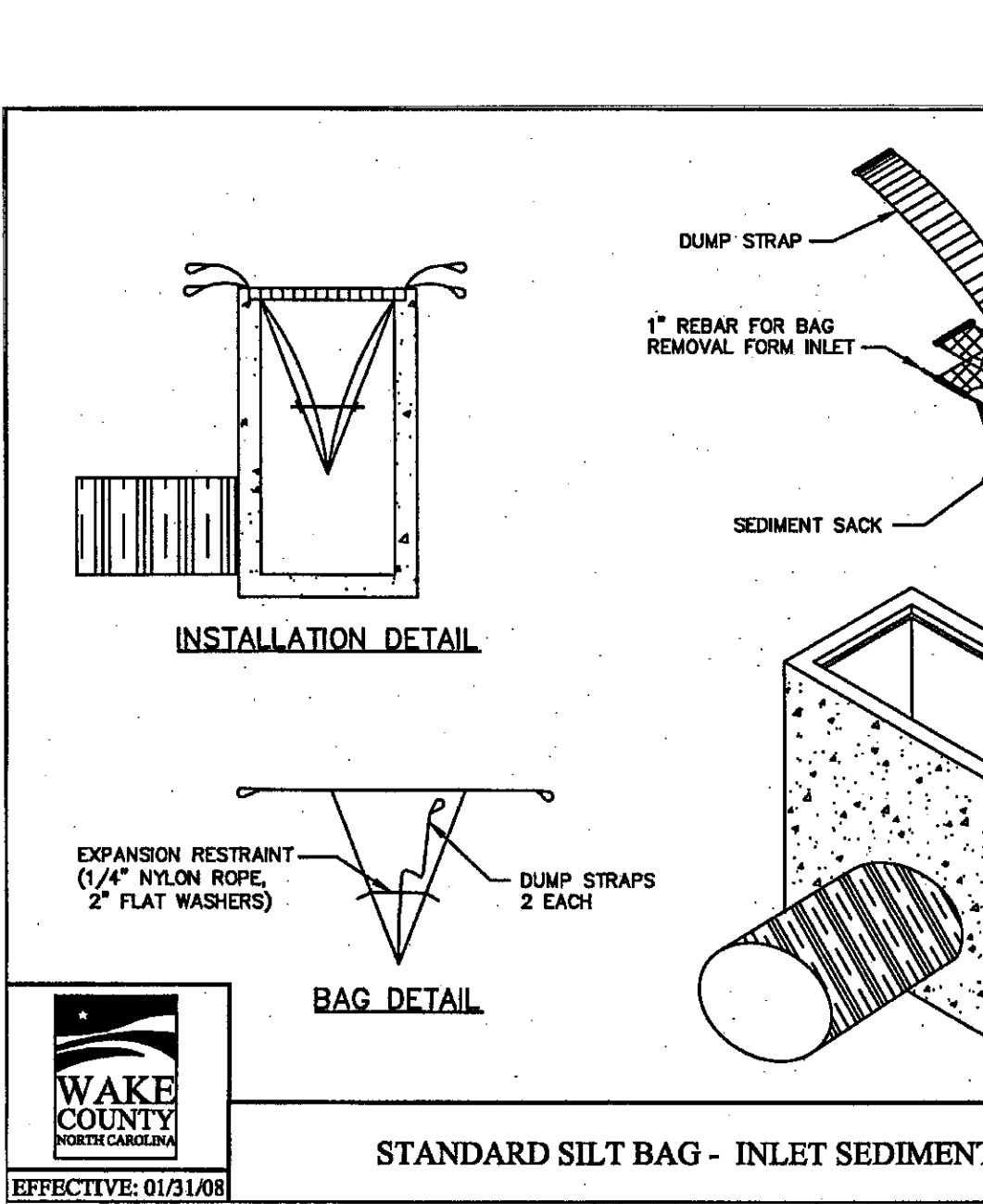
n<sub>compos</sub> = 0.02  
n<sub>unvegetated</sub> = refer to Table 6.17c and Figure 6.17a  
n<sub>veg</sub> = refer to Table 8.05e

**Table 6.17c Grass Retardance Categories**

Average Grass Length	Retardance
>24 in.	A
10 in. to 24 in.	B
6 in. to 10 in.	C
2 in. to 6 in.	D
Less than 2 in.	E

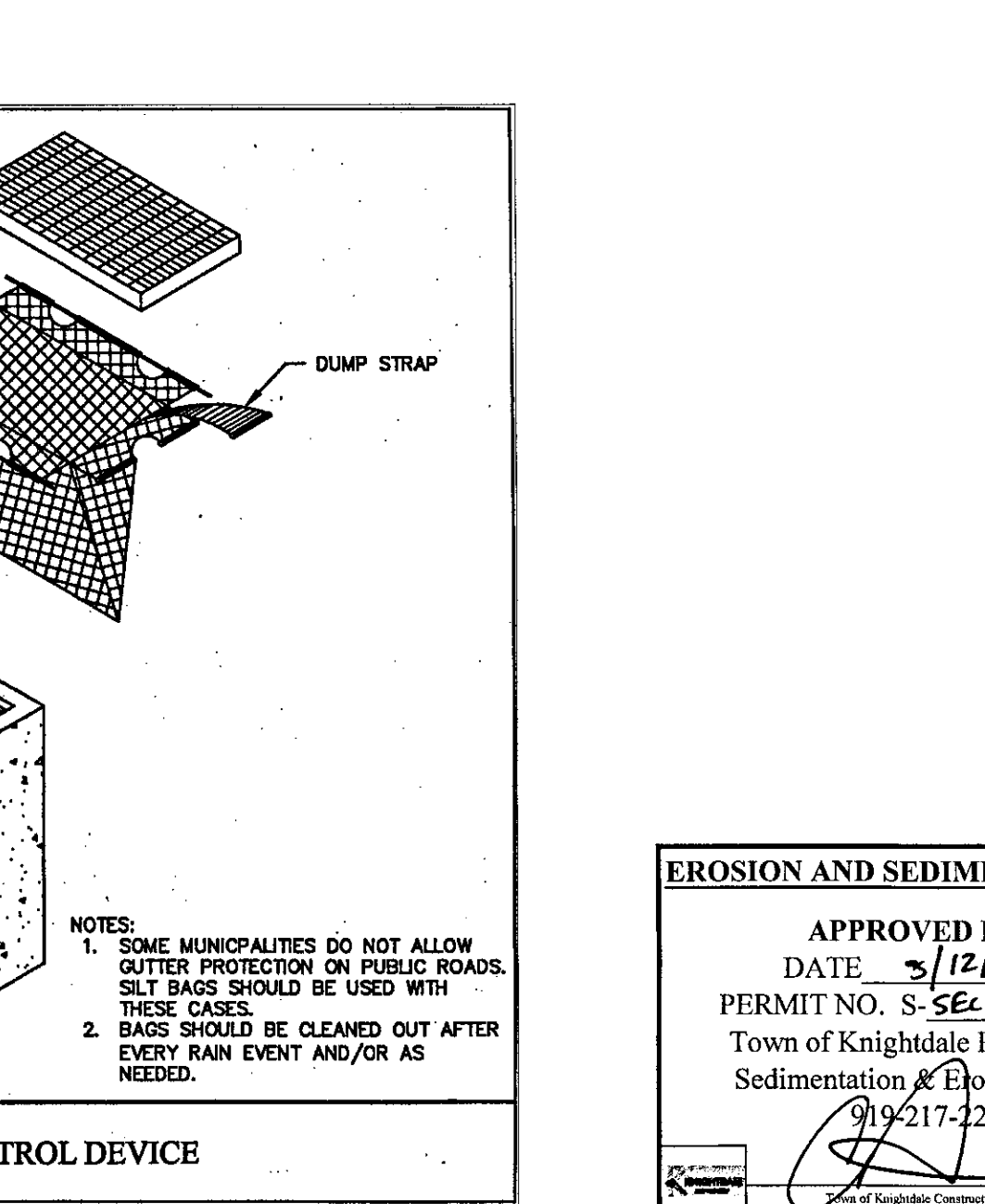
**Practice Standards and Specifications**

**INSTALLATION DETAIL**



**Practice Standards and Specifications**

**STANDARD SILT BAG - INLET SEDIMENT CONTROL DEVICE**



**NOTES:**  
1. SOME MUNICIPALITIES DO NOT ALLOW GUTTER PROTECTION ON PUBLIC ROADS. SILT BAGS SHOULD BE USED WITH THESE CASES.  
2. BAGS SHOULD BE CLEANED OUT AFTER EVERY RAIN EVENT AND/OR AS NEEDED.

**APPROVED PLAN**  
DATE 5/12/2023  
PERMIT NO. S-SEL-00004-2023  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
9/9/217-2250

**PROJECT TEAM**

ISSUE/REVISION RECORD

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITAL

**PROFESSIONAL SEAL**

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055113

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Atlanta, GA 30309  
t. 404 601 4000

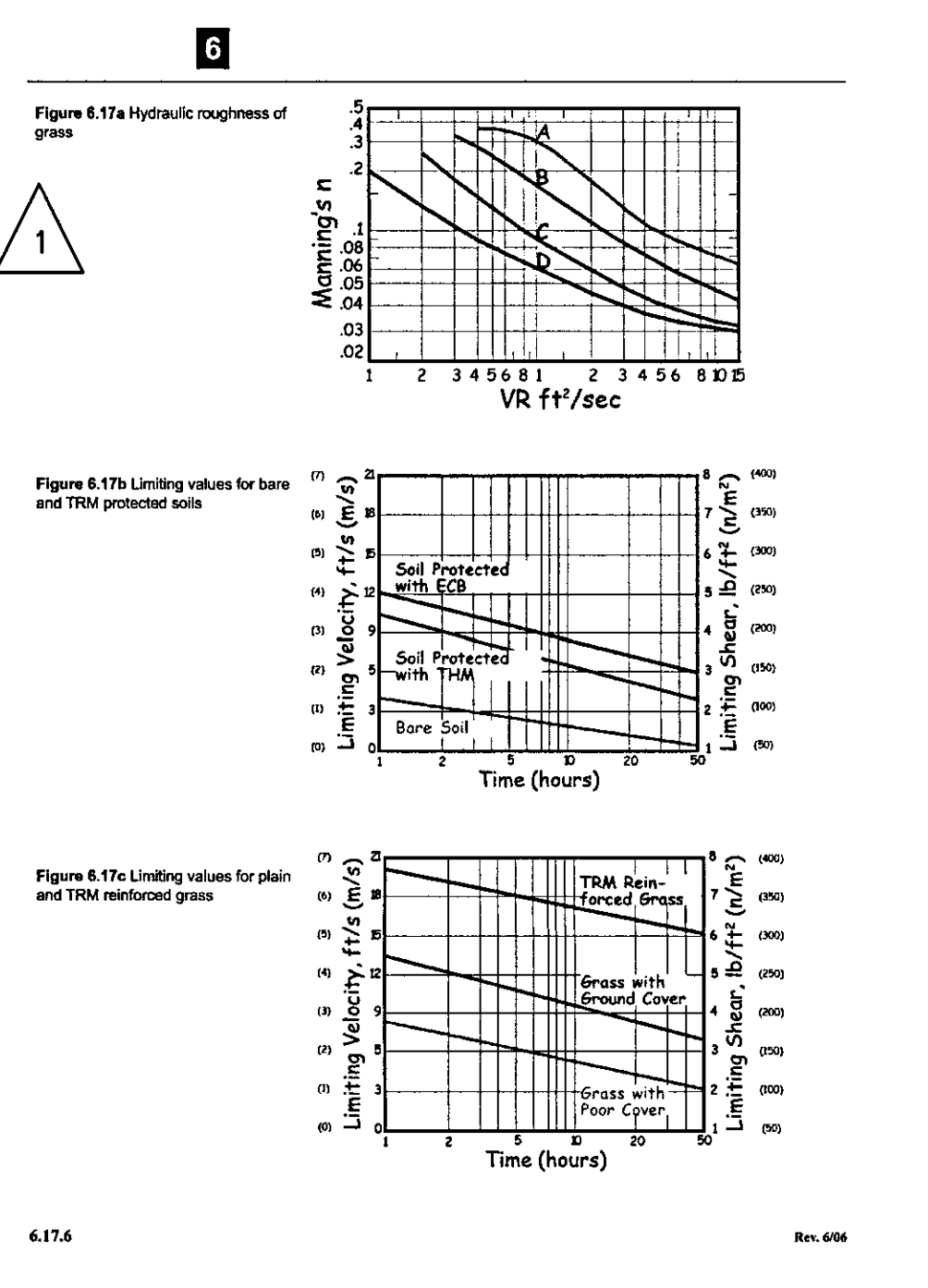
**PROFESSIONAL IN CHARGE**  
TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**  
**PANERA BREAD**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD**

**PROJECT NUMBER**  
20211261.0

**SHEET TITLE**  
**EROSION AND SEDIMENT CONTROL DETAILS**

**SHEET NUMBER**  
**C-6.5**



**Practice Standards and Specifications**

**Sample Problem 6.17b**

Determine if an RECP-lined drainage channel will be stable for a long-term peak flow (10-year design storm) of 70 cfs down a 20:1 slope (S=0.05) with a 4-foot bottom width and 1:1 side slopes. The duration of flow is 50 hours for long-term and one hour for short-term design. The grass cover is expected to be in retardance group D. Short-term stability can be checked using the two-year design storm, which produces a short-term peak flow of 45 cfs.

Long-term design = vegetated channel stability

- Use  $Q_{max} = Q_{peak} = 70$  cfs
- From Figure 6.17c: Limiting shear = 8.8 lb/ft<sup>2</sup>
- Assume  $\tau_{critical} = 0.05$

Solve for the depth of flow using iterations of Manning's equation. An Excel spreadsheet located on the internet at <http://www.dnr.state.nj.us/water/management/estimates/html/corcommercallyavailablechannelsoftware.htm> is recommended.

For trapezoidal channels:

$$(bd + z^2d^3)^{1/3} = \frac{Qn}{1.486A^{2/3}}$$

From trial-and-error,  $d = 1.78$

Determine area of flow A, from  $A = (bd + z^2d^2) \cdot L$

Since slope = 1:1, calculate VR using:

$$V = \frac{Q}{A} = \frac{70}{(2.2)(1.78)} = 2.88 \text{ ft/s}$$

From Figure 6.17a:  $V = 0.032$ . Recalculate  $d = 1.34$  ft

Check shear stress  $\tau = YDS = (62.4)(1.34)(0.05) = 4.18 \text{ lb/ft}^2$

$4.18 < 8.8 \text{ lb/ft}^2$ , therefore acceptable

**6**

**Sample Problem 6.17b cont.**

Short-term design = bare soil channel stability

- Use  $Q_{max} = Q_{peak} = 45$  cfs
- From Figure 6.17c: Limiting shear = 4.5 lb/ft<sup>2</sup>
- For mat on bare soil,  $n = 0.03$

Determine depth of flow via trial-and-error using Manning's Equation:

For trapezoidal channels:  $(bd + z^2d^3)^{1/3} = \frac{Qn}{1.486A^{2/3}}$

From trial-and-error,  $d = 1.0$  ft

Check shear stress  $\tau = YDS = (62.4)(1.0)(0.05) = 3.12 \text{ lb/ft}^2$ , therefore acceptable

**Construction Specifications**

**Criteria:** Even if properly designed, if not properly installed, RECP's will probably not function as desired. Proper installation is imperative. Even if properly installed, if not properly sized and nourished, vegetation will probably not grow as desired. Proper seed/vegetation selection is also imperative.

Grade the surface of installation areas so that the ground is smooth and loose. When seeding prior to installation, follow the steps for seed bed preparation, soil amendments, and seeding in *Surface Stabilization*, 6.1. All gullies, rills, and any other disturbed areas must be graded prior to installation. Spread seed before RECP installation. (Important: Remove all large rocks, dirt clods, stumps, roots, grass clumps, trash, and other obstructions from the soil surface to allow for direct contact between the soil surface and the RECP.)

Terminal anchor trenches are required at RECP ends and intermittent trenches must be constructed across channels at 25-foot intervals. Terminal anchor trenches should be a minimum of 12 inches in depth and 6 inches in width, while intermittent trenches need to be only 6 inches deep and 6 inches wide.

**Installation for Slopes:** Place the RECP 3.5 feet over the top of the slope and into an excavated end trench measuring approximately 12 inches deep by 6 inches wide. Pin the RECP at 1-foot intervals along the bottom of the trench, backfill, and compact. Unroll the RECP down (or along) the slope maintaining direct contact between the soil and the RECP. Overlap adjacent rolls a minimum of 3 inches. Pin the RECP to the ground using staples or pins in a 3-foot center-to-center pattern. Less frequent stapling/pinning is acceptable on moderate slopes.

**Practice Standards and Specifications**

**Installation in Channels:** Excavate terminal trenches (12 inches deep and 6 inches wide) across the channel at the upper and lower end of the lined channel section. At 25-foot intervals along the channel, anchor the RECP across the channel either at 6-inch by 6-inch trenches or by installing two closely spaced rows of anchors. Excavate longitudinal trenches 6 inches deep and wide along channel edges (above water line) in which to bury the outside RECP edges. Place the first RECP at the downstream end of the channel. Place the end of the first RECP in the terminal trench and pin it at 1-foot intervals along the bottom of the trench.

Water the RECP before placed upside down in the trench with the roll on the downstream side of the trench.

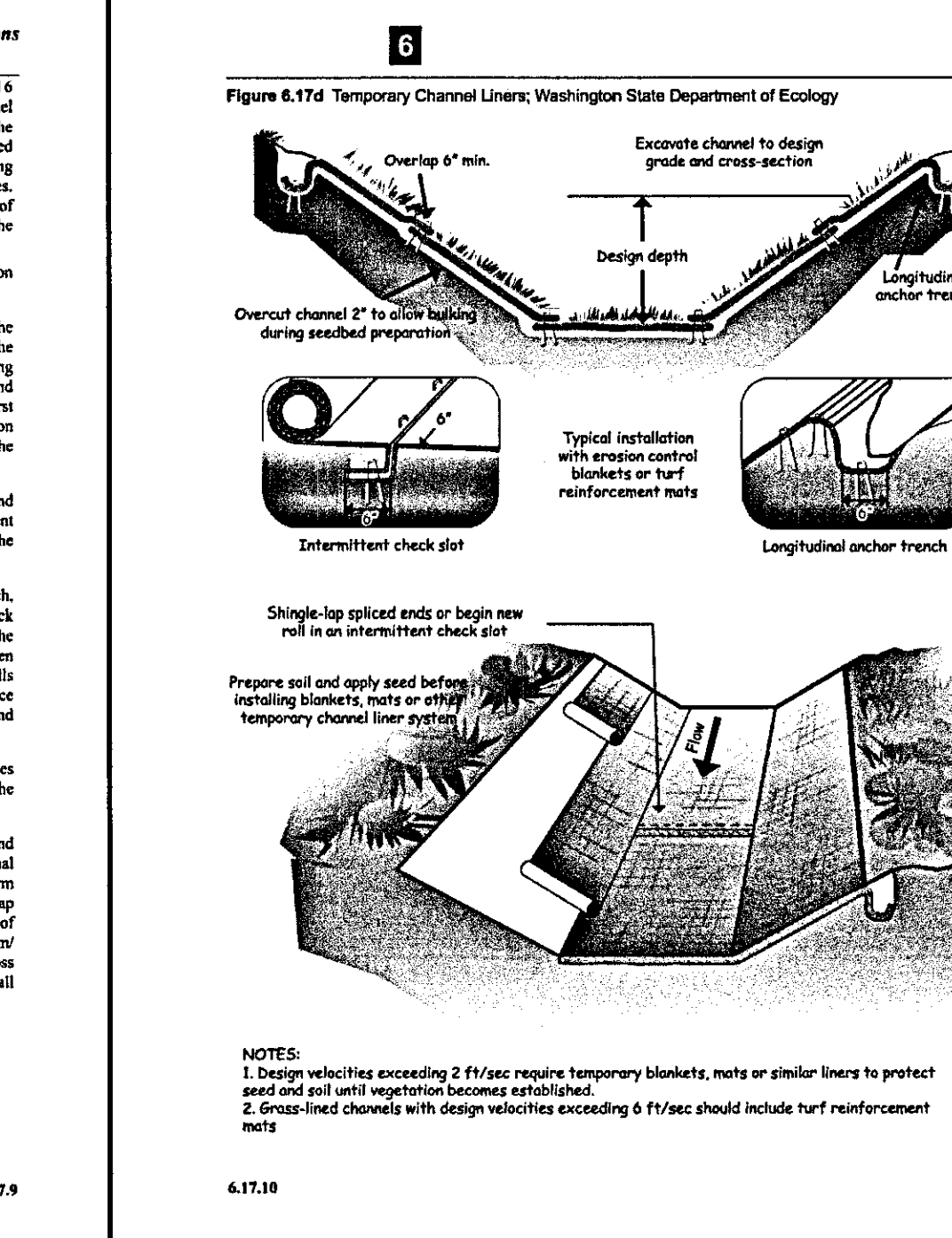
Once pinned and backfilled, the RECP is deployed by wrapping over the top of the trench and unrolling upstream. If the channel is wider than the provided rolls, place ends of adjacent rolls in the terminal trench, overlapping the adjacent rolls a minimum of 3 inches. Pin at 1-foot intervals, backfill, and compact. Unroll the RECP in the upstream direction until reaching the first intermittent trench. Fold the RECP back over itself, positioning the roll on the downstream side of the trench, and allowing the mat to conform to the trench.

Then pin the RECP (two layers) to the bottom of the trench, backfill, and compact. Continue this step at other intermittent trenches, until reaching the upper terminal trench.

At the upper terminal trench, allow the RECP to conform to the trench, secure with pins or staples, backfill, compact and then bring the mat back over the top of the trench and onto the existing mat (2 to 3 feet overlap in the downstream direction) and pin at 1-foot intervals across the RECP. When starting installation of a new roll, begin in a trench or shingle-lap ends of rolls a minimum of 1 foot with upstream RECP on top to prevent splitting. Pin the outside edges of the RECP(s) in longitudinal trenches, pin, backfill, and compact.

**Anchoring Devices:** 11-gauge, at least 6 inches length by 1 inch width staples or 12 inch minimum length wooden stakes are recommended for anchoring the RECP to the ground.

Drive staples or pins so that the top of the staple or pin is flush with the ground surface. Anchor each RECP every 3 feet along its center. Longitudinal anchors must be sufficient to accommodate a row of anchors and uniform along the entire length of overlap and anchored every 3 feet along the overlap length. Roll ends may be spliced by overlapping 1 foot in the direction of water flow, with the upstream RECP on top to prevent splitting. Pin the downstream RECP. This overlap should be anchored at 1 foot spacing across the RECP. When installing multiple-width mats between the factory-cut factory seams and field overlaps should be similarly anchored.



**Practice Standards and Specifications**

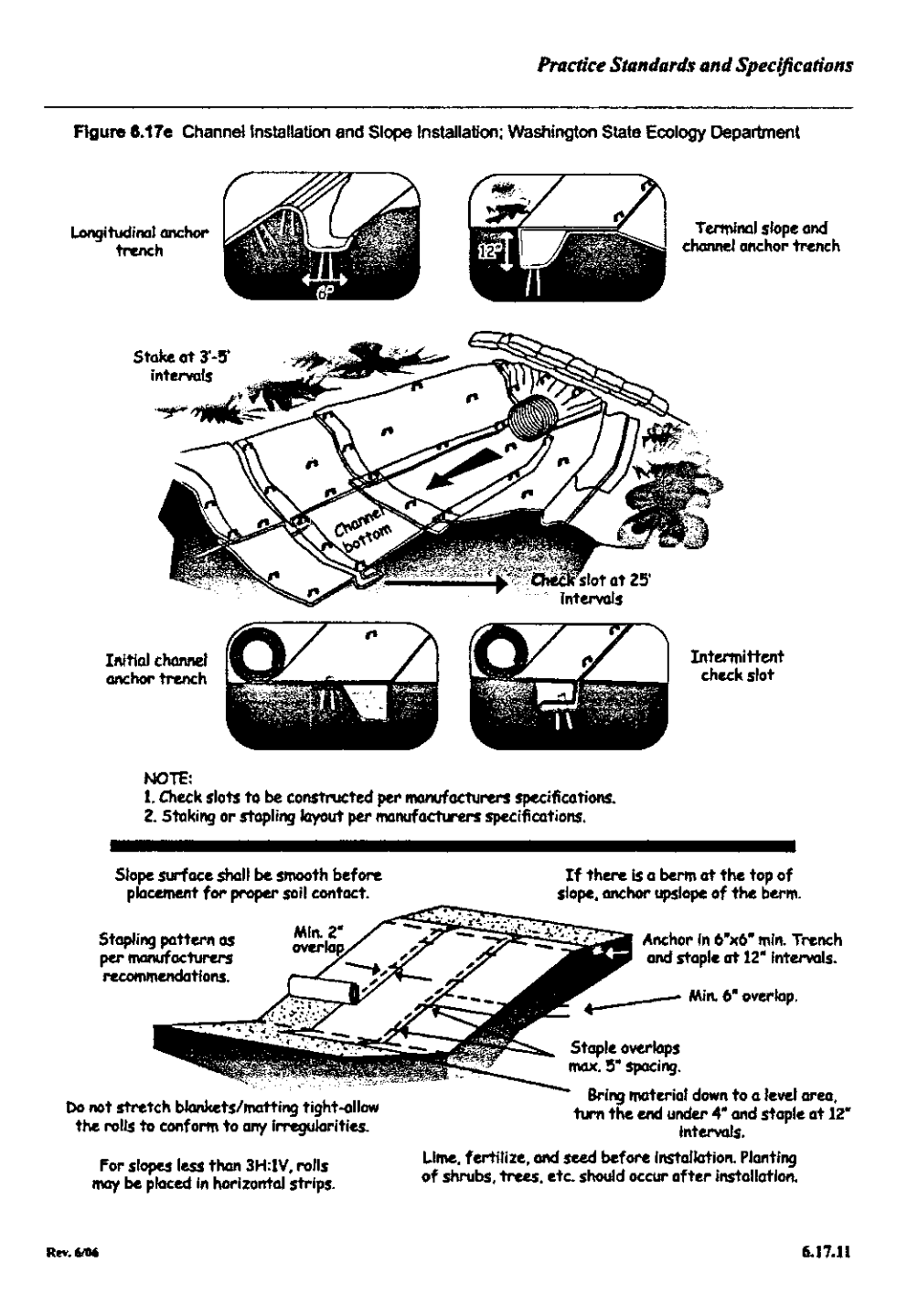
**Guidance for Determining Width of Undisturbed Vegetation Zones**

**Slope (%)**

Slope (%)	Width of Zone of Undisturbed Vegetation
0-1	15 feet
1-3	20 feet
3-5	25 feet
5-10	25 feet + (% of slope)
10-15	25 ft + 20 ft Zone of Undisturbed Vegetation (25 ft + 1 ft), and
15-20	50 ft + 20 ft Zone of Undisturbed Vegetation (25 ft + 4 ft)

NOTE: Certain projects may be subject to riparian buffers under the statutes and rules regarding development activities in specified river basins or coastal areas. Use of the above-stated guidance may not satisfy the requirements of these applicable laws. The width of the riparian buffer, if applicable, or 2) the zone of undisturbed vegetation, allowing for exceptions based on good engineering judgment, should be applied on a site specific basis.

**References:** Best Management Practices for Construction and Maintenance Activities, North Carolina Department of Transportation, August, 2003, Appendix D.



**Practice Standards and Specifications**

**6.17b**

**Maintenance**

- Inspect Rolled Erosion Control Products at least weekly and after each significant (1/2 inch or greater) rain fall event immediately.
- Good contact with the ground must be maintained, and erosion must not occur beneath the RECP.
- Any areas of the RECP that are damaged or not in close contact with the ground shall be repaired and stapled.
- If erosion occurs due to poorly controlled drainage, the problem shall be fixed and the eroded area protected.
- Monitor and repair the RECP as necessary until ground cover is established.

**References:** Sprague, C. Joel. TRB Environmental, Inc. "Green Engineering: Design principles and applications using rolled erosion control products". Storm Water Management Manual for Western Washington, Washington State Department of Ecology, Water Quality Program <http://www.ecw.wa.gov/programs/wqm/stormwatermanagement.html> Erosion Control Technology Council, <http://www.ecct.org>

**6.74**

**Practice Standards and Specifications**

**6.74**

**Definition:** Buffer zone means the strip of land adjacent to a lake or natural water course (stream, river, swamp, canal, estuary, etc.).

**Purpose:** Buffer zones are used to reduce the impact of upland pollution by:

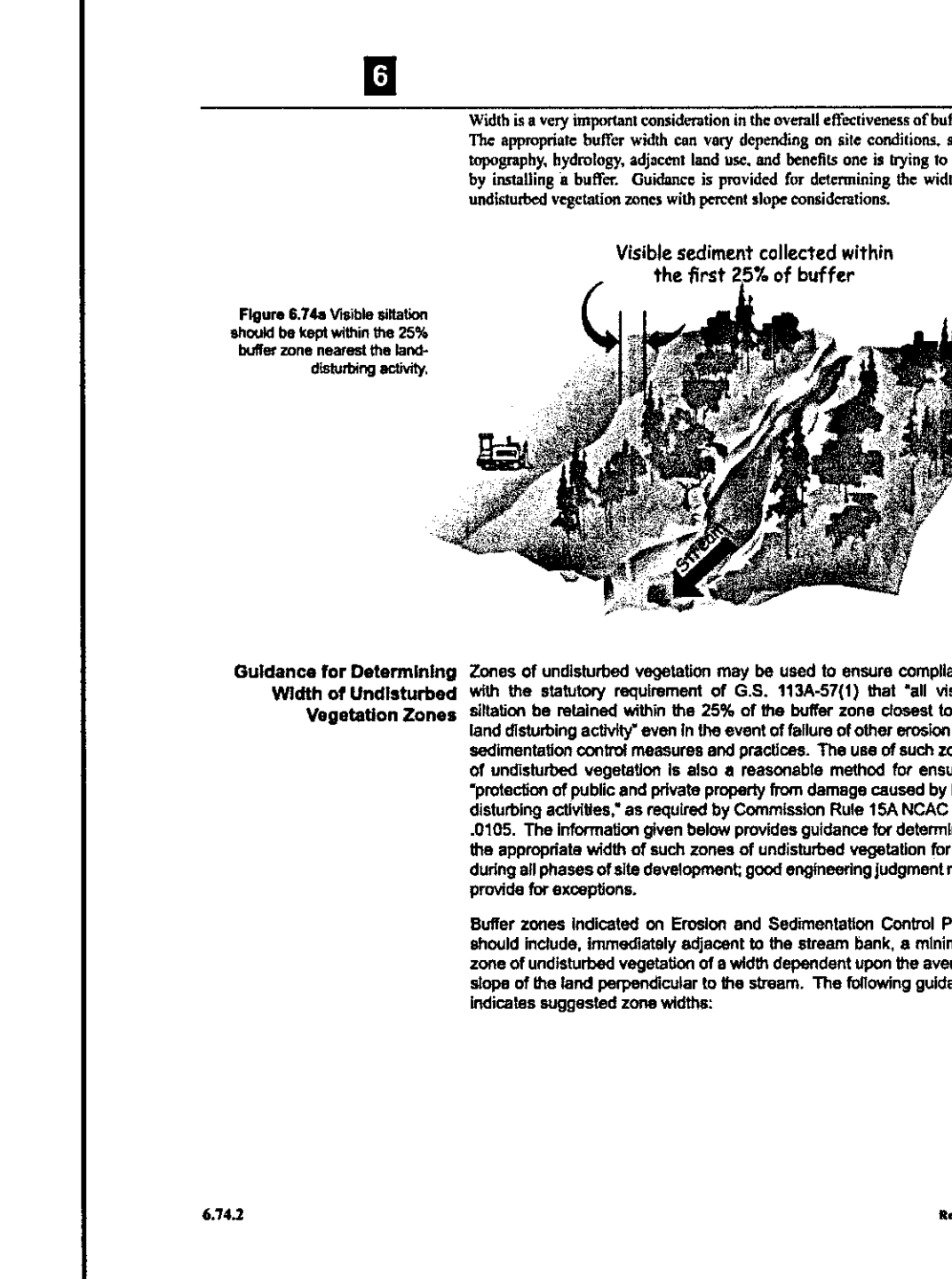
- filtering surface runoff and groundwater;
- filter dust from surrounding land-disturbing activities;
- providing habitat for native plants and animals;
- providing shade and woody debris used for food and shelter by aquatic organisms.

**Conditions Where Practice Applies:**

- perennial streams;
- intermittent streams;
- lakes and ponds, natural or impounded;
- any river, brook, swamp, sound, bay, creek, run, branch, canal, waterway or estuary which could be damaged by sedimentation.

Plan designers and others involved in land-disturbing activities should check with local, state, and federal agencies about the assigned surface water classification for a waterbody or stream on or adjacent to a property where land-disturbing activity is planned. It is the responsibility of the Division of Water Quality (DWQ) classified trout waters (T). To determine a North Carolina waterbody and stream classification visit <http://h2o.nc.gov/assess/biom/Reports/ReportsV8.html>.

**Planning Considerations:** As stated in the *Sedimentation Pollution Control Act of 1976* (As Amended through 2005) § 113A-571(1) "No land-disturbing activity during periods of construction or improvement to land shall be permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the twenty-five percent (25%) of the buffer zone nearest the land-disturbing activity. Waters that have been classified as trout waters by the Environmental Management Commission shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the twenty-five percent (25%) of the buffer zone nearest the land-disturbing activity, whichever is greater. Provided, however, that the Sedimentation Control Commission may approve plans which include land-disturbing activity along trout waters when the duration of said disturbance would be temporary and the extent of said disturbance would be minimal. This subdivision shall not apply to a land-disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse." Rule 15A NCAC 04B .0112 requires that "Land-disturbing activity in connection with construction is, on, over, or under a lake or natural watercourse shall minimize the extent and duration of diversion of the stream channel."



**Practice Standards and Specifications**

**6.15**

**6.15**

**Definition:** A layer of stone designed to protect and stabilize areas subject to erosion.

**Purpose:** To protect the soil surface from erosive forces and/or improve stability of soil slopes that are subject to seepage or have poor soil structure.

**Conditions Where Practice Applies:**

- Riprap is used for the following applications:
  - cut-and-fill slopes subject to seepage or weathering, particularly where conditions prohibit establishment of vegetation;
  - channel side slopes and bottoms;
  - inlets and outlets for culverts, bridges, slope drains, grade stabilization structures, and storm drains;
  - streambank and stream drains;
  - shorelines subject to wave action.

**Planning Considerations:** Riprap is a versatile, highly erosion-resistant material that can be used effectively in many locations and in a variety of ways to control erosion on construction sites.

**GRADED VERSUS UNIFORM RIPRAP:** Riprap is placed in either graded or uniform. Graded riprap includes a wide range of stone sizes. Uniform riprap consists of stones nearly all the same size.

Graded riprap is preferred to uniform riprap in most applications because it forms a dense, flexible cover. Uniform riprap is more open, and cannot adjust as effectively to movement of the stones. Graded riprap is also cheaper to install requiring less hand work for installation than uniform riprap, which must be placed in a uniform pattern. Uniform riprap may give a more pleasing appearance.

Riprap sizes are designated by either the mean diameter or the weight of the stones. The diameter specification is often misleading since the stones are usually angular. However, common practice is to specify stone size by the diameter of an equivalent size of spherical stone. Table 6.15a lists some typical stones by their spherical diameter and the corresponding rectangular dimensions. These stone sizes are based upon an assumed specific weight of 165 lb/ft<sup>3</sup>.

A method commonly used for specifying the range of stone sizes in graded riprap is to designate a diameter for which more percentage by weight will be smaller. For example, "4-16" specifies a mixture of stones in which 85% of the stone by weight would be smaller than the diameter specified. Most designs are based on "4-16" or medium size stone.

Riprap and gravel are often designated by N.C. Department of Transportation specifications (Table 6.15b).

**Practice Standards and Specifications**

**6.15**

**6.15**

**Table 6.04a**

Cubic Yards of Topsoil Required for Application to Various Depths

Depth (Inches)	Per 1,000 Sq. ft.	Per Acre
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	536
5	15.5	670
6	18.6	804

On slopes and areas that will not be moved, the surface may be left rough after spreading topsoil. A disk may be used to promote bonding at the interface between the topsoil and subsoil.

After topsoil application, follow procedures for seedbed preparation, taking care to avoid excessive mixing of topsoil into the subsoil.

**References:** Site Preparation 6.03, Surface Roughening 6.10, Temporary Seeding 6.11, Permanent Seeding 6.12, Vegetative Stabilization

**Practice Standards and Specifications**

**6.04**

**6.04**

**TOPSOILING**

**Definition:** Preserving and using topsoil to enhance final site stabilization with vegetation.

**Purpose:** To provide a suitable growth medium for vegetation.

**Conditions Where Practice Applies:** Where a sufficient supply of quality topsoil is available. Where the subsoil or areas of existing surface soil present the following problems:

- the structure, pH, or nutrient balance of the available soil cannot be amended by reasonable means to provide an adequate growth medium for the desired vegetation;
- the soil is too shallow to provide adequate rooting depth or will not supply necessary moisture and nutrients for growth of desired vegetation;
- the soil contains substances toxic to the desired vegetation.

Where high-quality turf or ornamental plants are desired. Where slopes are 2:1 or flatter.

**Planning Considerations:** Topsoil is the surface layer of the soil profile, generally characterized as darker than the subsoil due to enrichment with organic matter. It is the major zone of root development and biological activity. Microorganisms that reduce plant growth thrive in this layer. Topsoil can usually be differentiated from subsoil by texture as well as color. Clay content usually increases in the subsoil. In North Carolina, where subsoils are often high in clay, the topsoil layer may be significantly coarser in texture. The depth of topsoil may be quite variable. On severely eroded sites it may be gone entirely.

Advantages of topsoil include its high organic-matter content and friable consistency (soil aggregates can be crumbed with only moderate pressure), and its available water-holding capacity and nutrient content. Most often it is expected to subsoil in these characteristics. The texture and friability of topsoil are usually much more conducive to seedling emergence and root growth.

In addition to being a better growth medium, topsoil is often less erodible than subsoils, and the coarse texture of topsoil increases infiltration capacity and reduces runoff.

Although topsoil may provide improved growth medium, there may be disadvantages, too. Strippling, stockpiling, hauling, and spreading topsoil, or importing topsoil, may not be cost-effective. Handling may be difficult if large amounts of branches or rocks are present, or if the terrain is too rough. Most topsoil contains weed seeds, which compete with desirable species.

In site planning, compare the options of topsoiling with preparing a seedbed in the available subsoil. The clay content of many subsoils resists moisture. When properly limed and fertilized, subsoils may provide a satisfactory growth medium, which is generally free of weed seeds.

**Practice Standards and Specifications**

**6.04**

**6.04**

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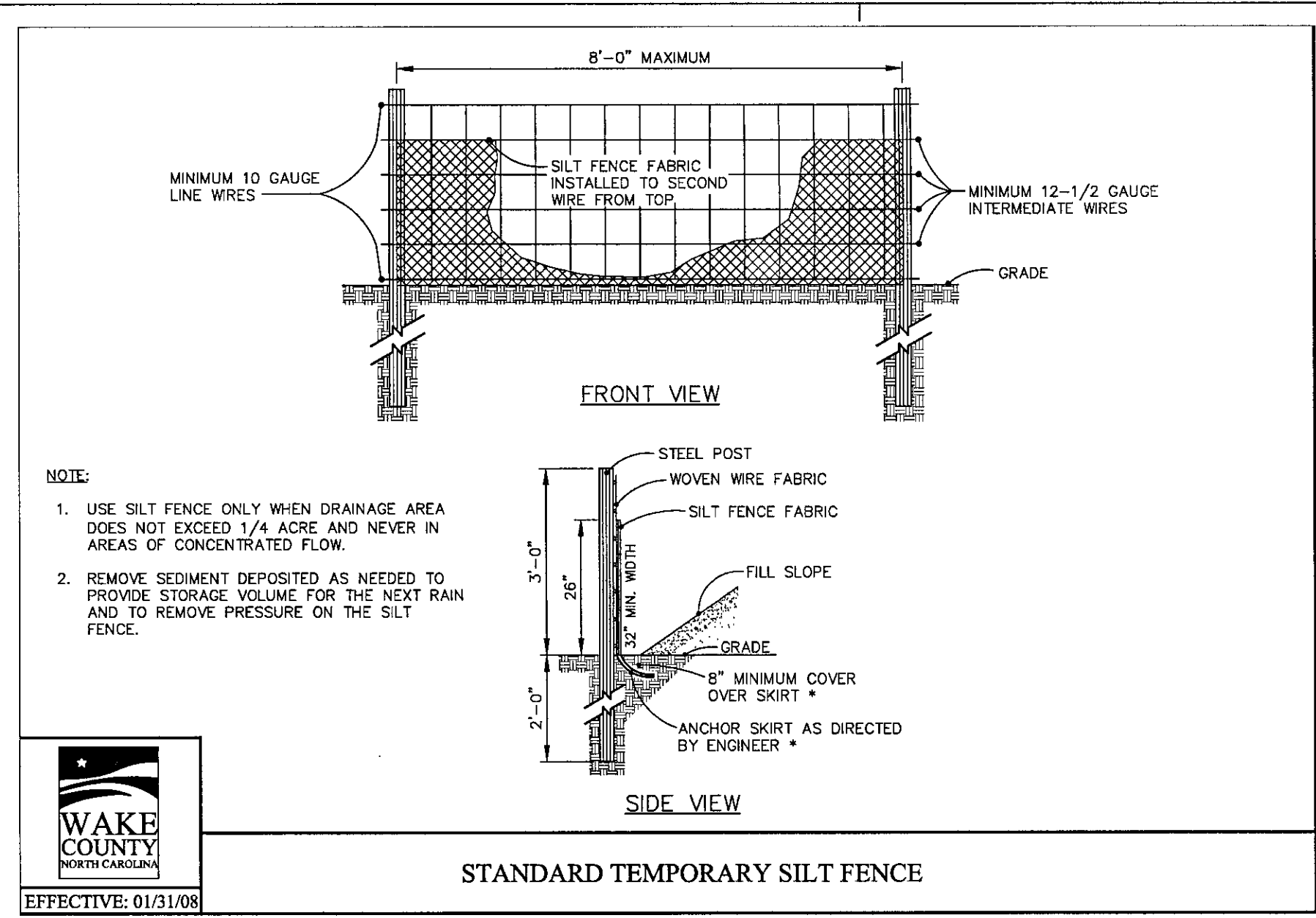
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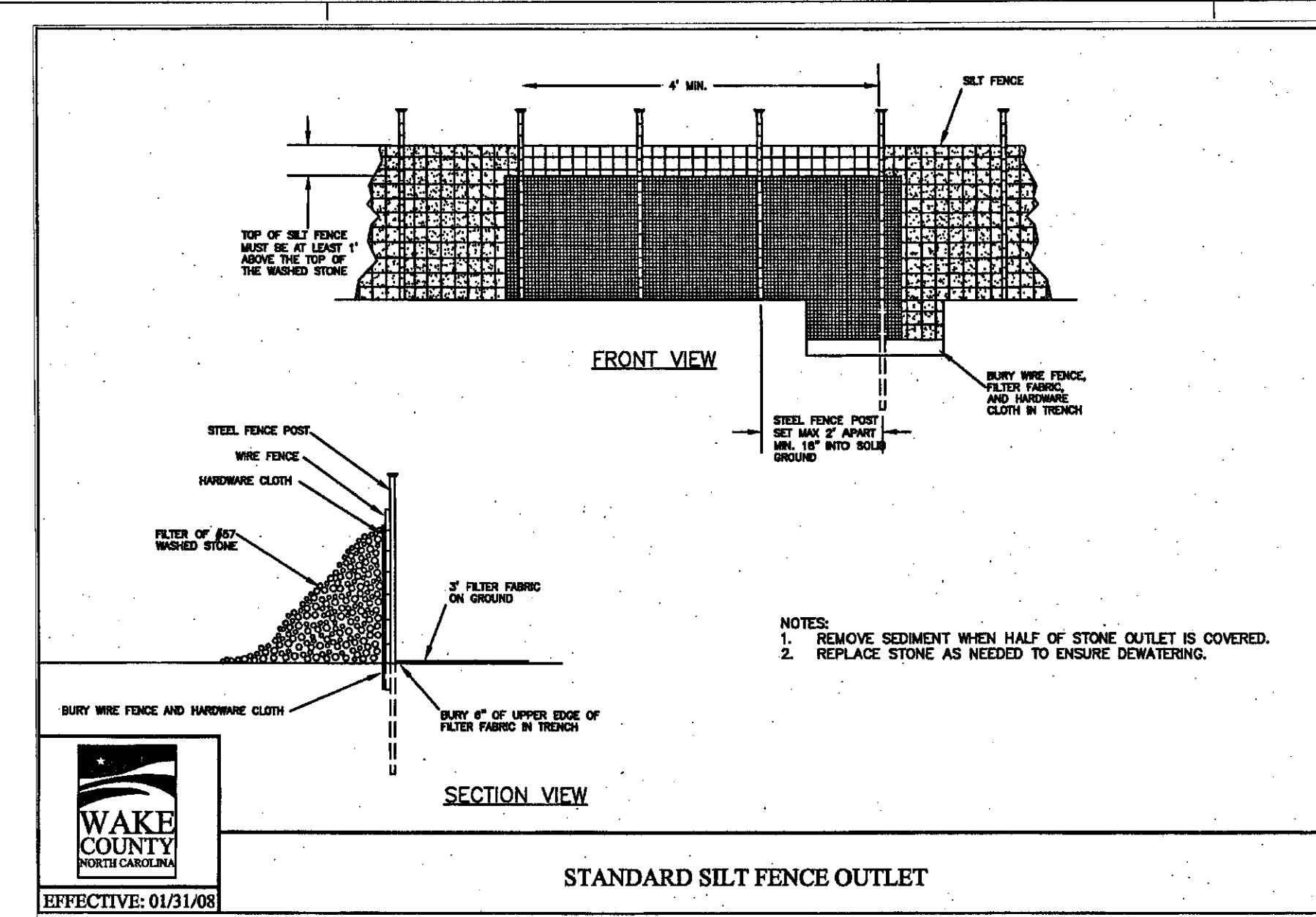
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**EROSION AND SEDIMENT CONTROL**

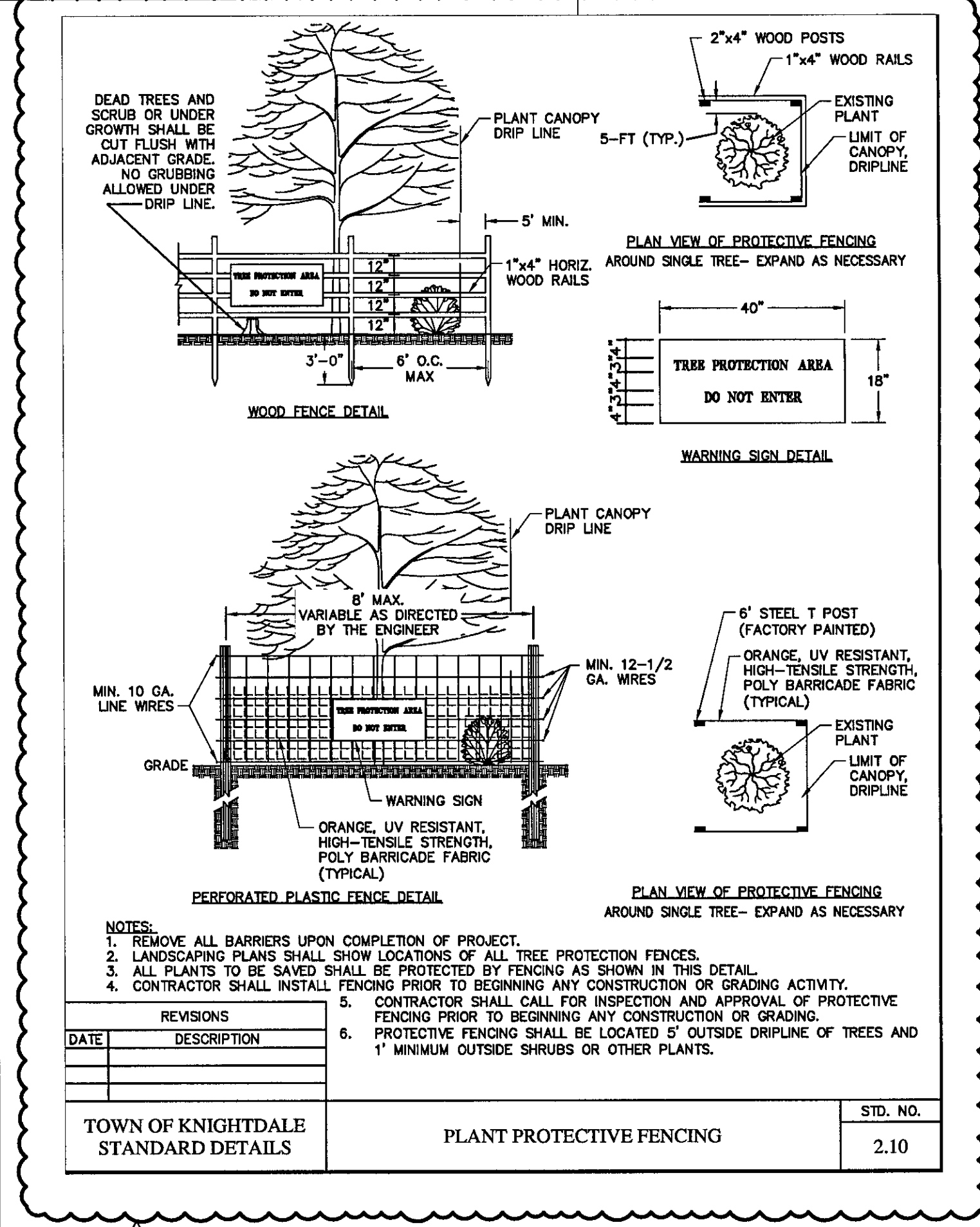
APPROVED PLAN  
DATE 5/11/2023  
PERMIT NO. S-SEC-00004-2023  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
619-217-2250



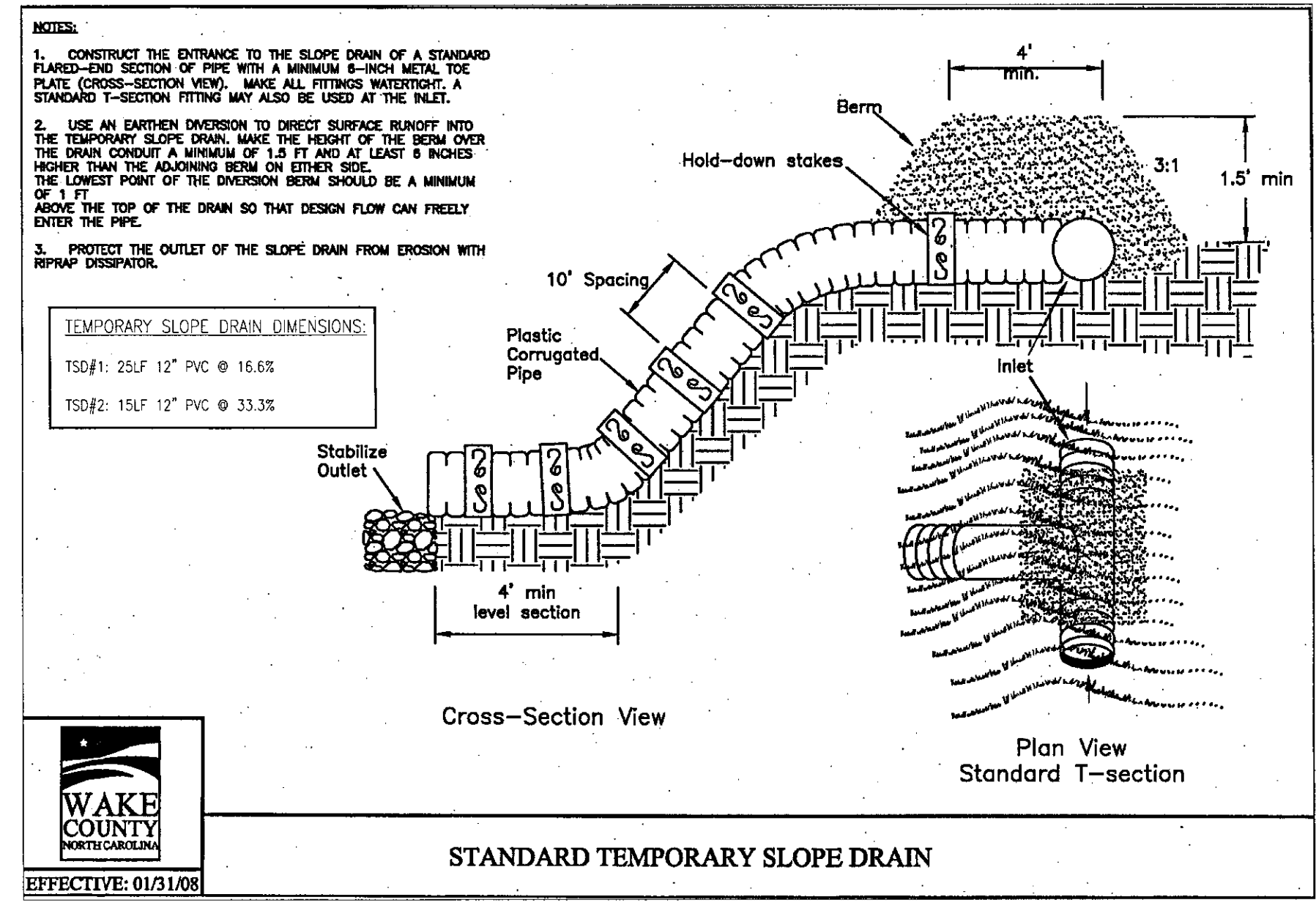
**STANDARD TEMPORARY SILT FENCE**



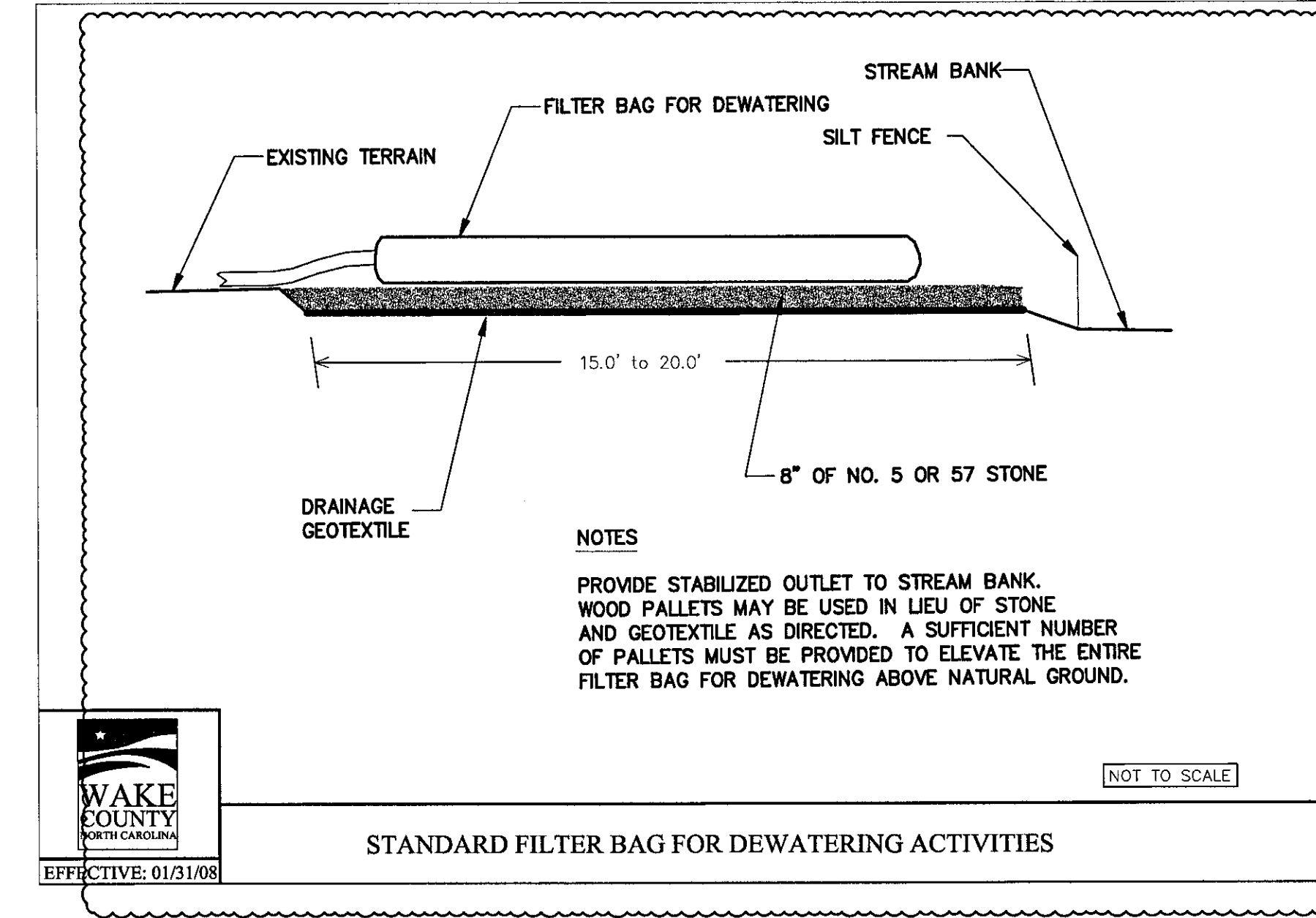
**STANDARD SILT FENCE OUTLET**



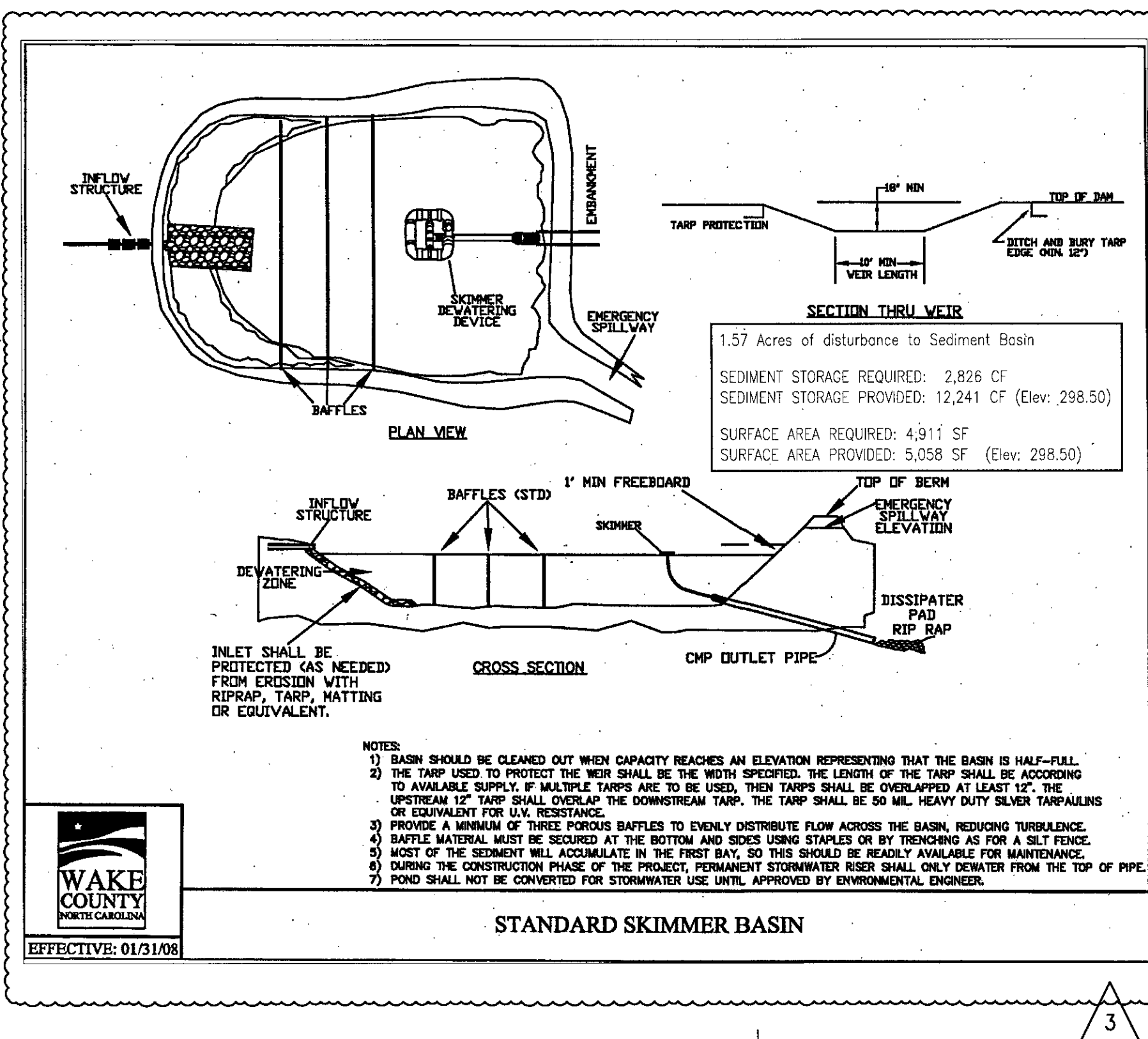
**PLANT PROTECTIVE FENCING**



**STANDARD TEMPORARY SLOPE DRAIN**



**STANDARD FILTER BAG FOR DEWATERING ACTIVITIES**



**STANDARD SKIMMER BASIN**

REVISIONS	DATE	DESCRIPTION

**TOWN OF KNIGHTDALE STANDARD DETAILS**



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**PROJECT TEAM**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
9/14/22	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
9/14/22	LDP COMMENT RESPONSE
9/14/22	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
2/24/23	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**  
TODD FLEMING  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**  
**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**EROSION AND SEDIMENT CONTROL**  
APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S-SEL-000004-2023  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
919-217-2250

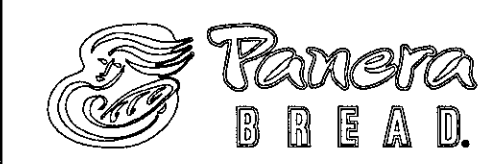
**PROJECT NUMBER**  
20211261.0

**SHEET TITLE**  
**EROSION & SEDIMENT CONTROL DETAILS**

**SHEET NUMBER**  
**C-6.6**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CP COMMENT RESPONSE
6/10/22	CP COMMENT RESPONSE
7/22/22	CP COMMENT RESPONSE
	LDP SUBMITTAL
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	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL



**PART III  
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

**SECTION A: SELF-INSPECTION**

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual day rainfall information is available, record the cumulative rain measurement for those unattended days (are this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	1. Identification of the measures inspected. 2. Date and time of the inspection. 3. Name of the person performing the inspection. 4. Indication of whether the measures were operating properly. 5. Description of maintenance needs for the measure. 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDCs)	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected. 2. Date and time of the inspection. 3. Name of the person performing the inspection. 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration. 5. Indication of visible sediment leaving the site. 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Access plan to clean up or stabilize the sediment that has left the site limits. 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands erode or erode (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event $\geq$ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(c) of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of permanent E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all non-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

**PART II, SECTION G, ITEM (4)  
DRAW DOWN OF SEDIMENT BASINS FOR MAINTENANCE OR CLOSE OUT**

Sediment basins and traps that receive runoff from drainage areas of one acre or more shall use outlet structures that withdraw water from the surface when these devices need to be drawn down for maintenance or close out unless this is infeasible. The circumstances in which it is not feasible to withdraw water from the surface shall be rare (for example, times with extended cold weather). Non-surface withdrawals from sediment basins shall be allowed only when all of the following criteria have been met:

- The E&SC plan authority has been provided with documentation of the non-surface withdrawal and the specific time periods or conditions in which it will occur. The non-surface withdrawal shall not commence until the E&SC plan authority has approved these items.
- The non-surface withdrawal has been reported as an anticipated bypass in accordance with Part III, Section C, Item (2)(c) and (d) of this permit.
- Dewatering discharges are treated with controls to minimize discharges of pollutants from stormwater that is removed from the sediment basin. Examples of appropriate controls include properly sited, designed and maintained dewatering tanks, weir tanks, and filtration systems.
- Vegetated, upland areas of the sites or a properly designed stone pad is used to the extent feasible at the outlet of the dewatering treatment devices described in item (c) above.
- Velocity dissipation devices such as check dams, sediment traps, and riprap are provided at the discharge points of all dewatering devices, and
- Sediment removed from the dewatering treatment devices described in item (c) above is disposed of in a manner that does not cause deposition of sediment into waters of the United States.

**PART III  
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

**SECTION B: RECORDKEEPING**

**1. E&SC Plan Documentation**

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be kept on site and available for inspection at all times during normal business hours.

Item to Document	Documentation Requirements
(a) Each E&SC measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC plan.	Initial and date each E&SC measure on a copy of the approved E&SC plan or complete, date and sign an inspection report that lists each E&SC measure shown on the approved E&SC plan. This documentation is required upon the initial installation of the E&SC measures or if the E&SC measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC plan.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC measures.	Initial and date a copy of the approved E&SC plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

**2. Additional Documentation to be Kept on Site**

In addition to the E&SC plan documents above, the following items shall be kept on the site and available for inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

- This General Permit as well as the Certificate of Coverage, after it is received.
- Records of inspections made during the previous twelve months. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

**3. Documentation to be Retained for Three Years**

All data used to complete the e-NOI and all inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

**PART III  
SELF-INSPECTION, RECORDKEEPING AND REPORTING**

**SECTION C: REPORTING**

**1. Occurrences that Must be Reported**

Permittees shall report the following occurrences:

- Visible sediment deposition in a stream or wetland.
- Oil spills if:
  - They are 25 gallons or more,
  - They are less than 25 gallons but cannot be cleaned up within 24 hours,
  - They cause sheen on surface waters (regardless of volume), or
  - They are within 100 feet of surface waters (regardless of volume).
- Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act [Ref: 40 CFR 110.3 and 40 CFR 117.3] or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.
- Anticipated bypasses and unanticipated bypasses.
- Noncompliance with the conditions of this permit that may endanger health or the environment.

**2. Reporting Timeframes and Other Requirements**

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Department's Environmental Emergency Center personnel at (800) 858-0368.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	<ul style="list-style-type: none"> <li>Within 24 hours, an oral or electronic notification.</li> <li>Within 7 calendar days, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis.</li> <li>If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired waters conditions.</li> </ul>
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	<ul style="list-style-type: none"> <li>Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.</li> </ul>
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> <li>A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.</li> </ul>
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	<ul style="list-style-type: none"> <li>Within 24 hours, an oral or electronic notification.</li> <li>Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.</li> </ul>
(e) Noncompliance with the conditions of this permit that may endanger health or the environment [40 CFR 122.41(l)(7)]	<ul style="list-style-type: none"> <li>Within 24 hours, an oral or electronic notification.</li> <li>Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue, and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. [40 CFR 122.41(l)(6)].</li> <li>Division staff may waive the requirement for a written report on a case-by-case basis.</li> </ul>



**NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING**

**EFFECTIVE: 04/01/19**





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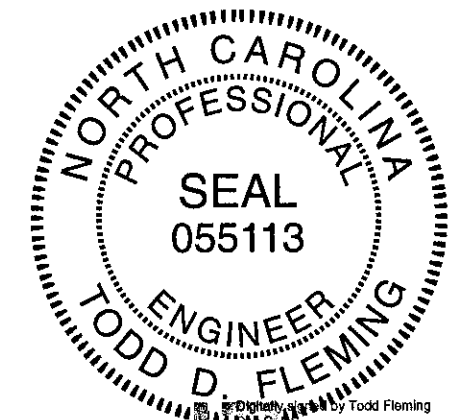
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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1
2/24/23	LDP COMMENT RESPONSE
	ADDENDUM 2
3/23/23	LDP COMMENT RESPONSE
4/21/23	STAMPING SUBMITTAL

**PROFESSIONAL SEAL**



Todd Fleming  
www.greenbergfarrow.com  
www.toddfleming.com

**PROFESSIONAL IN CHARGE**

TODD FLEMING

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA**

**BREAD**

**KNIGHTDALE**

**NORTH CAROLINA**

**6800 KNIGHTDALE BLVD**

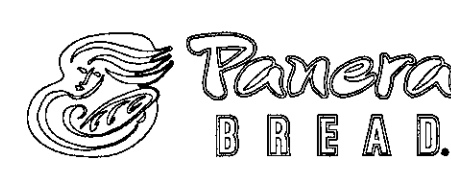
**PROJECT NUMBER**  
20211261.0

**SHEET TITLE**

**NCG01 - GROUND STABILIZATION & MATERIALS HANDLING**

**SHEET NUMBER**

**C-6.8**



**GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT**

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

**SECTION E: GROUND STABILIZATION**

Required Ground Stabilization Timeframes		
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1
		-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones
(e) Areas with slopes flatter than 4:1	14	-10 days for Falls Lake Watershed

**Note:** After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

**GROUND STABILIZATION SPECIFICATION**

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
<ul style="list-style-type: none"> <li>Temporary grass seed covered with straw or other mulches and tackifiers</li> <li>Hydroseeding</li> <li>Rolled erosion control products with or without temporary grass seed</li> <li>Appropriately applied straw or other mulch</li> <li>Plastic sheeting</li> </ul>	<ul style="list-style-type: none"> <li>Permanent grass seed covered with straw or other mulches and tackifiers</li> <li>Geotextile fabrics such as permanent soil reinforcement matting</li> <li>Hydroseeding</li> <li>Shrubs or other permanent plantings covered with mulch</li> <li>Uniform and evenly distributed ground cover sufficient to restrain erosion</li> <li>Structural methods such as concrete, asphalt or retaining walls</li> <li>Rolled erosion control products with grass seed</li> </ul>

**POLYACRYLAMIDES (PAMS) AND FLOCCULANTS**

- Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants.
- Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
- Apply flocculants at the concentrations specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions.
- Provide ponding area for containment of treated Stormwater before discharging offsite.
- Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

**EQUIPMENT AND VEHICLE MAINTENANCE**

- Maintain vehicles and equipment to prevent discharge of fluids.
- Provide drip pans under any stored equipment.
- Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
- Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
- Remove leaking vehicles and construction equipment from service until the problem has been corrected.
- Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

**LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE**

- Never bury or burn waste. Place litter and debris in approved waste containers.
- Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
- Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
- Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
- Anchor all lightweight items in waste containers during times of high winds.
- Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
- Dispose waste off-site at an approved disposal facility.
- On business days, clean up and dispose of waste in designated waste containers.

**PAINT AND OTHER LIQUID WASTE**

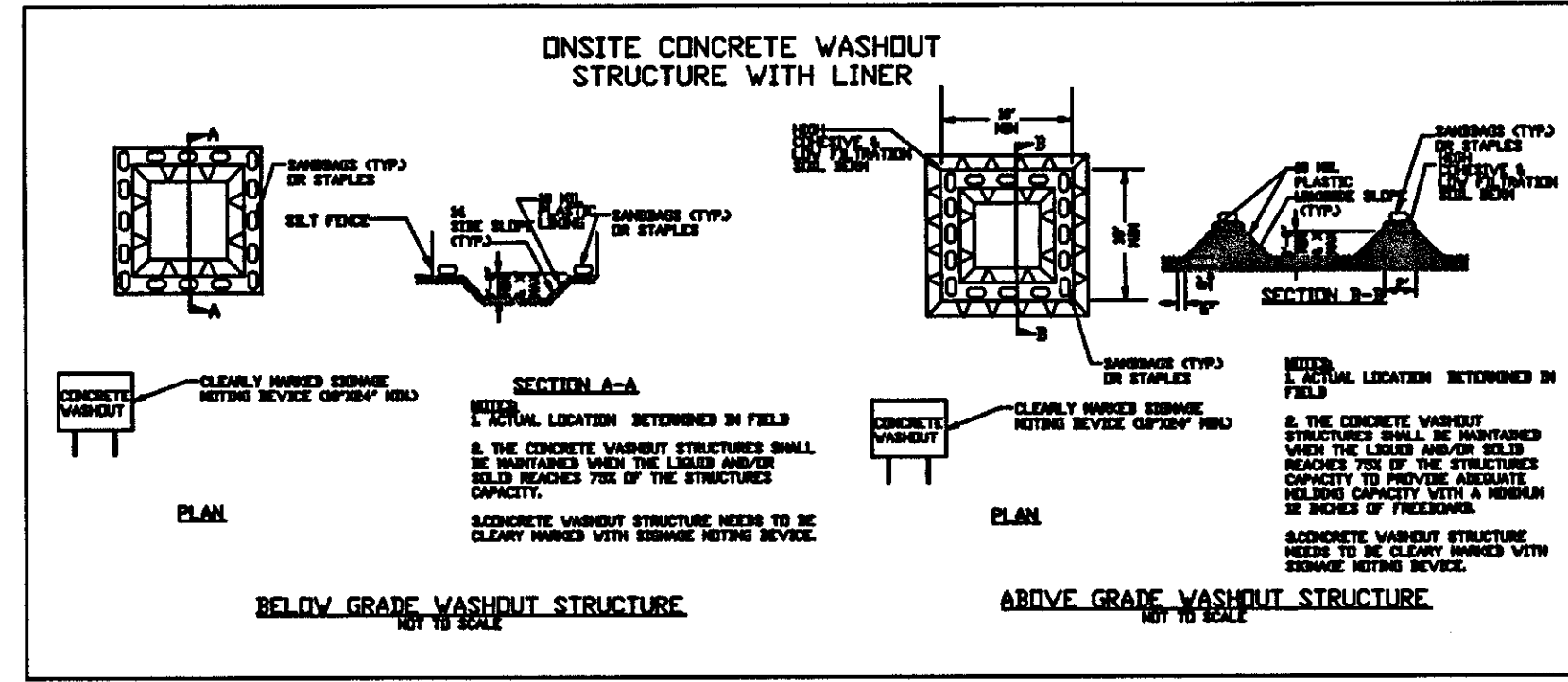
- Do not dump paint and other liquid waste into storm drains, streams or wetlands.
- Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
- Contain liquid wastes in a controlled area.
- Containment must be labeled, sized and placed appropriately for the needs of site.
- Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

**PORTABLE TOILETS**

- Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
- Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
- Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

**EARTHEN STOCKPILE MANAGEMENT**

- Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
- Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
- Provide stable stone access point when feasible.
- Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.



**CONCRETE WASHOUTS**

- Do not discharge concrete or cement slurry from the site.
- Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
- Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
- Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
- Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
- Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
- Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
- Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
- Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
- At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

**HERBICIDES, PESTICIDES AND RODENTICIDES**

- Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
- Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
- Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
- Do not stockpile these materials onsite.

**HAZARDOUS AND TOXIC WASTE**

- Create designated hazardous waste collection areas on-site.
- Place hazardous waste containers under cover or in secondary containment.
- Do not store hazardous chemicals, drums or bagged materials directly on the ground.

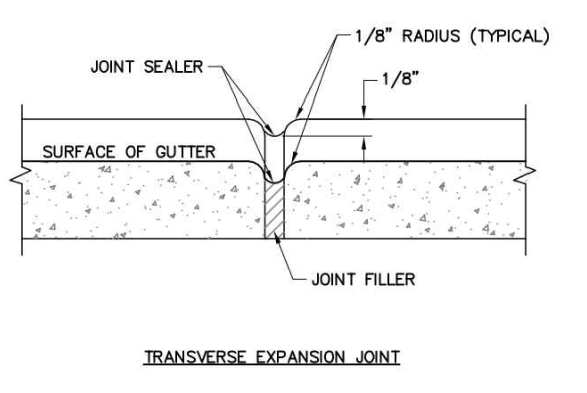
**NCG01 GROUND STABILIZATION AND MATERIALS HANDLING**

**EFFECTIVE: 04/01/19**

**EROSION AND SEDIMENT CONTROL**

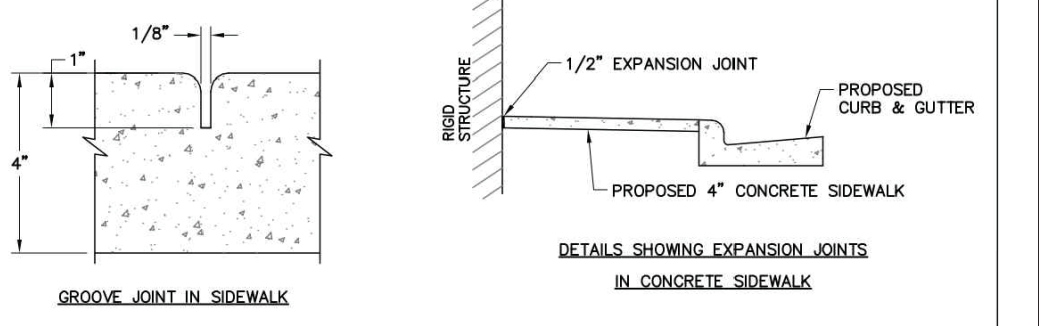
APPROVED PLAN  
DATE 5/12/2023  
PERMIT NO. S- 2021-00004-000  
Town of Knightdale Public Works  
Sedimentation & Erosion Control  
919-237-2250





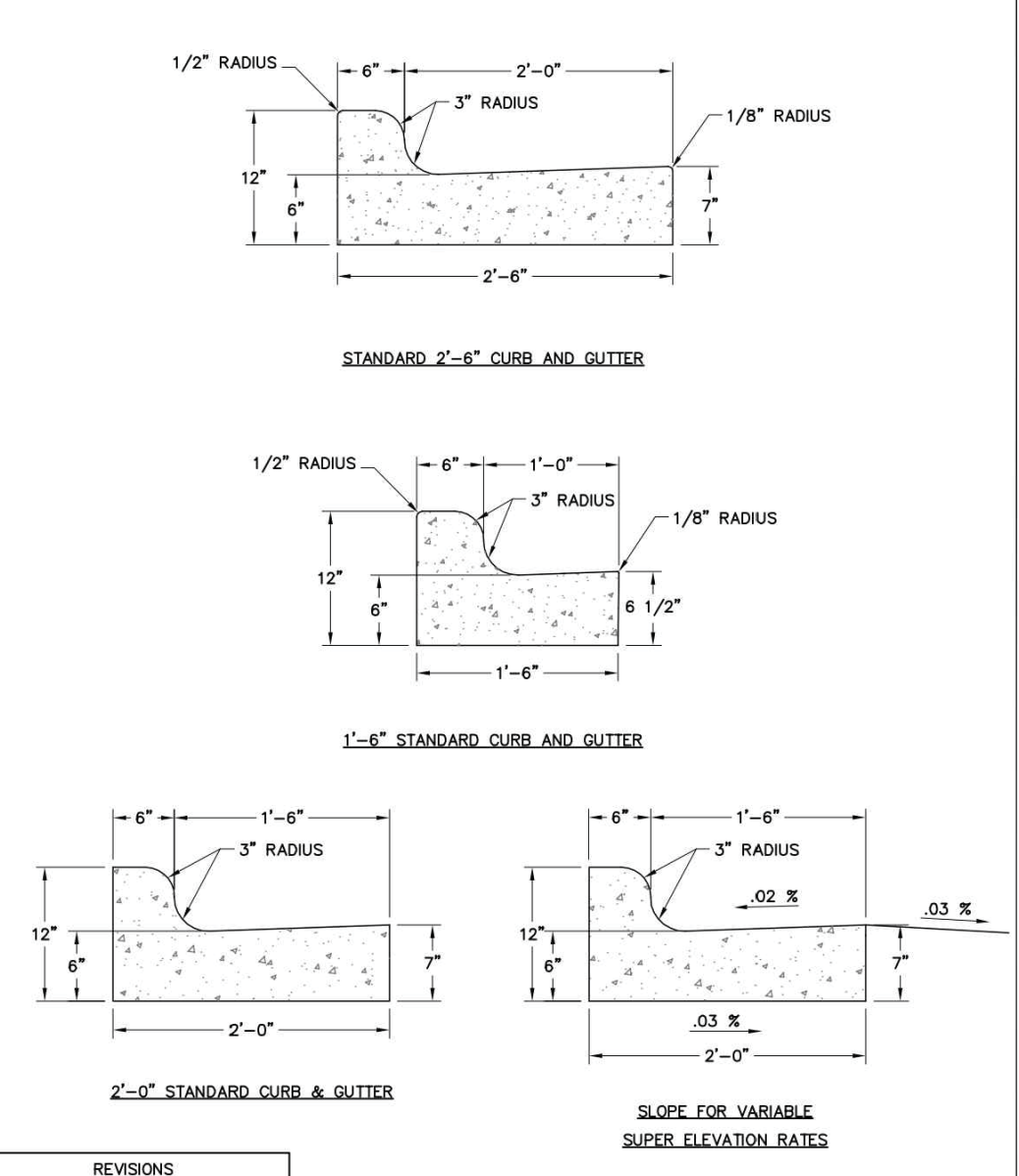
- NOTES:**
- CONTRACTION JOINTS SHALL BE SPACED AT 10-FOOT INTERVALS. JOINT SPACING MAY BE ALTERED BY THE ENGINEER TO PREVENT UNCONTROLLED CRACKING.
  - CONTRACTION JOINTS MAY BE INSTALLED BY THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS, WHERE SUCH JOINTS ARE NOT FORMED BY TEMPLATES, A MINIMUM DEPTH OF 1-1/2" SHALL BE OBTAINED.
  - ALL EXPANSION JOINTS SHALL BE SPACED AT 60-FOOT INTERVALS, AND ADJACENT TO ALL RIGID OBJECTS. JOINTS SHALL MATCH LOCATIONS WITH JOINTS IN ADJUTING SIDEWALK.
  - CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 PSI IN 28 DAYS.
  - CURB SHALL BE DEPRESSED AT INTERSECTIONS TO PROVIDE FOR FUTURE ACCESSIBLE RAMPS.
  - TOP 6" OF SUBGRADE BENEATH THE CURB AND GUTTER SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.

REVISIONS	DATE	DESCRIPTION	1 of 3
TOWN OF KNIGHTDALE		CURB AND GUTTER (S1)	4.01

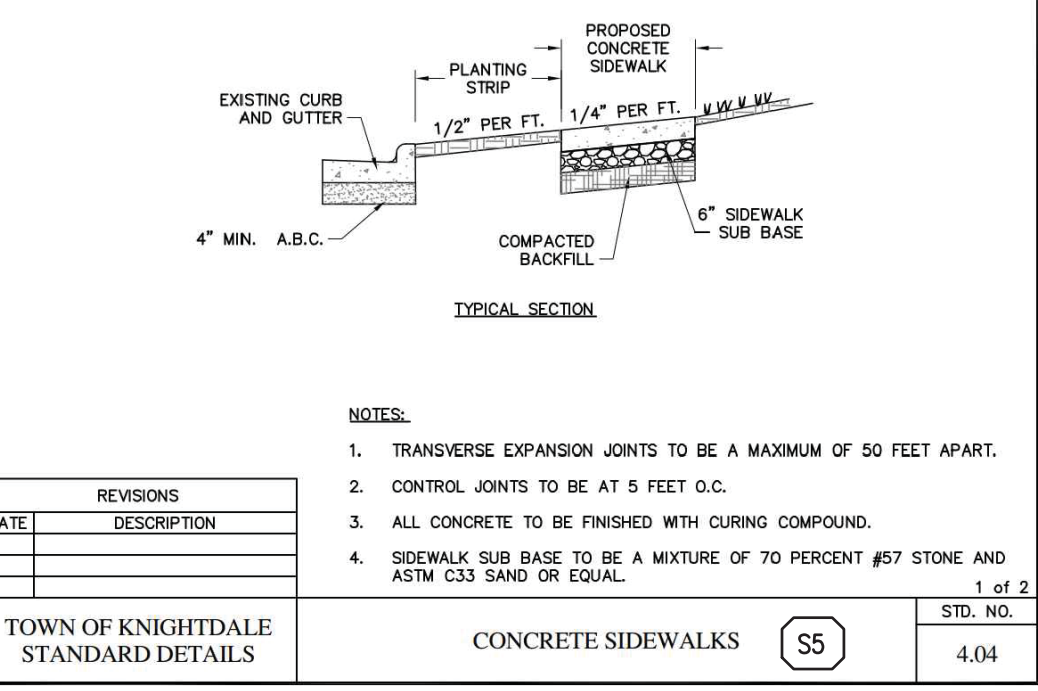
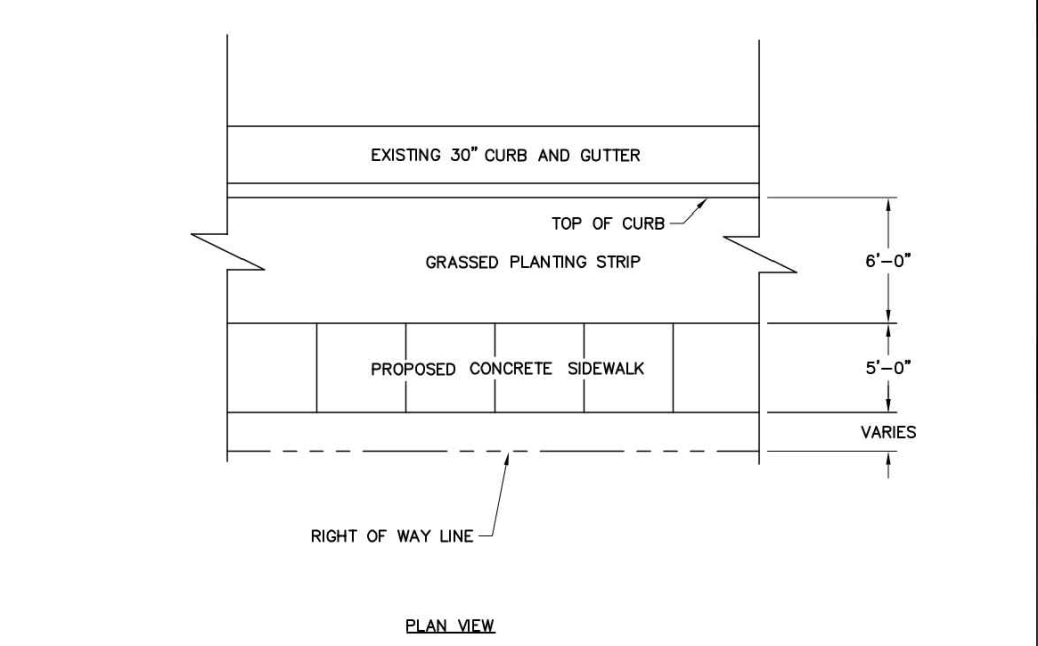


- NOTES:**
- A GROOVE JOINT 1" DEEP WITH 1/8" RADIUS SHALL BE REQUIRED IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT 45' INTERVALS NOT TO EXCEED 50' AND MATCHING EXPANSION/CONSTRUCTION JOINT IN ADJACENT CURB. A SEALED 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY ROAD STRUCTURE.
  - SIDEWALK AT DRIVEWAY ENTRANCES TO BE 6" THICK.
  - WIDTH OF SIDEWALK ON THOROUGHFARE STREETS SHALL BE A MINIMUM OF 5'. WIDTH OF SIDEWALKS IN THE CENTRAL BUSINESS DISTRICT WILL BE DETERMINED BY THE TOWN ENGINEER.
  - WIDTH OF SIDEWALKS ON NON-THOROUGHFARE STREETS SHALL BE A MINIMUM OF 5' UNLESS OTHERWISE SPECIFIED BY THE TOWN'S UNIFIED DEVELOPMENT ORDINANCE.
  - SIDEWALK TO BE POURED TO END OF RADIUS AT INTERSECTING STREETS.
  - CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 PSI IN 28 DAYS.

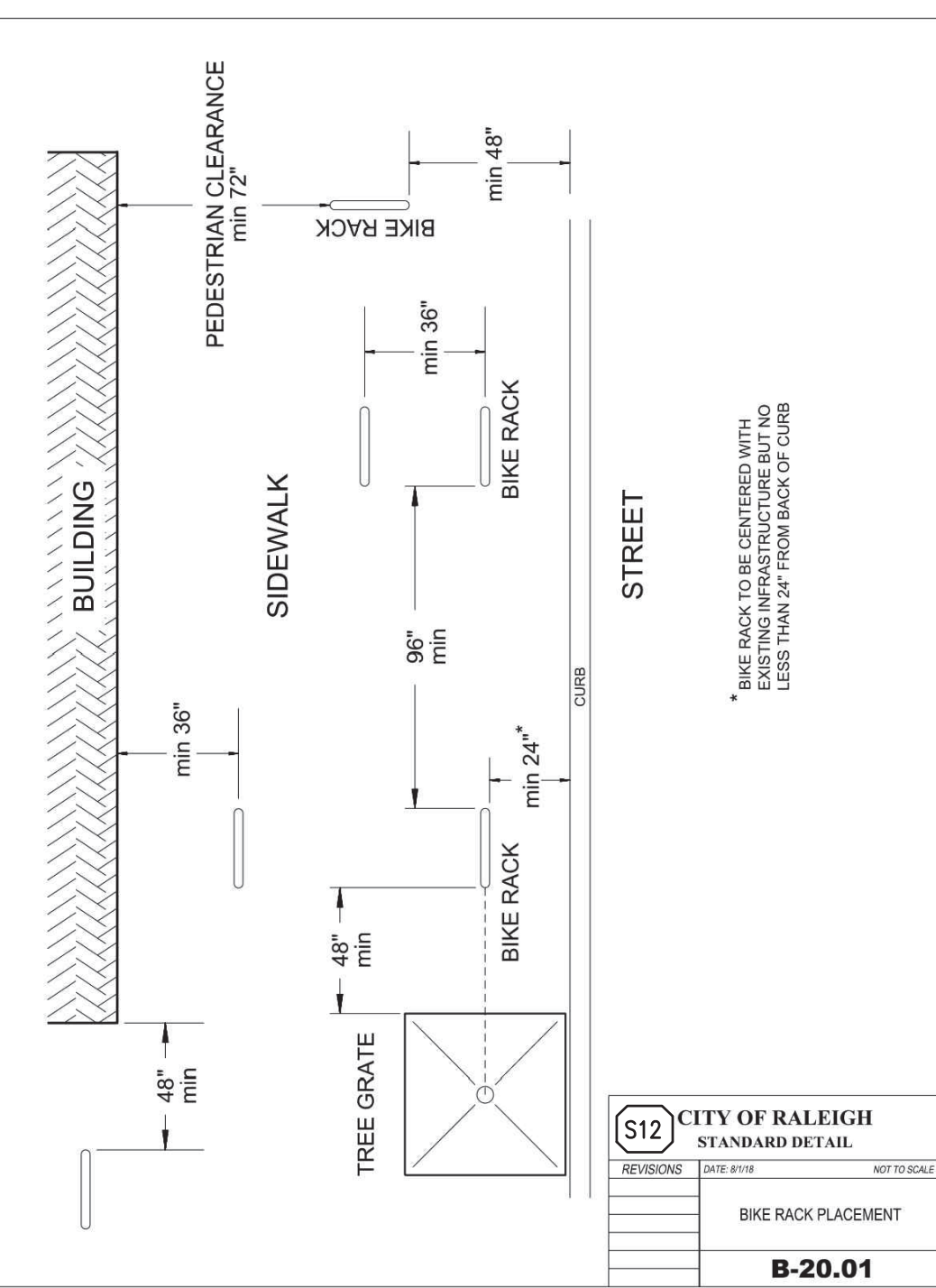
REVISIONS	DATE	DESCRIPTION	2 of 2
TOWN OF KNIGHTDALE		CONCRETE SIDEWALKS (S5)	4.04



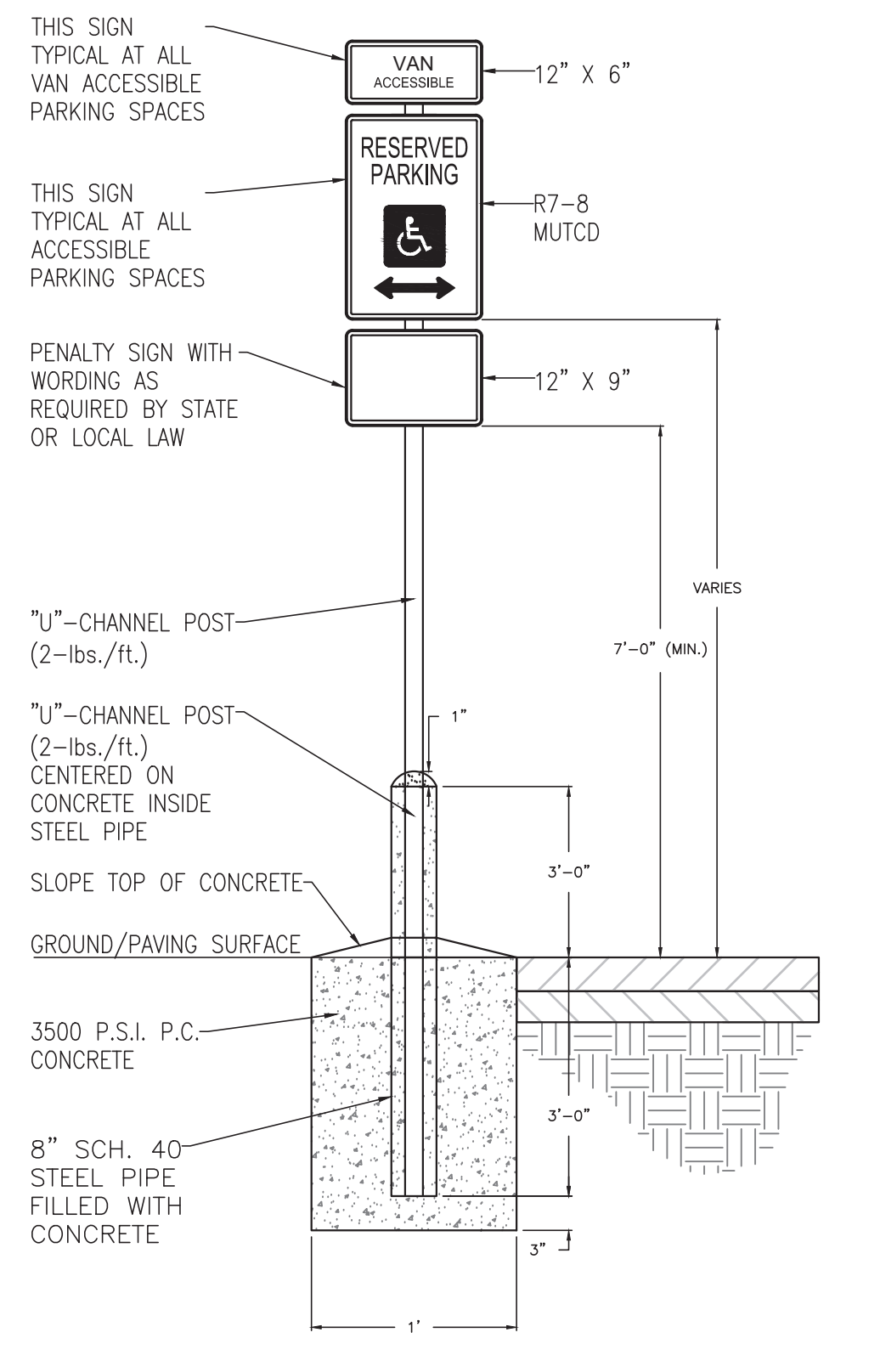
REVISIONS	DATE	DESCRIPTION	1 of 3
TOWN OF KNIGHTDALE		CURB AND GUTTER (S1)	4.01



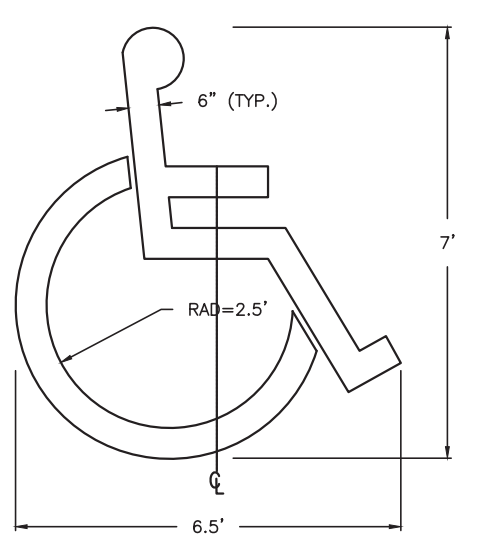
REVISIONS	DATE	DESCRIPTION	1 of 2
TOWN OF KNIGHTDALE		CONCRETE SIDEWALKS (S5)	4.04



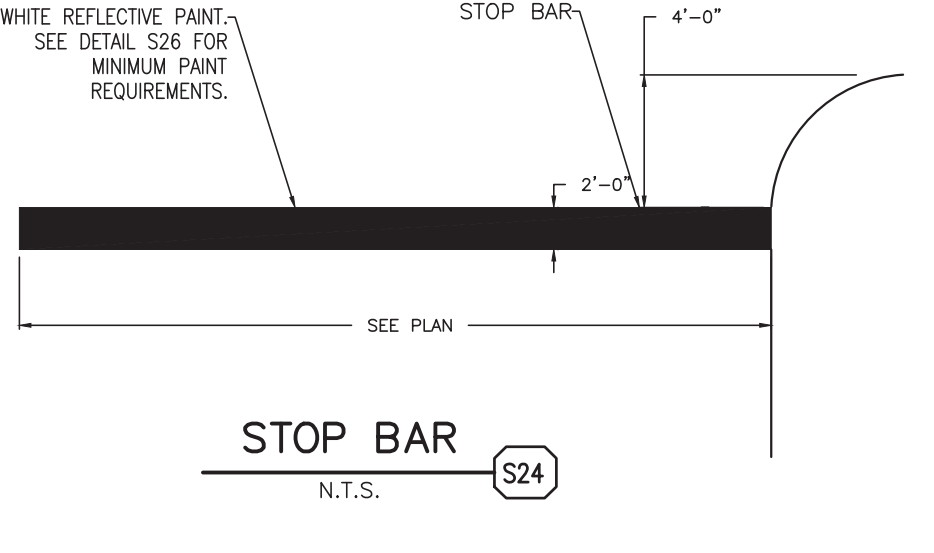
REVISIONS	DATE	DESCRIPTION	NOT ISSUED
TOWN OF KNIGHTDALE		BIKE RACK PLACEMENT	B-20.01



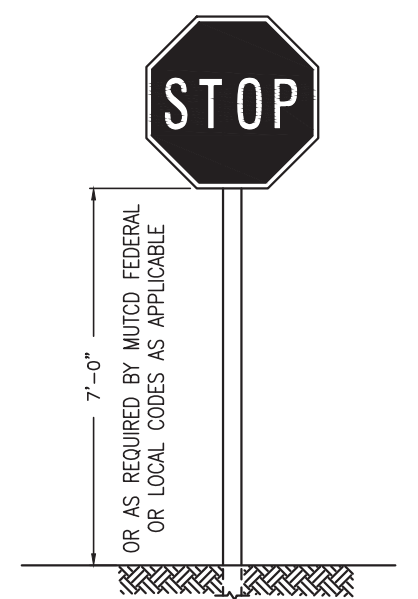
**ACCESSIBLE PARKING SIGN** (S17) (S18)  
N.T.S.



**ACCESSIBLE PARKING SYMBOL** (S16)  
N.T.S.

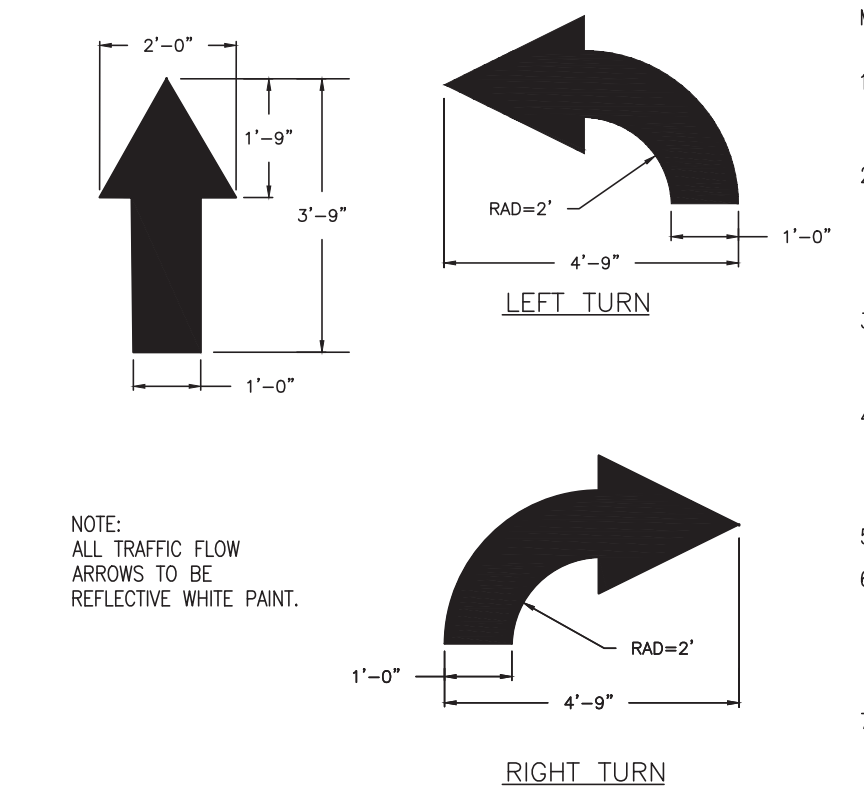


**STOP BAR** (S24)  
N.T.S.



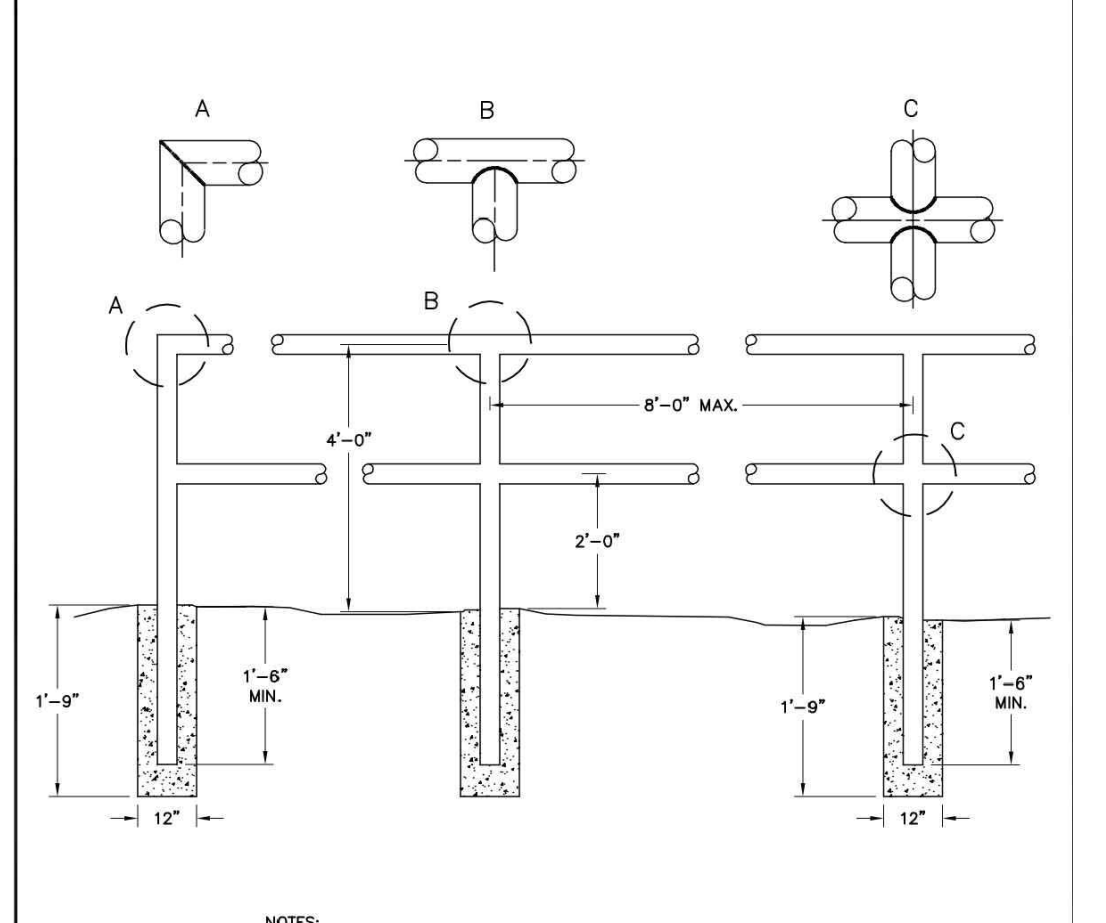
**SIGN MOUNTING DETAIL** (S43)  
N.T.S.

- NOTES:**
- ALL POSTS SHALL BE OF ADEQUATE LENGTH TO MEET THE REQUIREMENTS FOR ERECTION, AS STATED IN THE CURRENT "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" FOR STREETS AND HIGHWAYS (MUTCD).
  - ALL POSTS SHALL BE EMBEDDED 4"-2" MINIMUM.
  - POSTS MAY BE STEEL, ALUMINUM OR 2 PIECE U-POSTS IN CONFORMANCE WITH CURRENT A.S.T.M. SPECIFICATION A123. IN AREAS WITHOUT CURBING, THE OUTER EDGE OF SIGN TO BE 6"-0" MINIMUM TO 12"-0" MAXIMUM FROM EDGE OF SHOULDER, AS DIRECTED.



**DIRECTIONAL TRAFFIC ARROW** (S26)  
N.T.S.

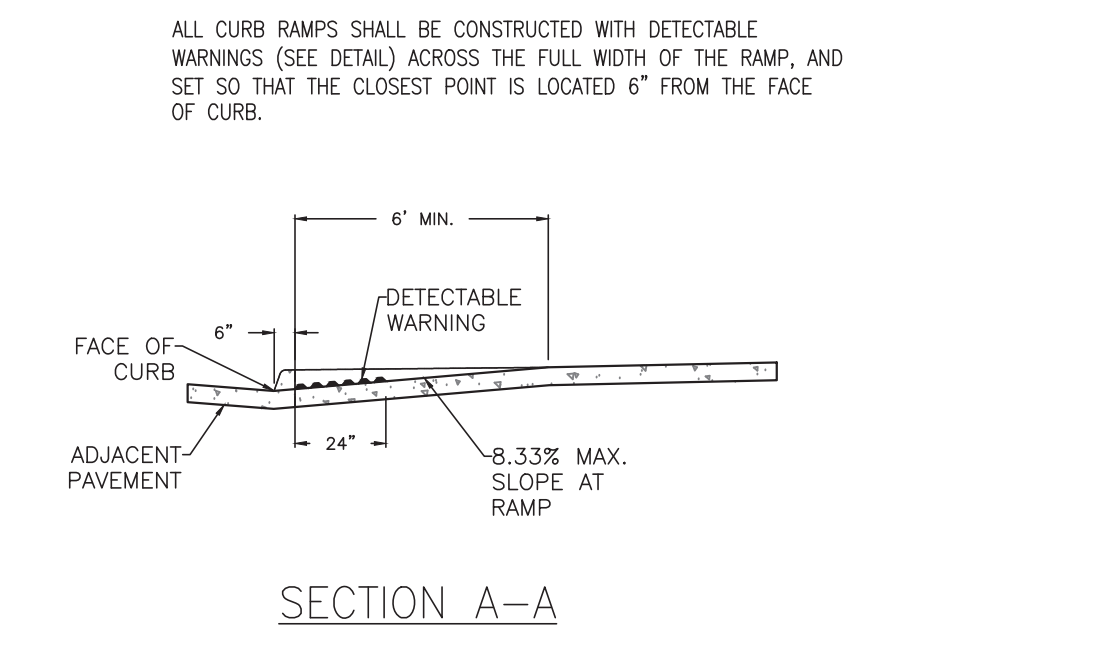
- MINIMUM REQUIREMENTS:**
- USE TRAINED AND EXPERIENCED PERSONNEL IN APPLYING THE PRODUCTS AND OPERATING THE EQUIPMENT REQUIRED FOR PROPERLY PERFORMED WORK.
  - PAINT SHALL BE WATERBORNE OR SOLVENT BORNE, COLOR SHALL BE REFLECTIVE YELLOW UNLESS OTHERWISE SPECIFIED. PAVEMENT MARKING PAINTS SHALL COMPLY WITH APPLICABLE STATE AND LOCAL LAWS ENACTED TO ENSURE COMPLIANCE WITH FEDERAL, CLEAN AIR STANDARDS. PAINT MATERIALS SHALL CONFORM TO THE RESTRICTIONS OF THE LOCAL AIR POLLUTION CONTROL DISTRICT.
  - WATERBORNE PAINT: PAINTS SHALL CONFORM TO FEDERAL SPECIFICATION TT-P-1952 (LATEST REVISION) AND ALL APPLICABLE ASTM STANDARDS WITHIN THIS SPECIFICATION.
  - SOLVENT BORNE PAINT: PAINT SHALL CONFORM TO FEDERAL SPECIFICATION A-4-2886 OR AASHTO M248. PAINT SHALL BE NON-BLEEDING, QUICK-DRYING, AND ALKYL PETROLEUM BASE PAINT SUITABLE FOR TRAFFIC-BEARING SURFACE AND BE MIXED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS BEFORE APPLICATION FOR COLOR YELLOW (UNLESS OTHER COLOR IS OTHERWISE SPECIFIED).
  - GLASS BEADS: AASHTO M 247, TYPE 1 OR FS TT-8-1325, TYPE 1, GRADATION A
  - APPLY TWO COATS OF PAINT, AT MANUFACTURER'S RECOMMENDED RATE, WITHOUT ADDITION OF THINNER, WITH MAXIMUM OF 100 SQUARE FEET PER GALLON OR AS REQUIRED TO PROVIDE A MINIMUM WET FILM THICKNESS OF 15 MILS AND DRY FILM THICKNESS OF 7 1/2 MILS PER COAT. PAINT SHALL BE APPLIED FOR A TOTAL DRY FILM THICKNESS OF 15 MILS. APPLY WITH MECHANICAL EQUIPMENT TO PRODUCE UNIFORM STRAIGHT EDGES.
  - APPLY GLASS BEADS AT PEDESTRIAN CROSSWALK STRIPING AND AT LANE STRIPING AND ARROWS. BROADCAST GLASS BEADS UNIFORMLY INTO WET MARKINGS AT A RATE OF 6 LB/GAL.



**NOTES:**

- ALL CONCRETE TO BE 3600 PSI COMPRESSIVE STRENGTH.
- TYPE OF PIPE TO BE USED IS 1-5/8" MAX. O.D. BLACK IRON, LOW CARBON PIPE.
- ALL JOINTS TO HAVE A 1/2" FILLET WELD.
- AFTER INSTALLATION, PAINT ASSEMBLY WITH BLACK ALL WEATHER ENAMEL.
- TO BE USED AS REQUIRED BY THE TOWN ENGINEER.

REVISIONS	DATE	DESCRIPTION	STD. NO.
TOWN OF KNIGHTDALE		TYPICAL HANDRAIL	4.13



**SECTION A-A**

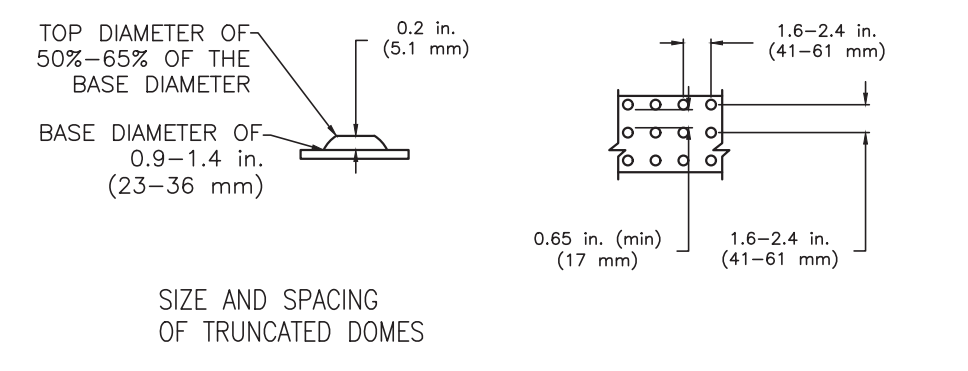
DETECTABLE WARNINGS SHALL BE STAMPED INTO PROPOSED CONCRETE BY USING A STAMPED CONCRETE PATTERN TOOL DESIGNED FOR SUCH USE.

DETECTABLE WARNINGS SHALL CONSIST OF A SURFACE OF TRUNCATED DOMES AND SHALL COMPLY WITH THE FOLLOWING:

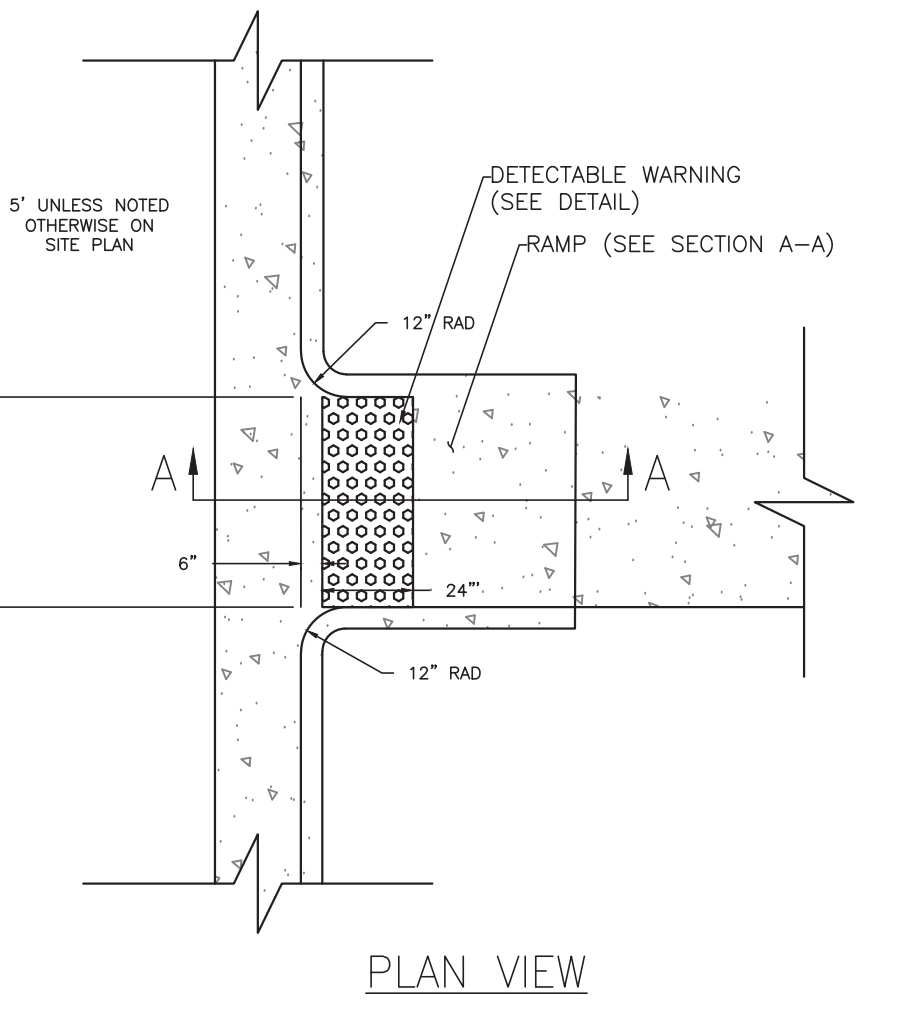
DOMES SIZE: TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE SHALL HAVE A BASE DIAMETER OF 0.9-1.4 INCH (23 MM) MINIMUM AND 1.4 INCHES (36 MM) MAXIMUM, A TOP DIAMETER OF 50 PERCENT OF THE BASE DIAMETER MINIMUM TO 65 PERCENT OF THE BASE DIAMETER MAXIMUM, AND A HEIGHT OF 0.2 INCH (5.1 MM).

DOMES SPACING: TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE SHALL HAVE A CENTER-TO-CENTER SPACING OF 1.6 INCHES (41 MM) MINIMUM AND 2.4 INCHES (61 MM) MAXIMUM, AND A BASE-TO-BASE SPACING OF 0.65-INCH (17 MM) MINIMUM, MEASURED BETWEEN THE MOST ADJACENT DOMES ON A SQUARE GRID.

CONTRAST: DETECTABLE WARNING SURFACES SHALL CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT.



**CURB RAMP & DETECTABLE WARNING** (S6) (S8)  
N.T.S.



**PLAN VIEW**

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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1

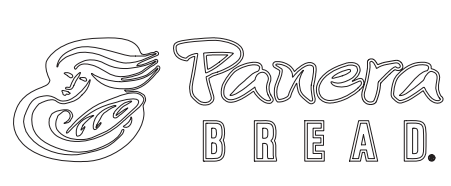
**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**  
KERI WILLIAMS, PE  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**

**PANERA BREAD KNIGHTDALE NORTH CAROLINA 6800 KNIGHTDALE BLVD**



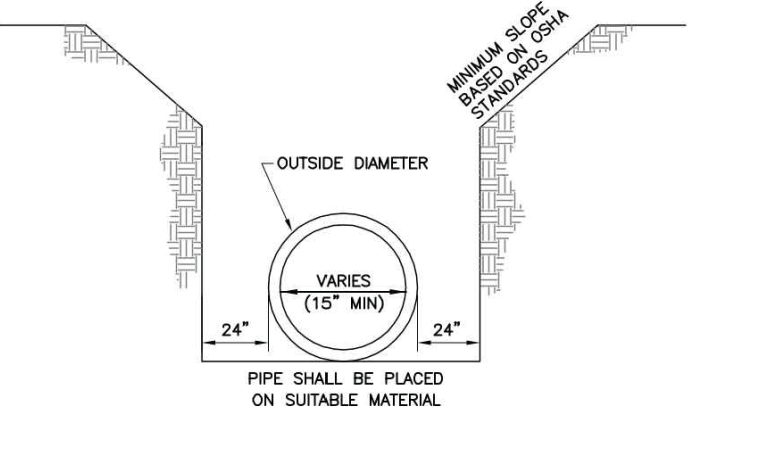
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**SHEET TITLE**  
**RALEIGH UTILITIES DETAILS**

**SHEET NUMBER**  
**C-7.1**

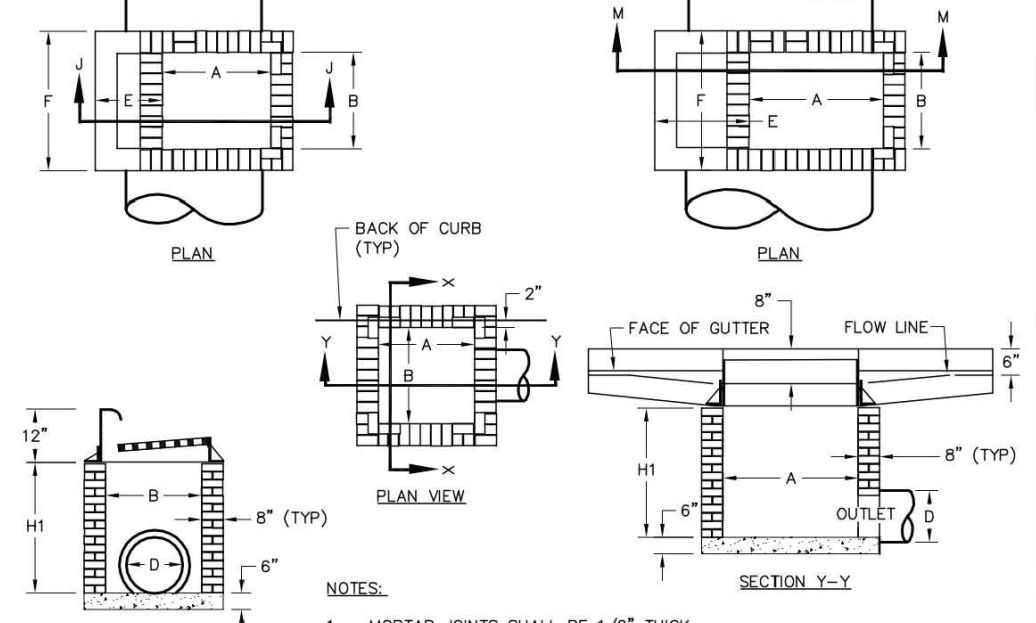
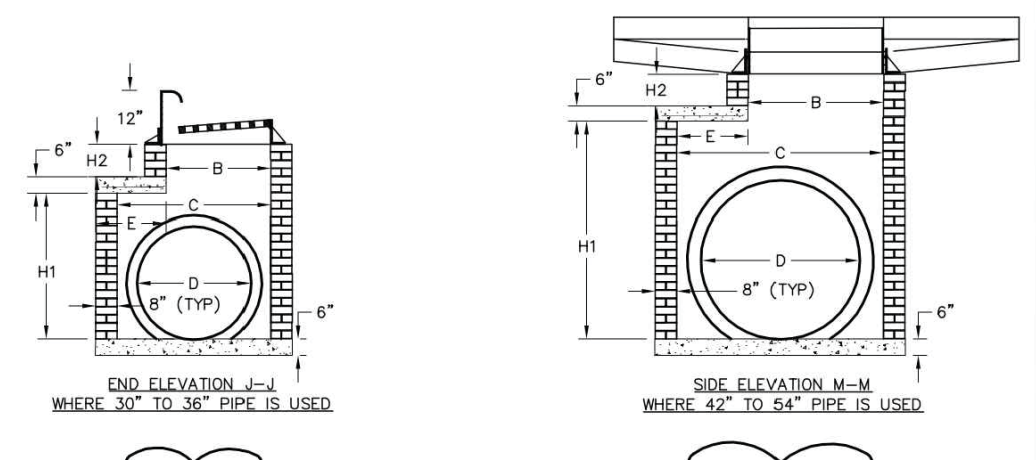
NOT ISSUED FOR CONSTRUCTION

- NOTES:**
- A MINIMUM OF 24" FROM OUTSIDE DIAMETER OF PIPE TO SIDE OF TRENCH MUST BE ALLOWED FOR COMPACTION OF FILL MATERIAL. BACKFILL OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER THE PIPE IS LAID. THE FILL AROUND THE PIPE SHALL BE PLACED IN LAYERS NOT TO EXCEED 6" UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO RISE IN UNBROOKED 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 COMPACTION 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 SELECT BACKFILL MATERIAL.



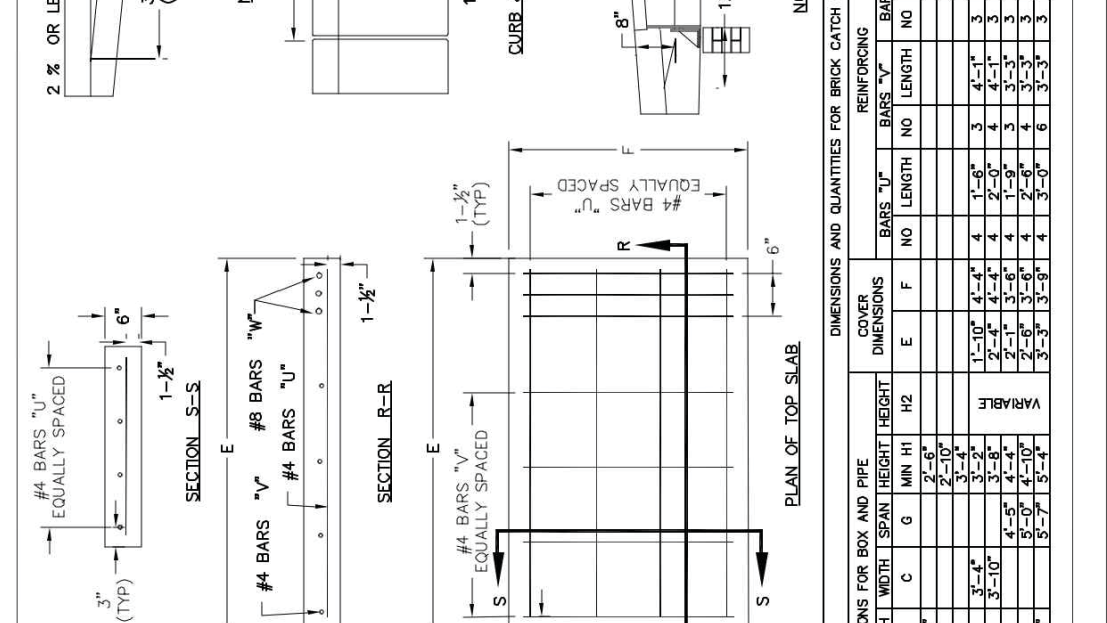
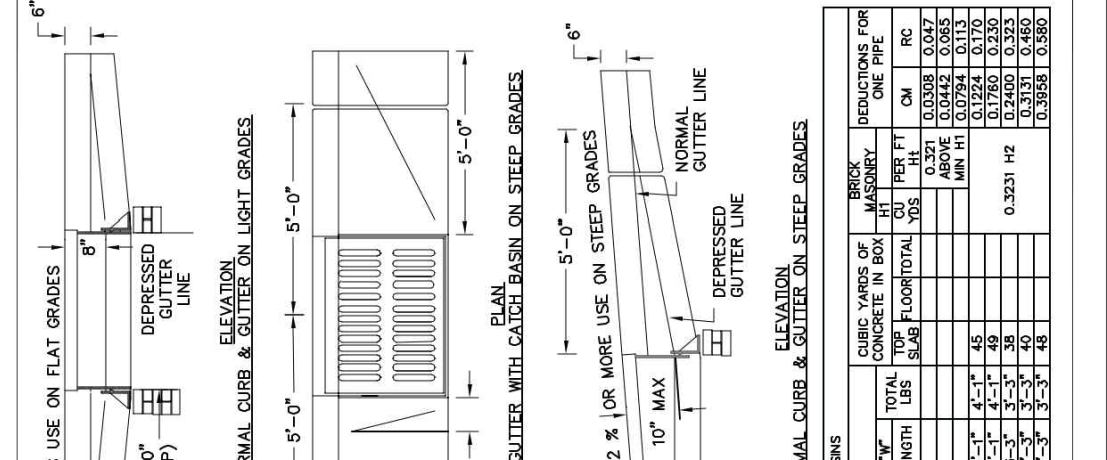
REVISIONS	DATE	DESCRIPTION

**TOWN OF KNIGHTDALE**      **TRENCH FOR STORM DRAIN PIPES**      **STD. NO. S17**      **5.02**



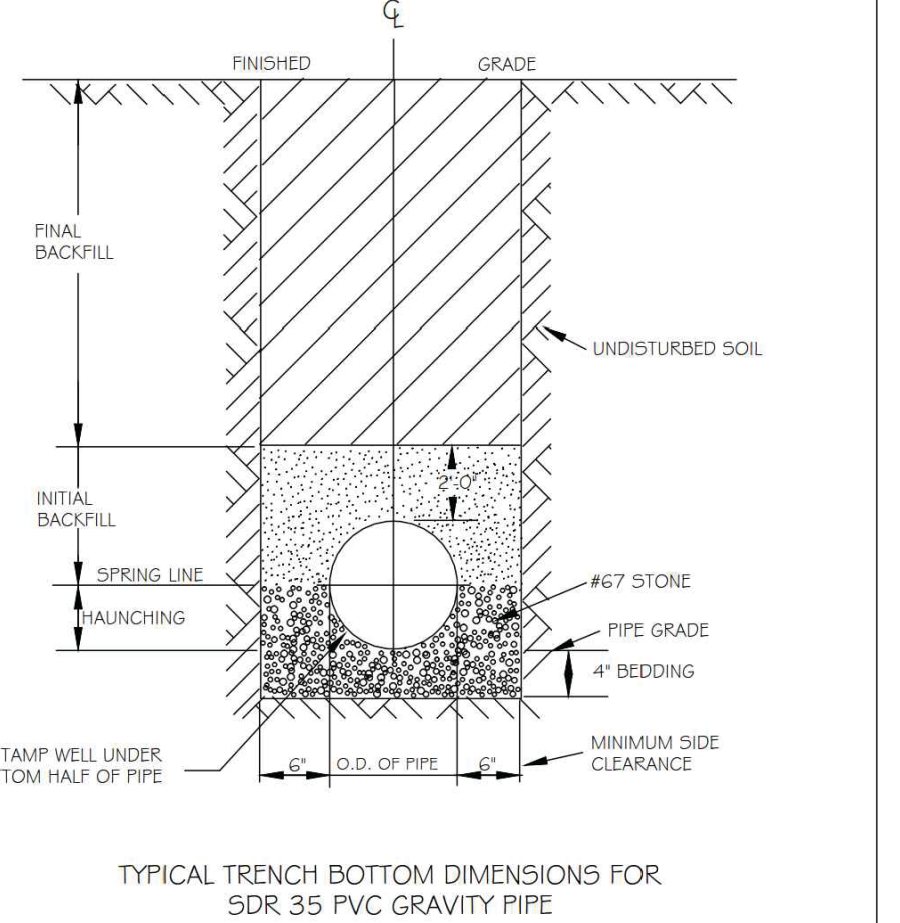
REVISIONS	DATE	DESCRIPTION

**TOWN OF KNIGHTDALE**      **STANDARD CURB INLET**      **STD. NO. S11**      **5.05**



REVISIONS	DATE	DESCRIPTION

**TOWN OF KNIGHTDALE**      **STANDARD CURB INLET**      **STD. NO. S11**      **5.05**



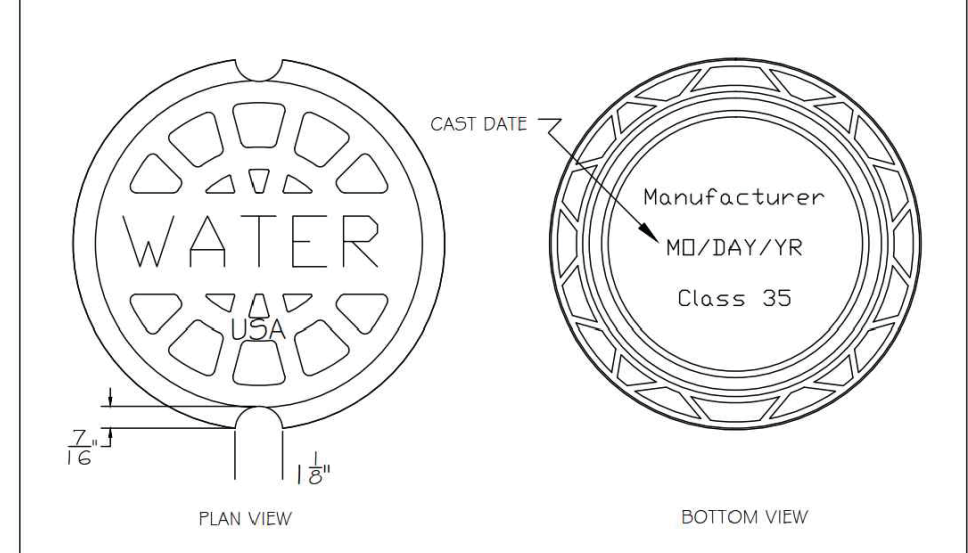
**TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE**

**NOTES:**

- FOR TRENCHES REQUIRING SHORING AND BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING AND BRACING.
- NO ROCKS OR BouldERS 4" OR LARGER TO BE USED IN INITIAL BACKFILL.
- ALL BACKFILL MATERIAL SHALL BE SUITABLE NATIVE MATERIAL.
- BACKFILL SHALL BE TAMPED IN 6" LIFTS IN TRAFFIC AREAS, 12" IN NON-TRAFFIC AREAS.

REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**TRENCH BOTTOM DIMENSIONS AND BACKFILL REQUIREMENTS FOR PVC GRAVITY SEWER MAIN**



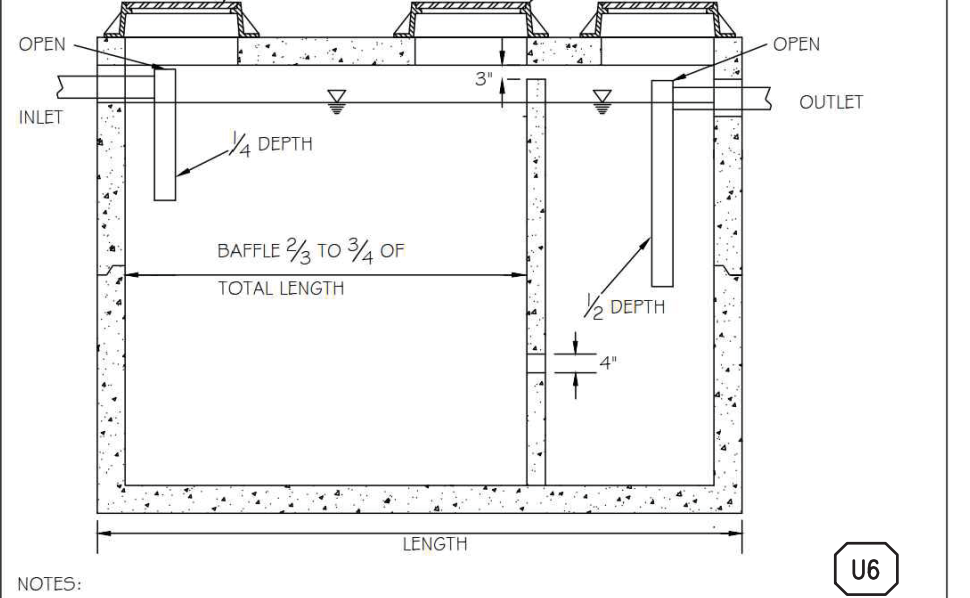
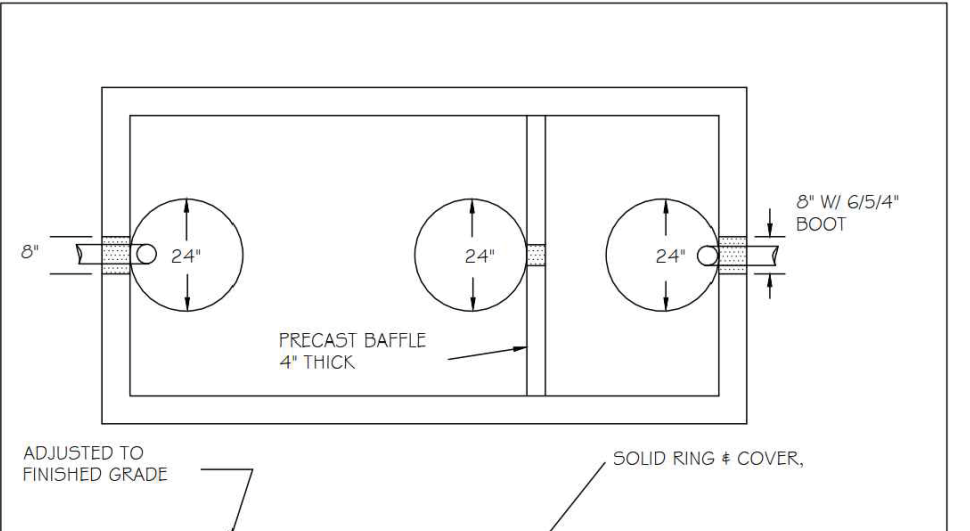
**5 1/4" VALVE BOX DROP LID WITH 4" SKIRT**

**NOTES:**

- "WATER" LETTERING MUST BE 1" RAISED (RECESSED FLUSH)
- VALVE COVER SHALL BE DOMESTICALLY CAST
- COVER MUST HAVE A MINIMUM WEIGHT OF 25 POUNDS
- COVER MUST BE CLASS 35 OR GREATER
- COVER MUST MEET OR EXCEED AASHTO H-20 LOAD REQUIREMENTS

REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**



REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**1000 GALLON GREASE INTERCEPTOR**

**LOCALLY AVAILABLE SIZES**

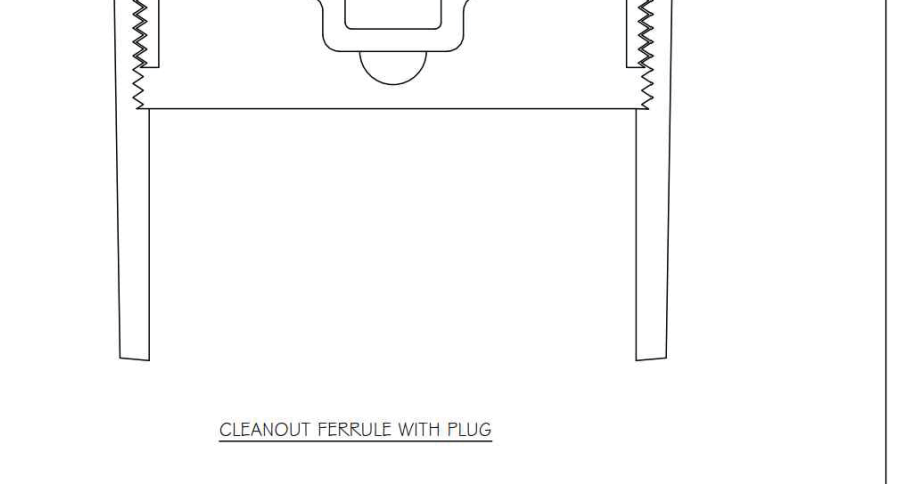
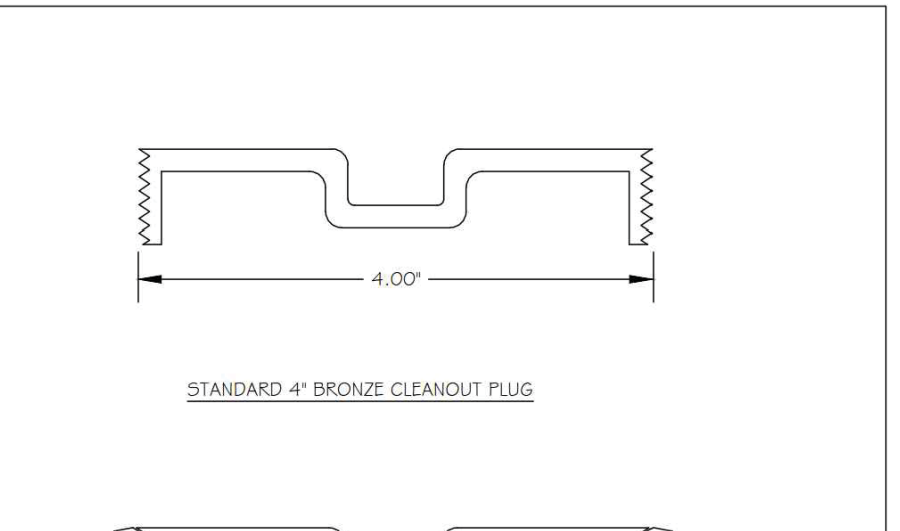
INTERCEPTOR CAPACITY (GAL.)	SEPARATORS CAPACITY (GAL.)
300	1000
500	1200
750	1600
1000	1800
1200	2000
1500	2500
2000	3000
2500	4000
3000	5000
4000	6000
5000	8000

**NOTES:**

- BAFFLE WALL LOCATED AT A DISTANCE FROM INLET WALL 2/3 TO 3/4 OF THE TOTAL LENGTH OF THE INTERCEPTOR OR SEPARATOR AS SHOWN ON DETAIL S-40.01.
- EACH INTERCEPTOR OR SEPARATOR SHALL HAVE INLET AND OUTLET TEES. THE OUTLET TEE SHALL EXTEND 50% INTO THE LIQUID DEPTH. THE INLET TEE SHALL EXTEND 25% INTO THE LIQUID DEPTH. INLET AND OUTLET TEES MUST BE OPEN TO ALLOW THE COLLECTION OF F.O.G. SAMPLE.
- ACCESS OPENINGS OVER EACH COMPARTMENT WITHIN THE INTERCEPTOR OR SEPARATOR SHALL BE 24 INCHES IN DIAMETER AND CONTAIN PICK HOLES. ALL COVERS SHALL BE CONSTRUCTED OF CAST IRON OR EQUIVALENT TRAFFIC BEARING MATERIAL. MANHOLE COVERS MUST BE OPEN TO FINISH GRADE AND BE INSTALLED TO EXCLUDE THE ENTRANCE OF STORMWATER INTO THE INTERCEPTOR OR SEPARATOR.
- FULL SIZE DUAL SUEDE CLEANOUTS SHALL BE INSTALLED ON THE INLET AND OUTLET SIDES OF THE INTERCEPTOR OR SEPARATOR.
- INTERCEPTORS AND SEPARATORS MUST BE INSTALLED IN ACCORDANCE WITH THE NC STATE PLUMBING CODE.
- CONCRETE: 4000 PSI @ 28 DAYS.
- DESIGN: ACI 318 BUILDING CODE.
- ASTM C150 FOR CONCRETE INTERCEPTORS.
- ASTM C813 C2 FOR WATER AND WASTEWATER STRUCTURES.
- ASTM A563 FOR MANHOLE STRUCTURAL DESIGN LOADS.
- INTERCEPTORS AND SEPARATORS SHALL BE DESIGNED TO WITHSTAND AN H-20 WHEEL LOAD.
- INTERCEPTORS OR SEPARATORS MADE OF POLYETHYLENE OR FIBERGLASS SHALL INCLUDE A MINIMUM 12,000 PSI TENSILE STRENGTH, 19,000 PSI FLEXURAL STRENGTH, AND 800,000 PSI FLEXURAL MODULUS.
- ALL INTERCEPTORS AND SEPARATORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.

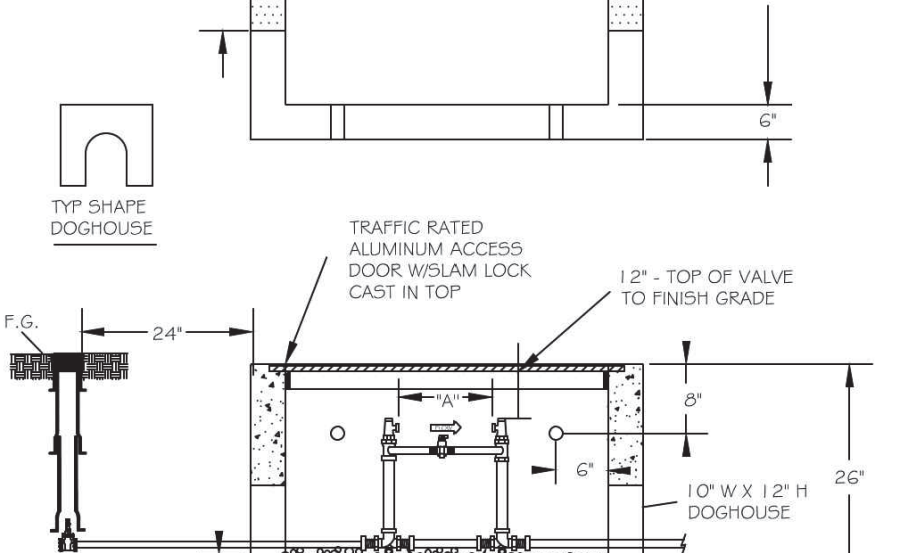
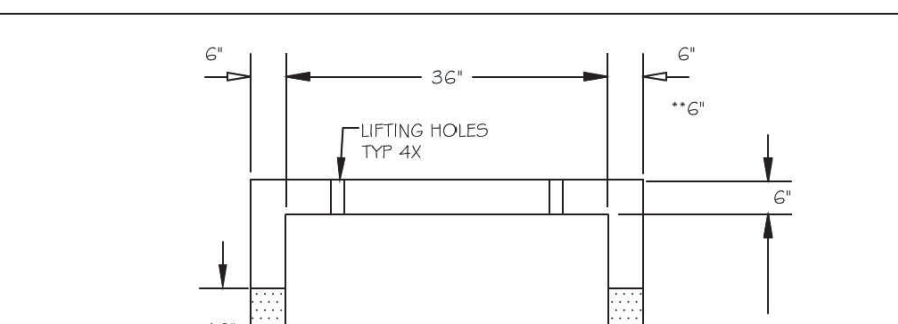
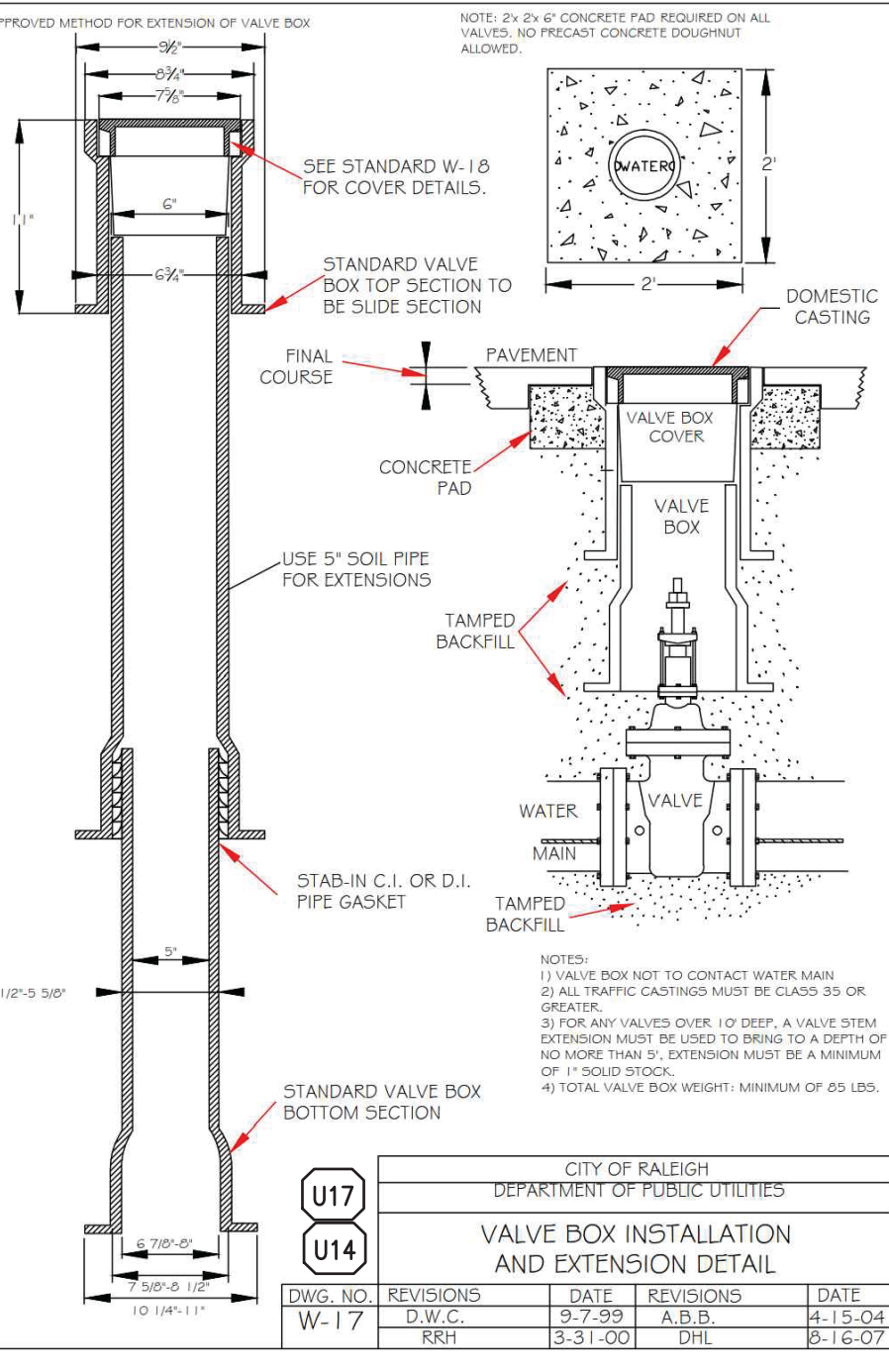
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**DIMENSIONS: GREASE INTERCEPTORS OIL-WATER-SAND SEPARATORS**



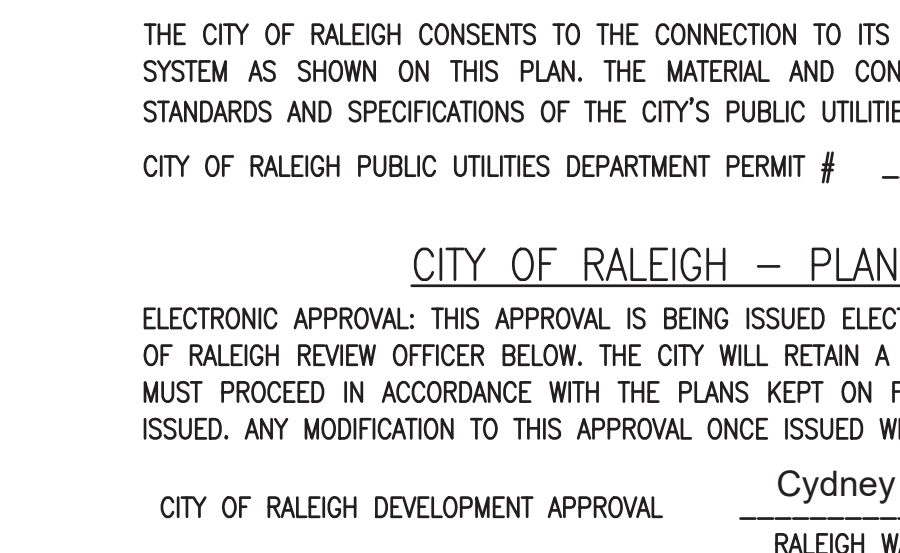
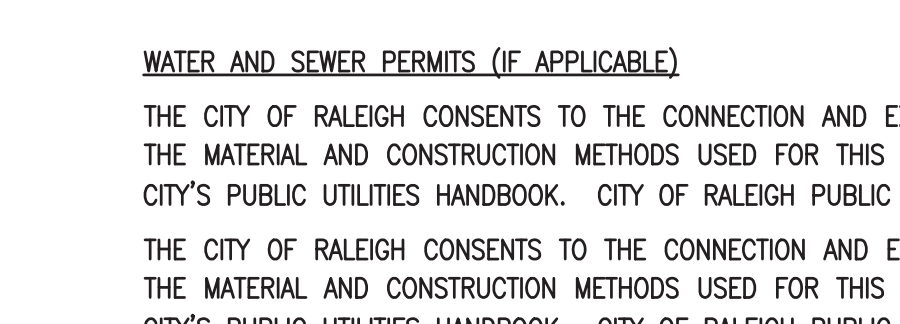
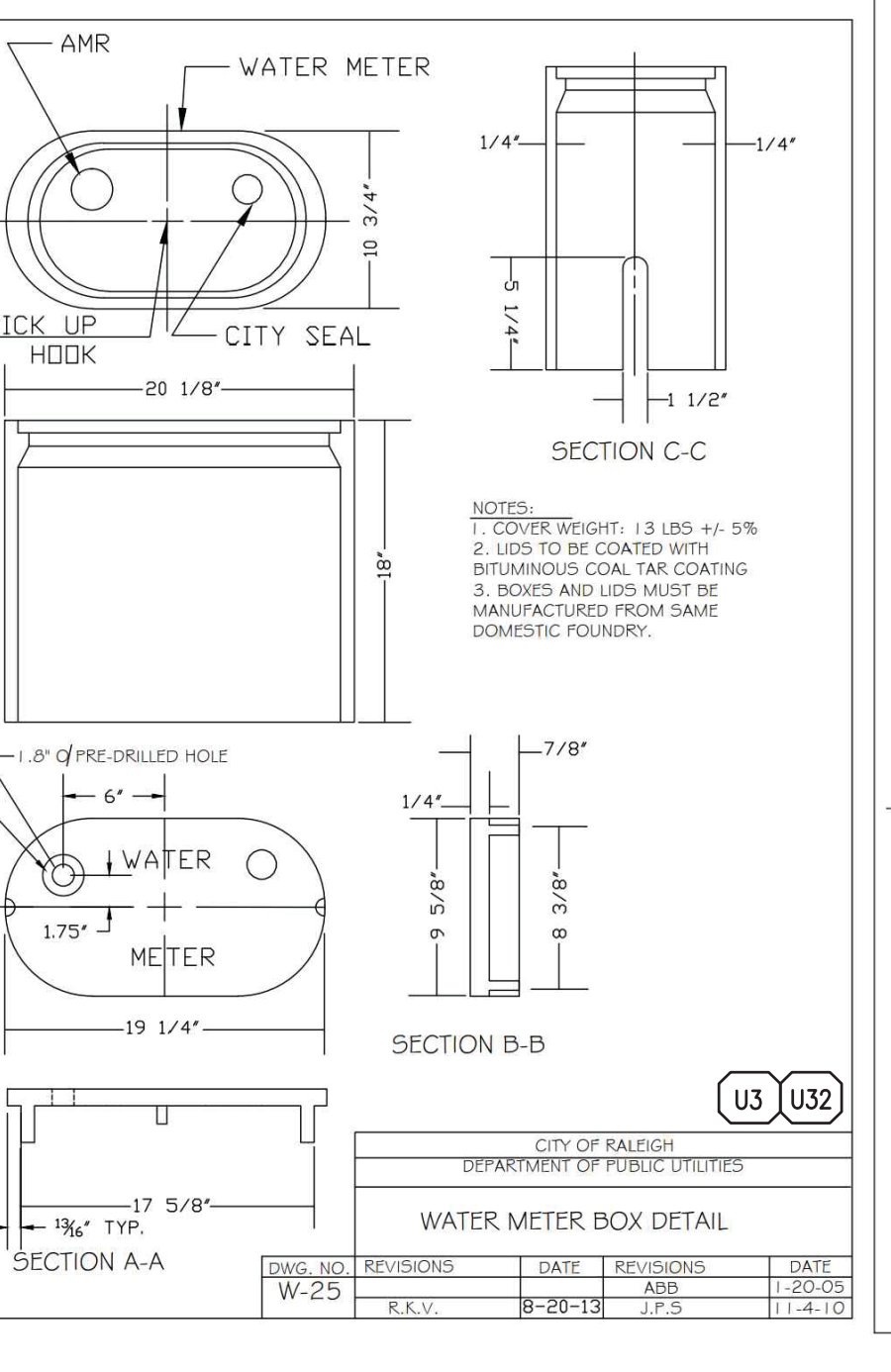
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**4" CLEANOUT PLUG**



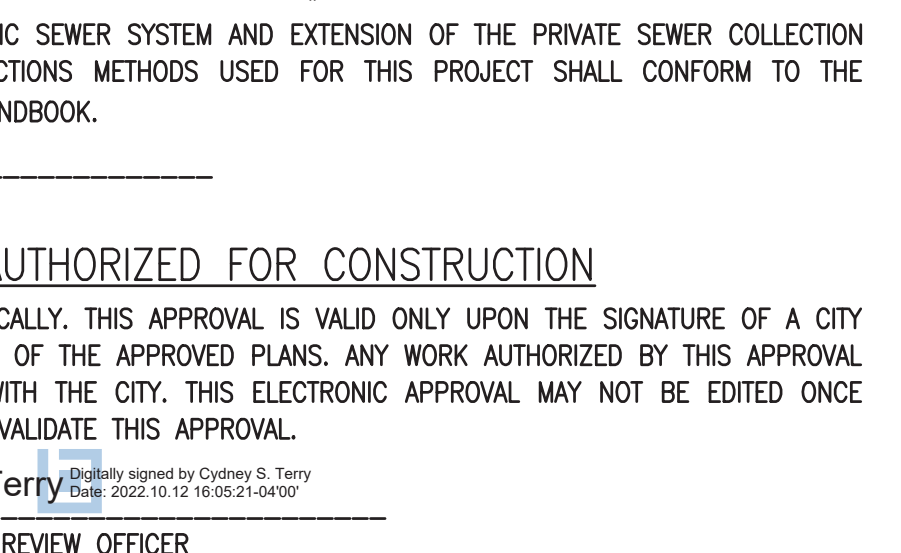
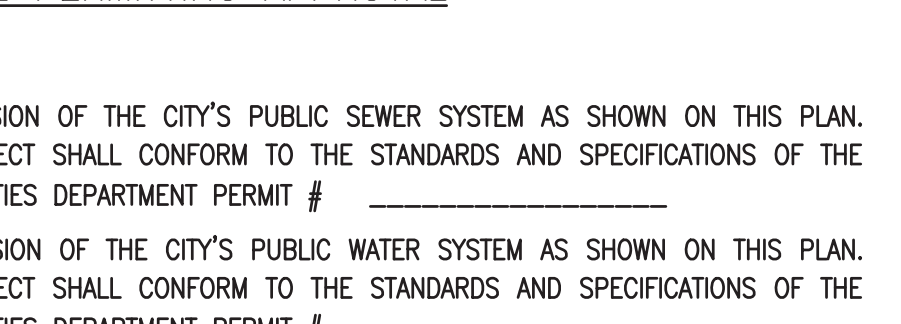
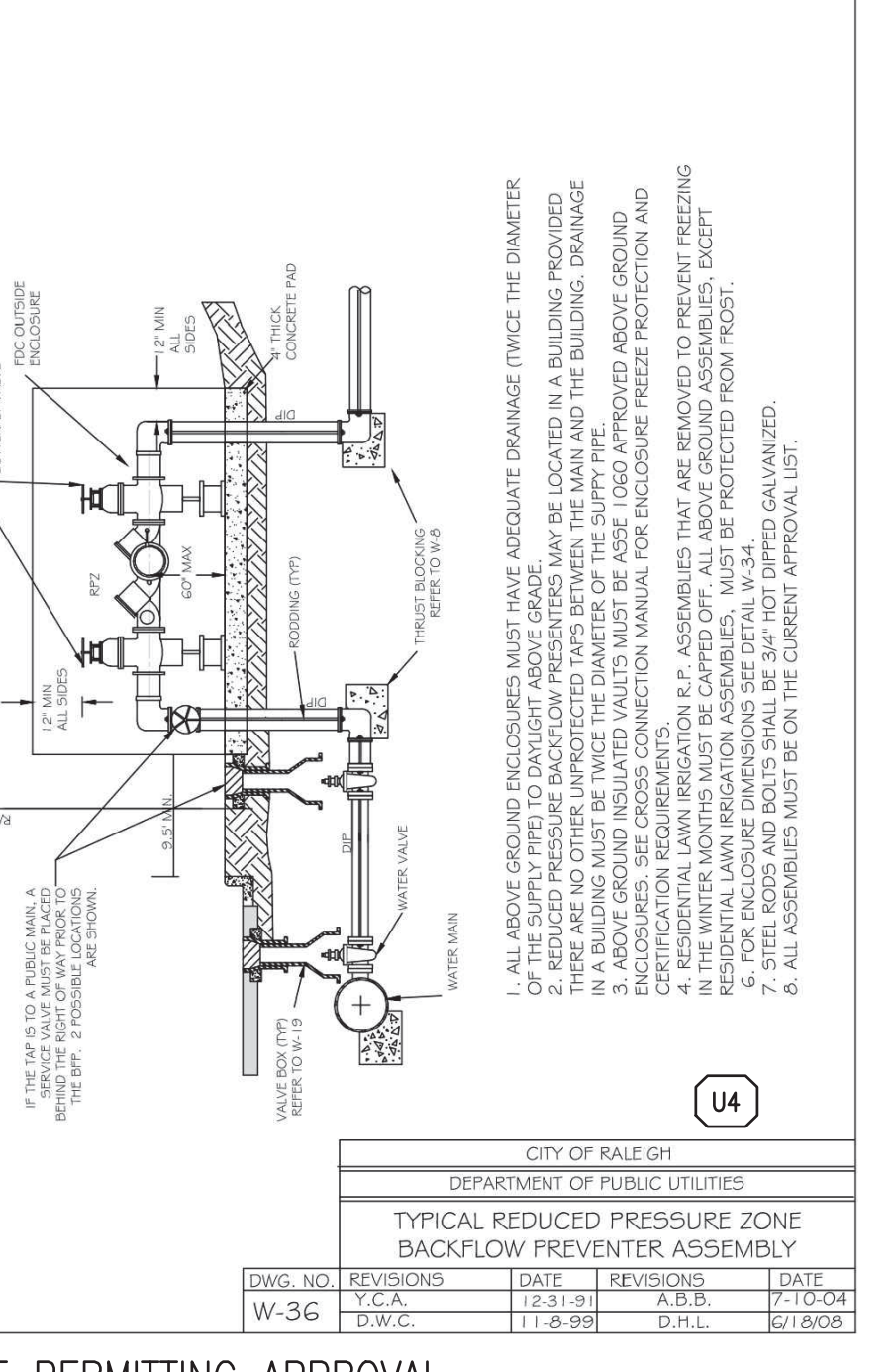
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**VALVE BOX INSTALLATION AND EXTENSION DETAIL**



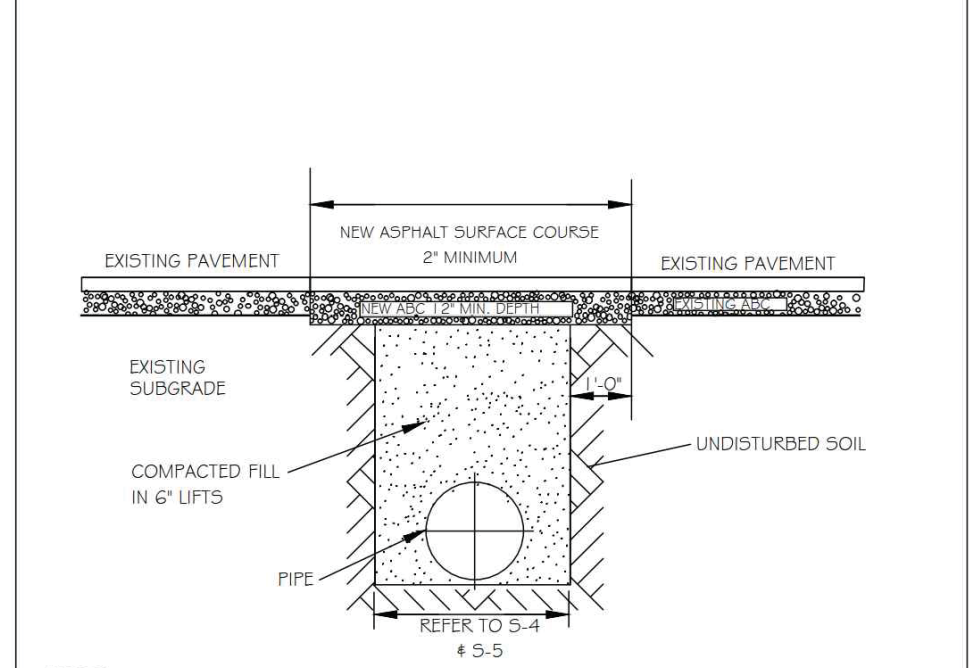
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**WATER METER BOX DETAIL**



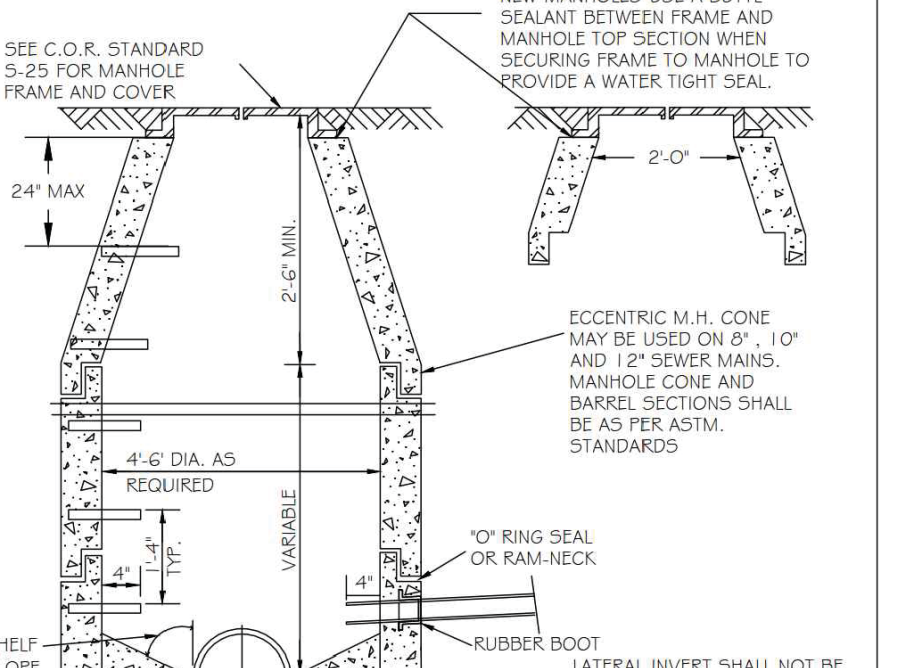
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**TYPICAL REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY**



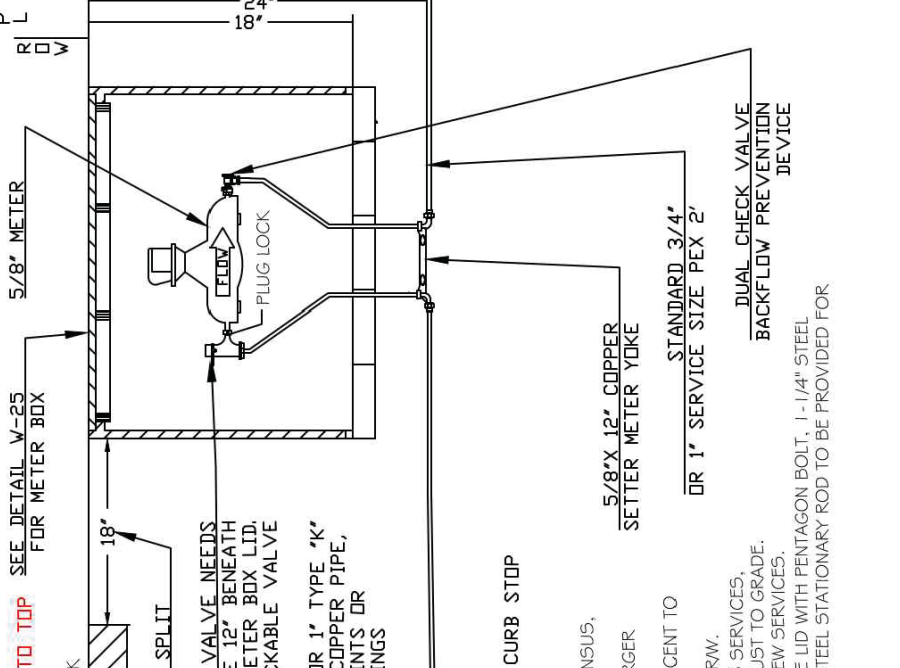
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**STANDARD ASPHALT PAVEMENT PATCH DETAIL**



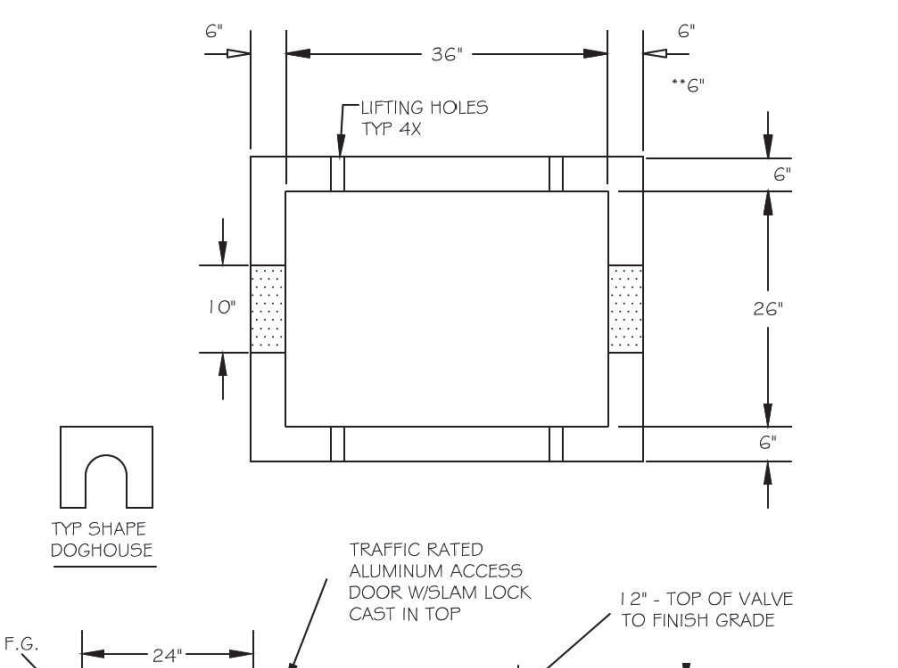
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**STANDARD PRECAST SANITARY SEWER MANHOLE**



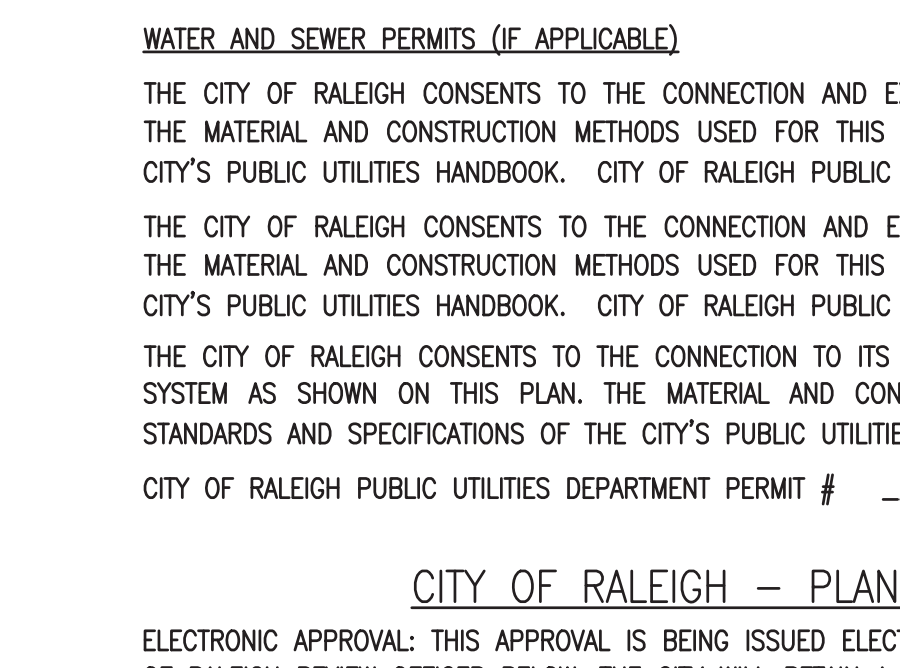
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**STANDARD 3/4" 1" WATER SERVICE INSTALLATION**



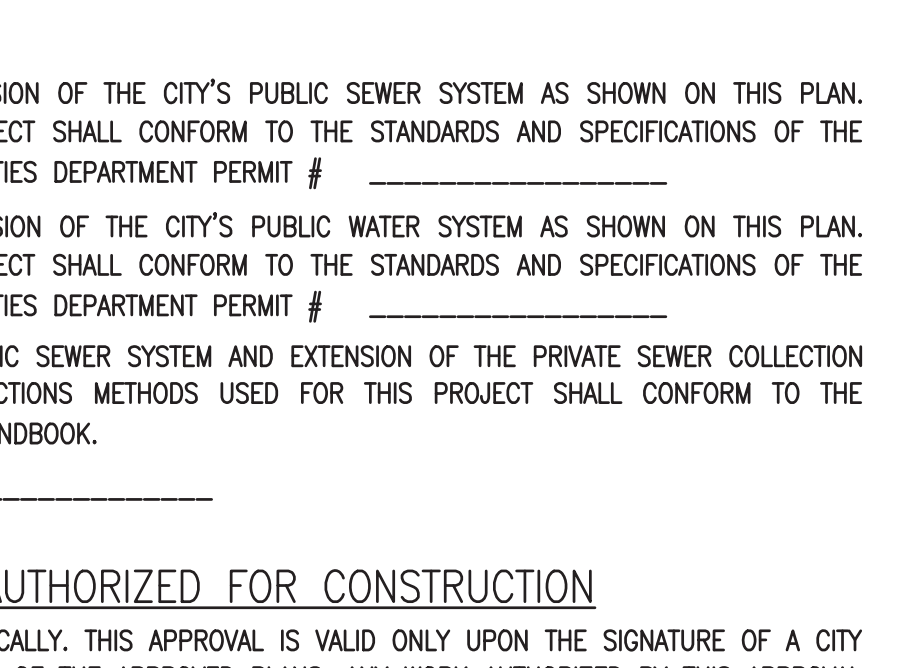
REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**TYPICAL 1 1/2" 2" WATER METER BOX INSTALLATION**



REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**WATER METER BOX DETAIL**



REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**WATER METER BOX DETAIL**

**WATER AND SEWER PERMITS (IF APPLICABLE)**

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 # \_\_\_\_\_

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 # \_\_\_\_\_

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION TO ITS PUBLIC SEWER SYSTEM AND EXTENSION OF THE PRIVATE SEWER COLLECTION 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 # \_\_\_\_\_

**CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION**

ELECTRONIC APPROVAL: THIS APPROVAL IS BEING ISSUED ELECTRONICALLY. THIS APPROVAL IS VALID ONLY UPON THE SIGNATURE OF A CITY OF RALEIGH REVIEW OFFICER BELOW. THE CITY WILL RETAIN A COPY OF THE APPROVED PLANS. ANY WORK AUTHORIZED BY THIS APPROVAL MUST PROCEED IN ACCORDANCE WITH THE PLANS KEPT ON FILE WITH THE CITY. THIS ELECTRONIC APPROVAL MAY NOT BE EDITED ORCE ISSUED. ANY MODIFICATION TO THIS APPROVAL ONCE ISSUED WILL INVALIDATE THIS APPROVAL.

CITY OF RALEIGH DEVELOPMENT APPROVAL: \_\_\_\_\_  
RALEIGH WATER REVIEW OFFICER: \_\_\_\_\_

REVISIONS	DATE	DESCRIPTION

**CITY OF RALEIGH**      **DEPARTMENT OF PUBLIC UTILITIES**  
**TYPICAL 1 1/2" 2" WATER METER BOX INSTALLATION**

**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: \_\_\_\_\_  
TOWN ENGINEER

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

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
ADMINISTRATOR



www.greenbergfarrow.com  
1230 Peachtree Street, NE  
Suite 2900  
Atlanta, GA 30309  
t: 404 601 4000

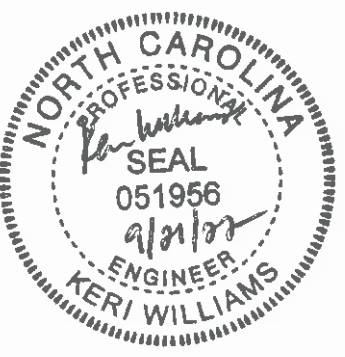
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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**

KERI WILLIAMS, PE

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA BREAD KNIGHTDALE**  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

20211261.0

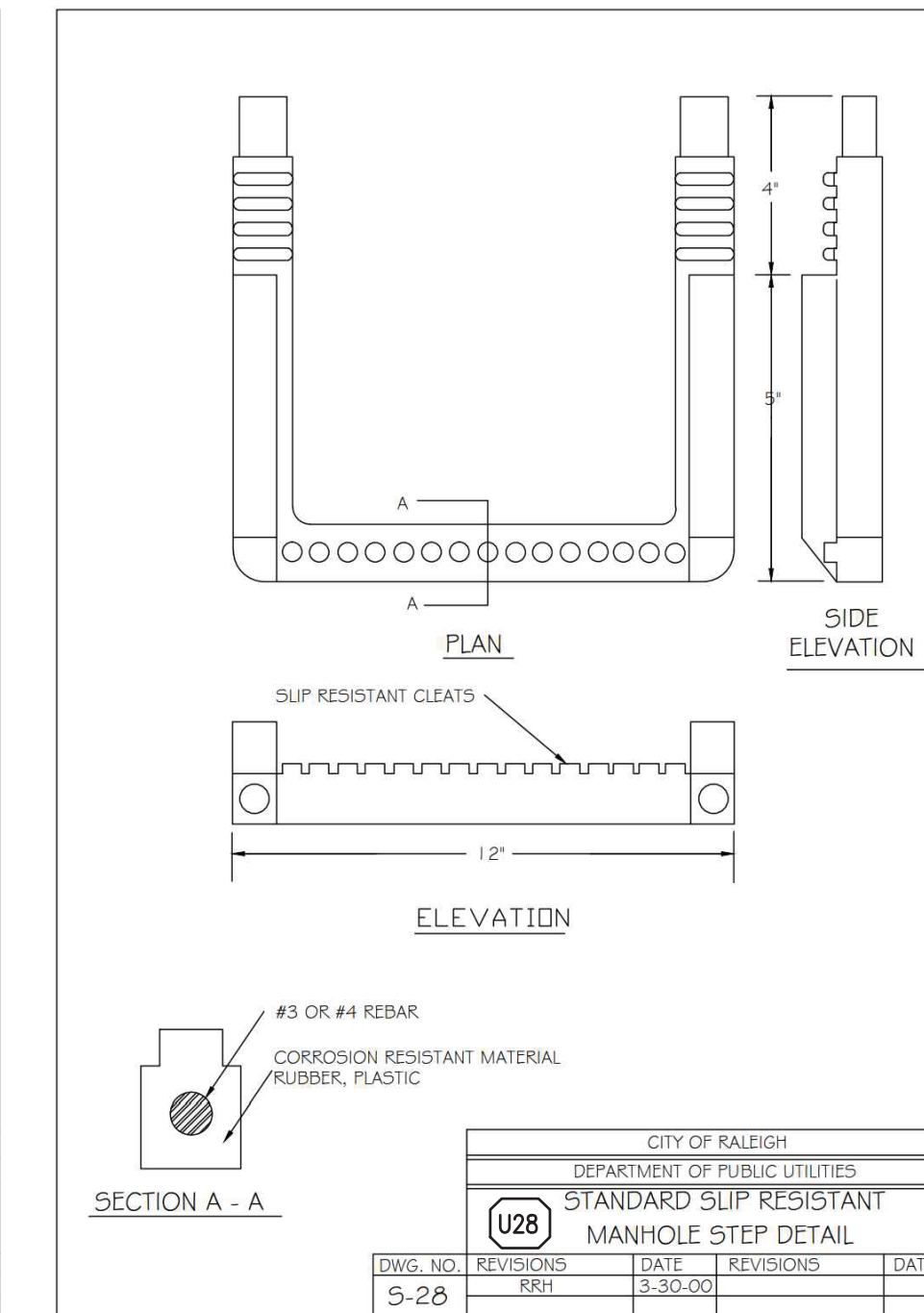
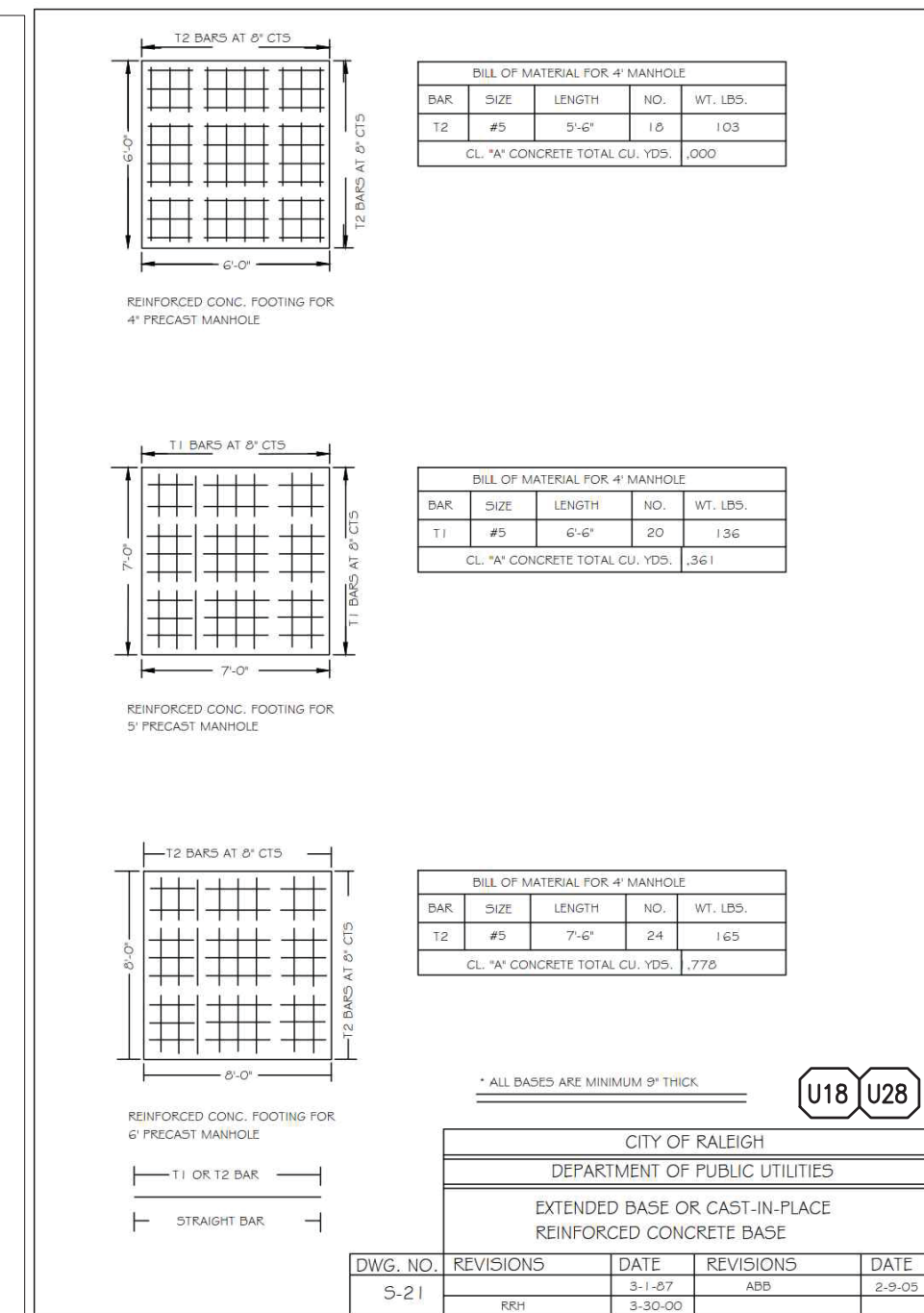
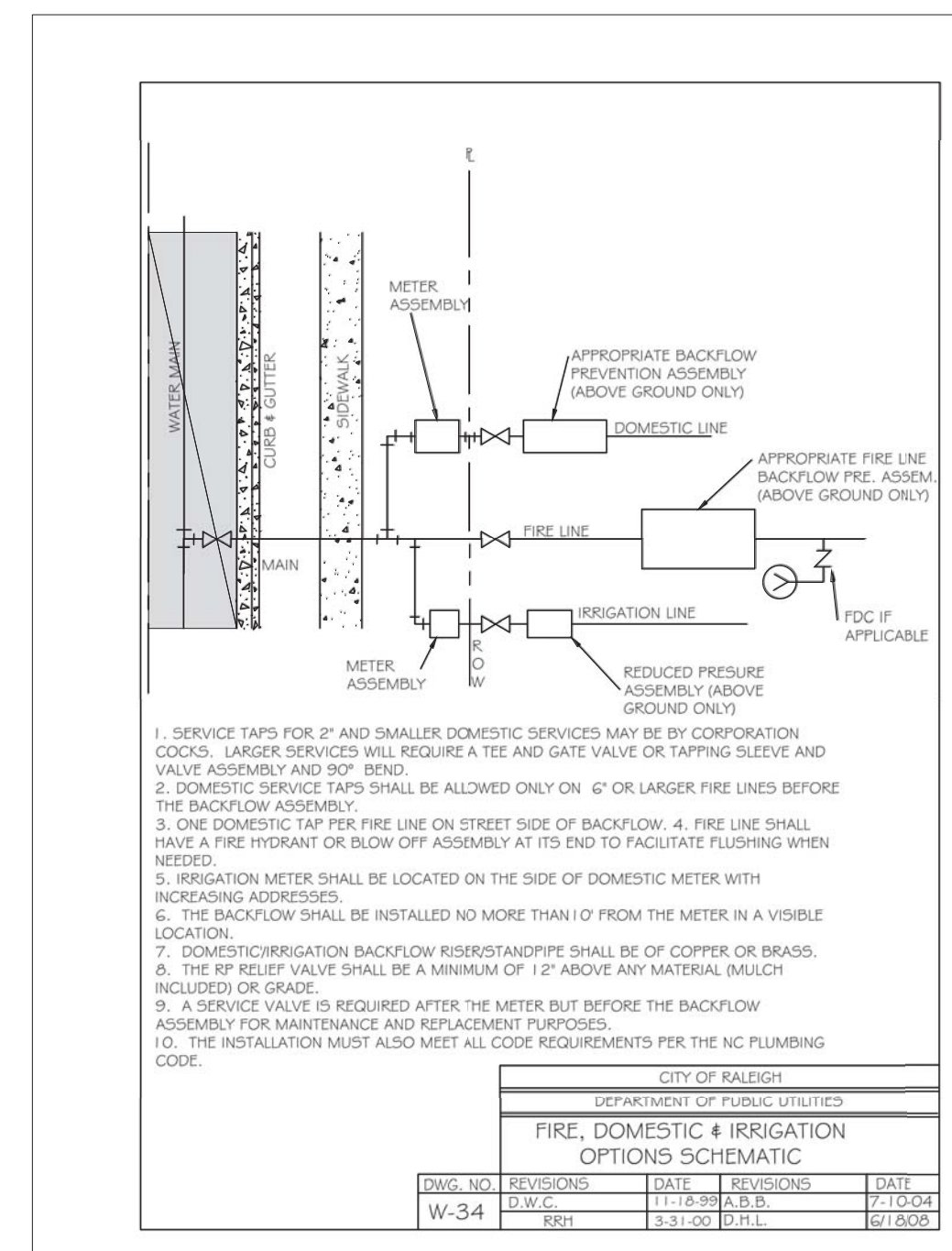
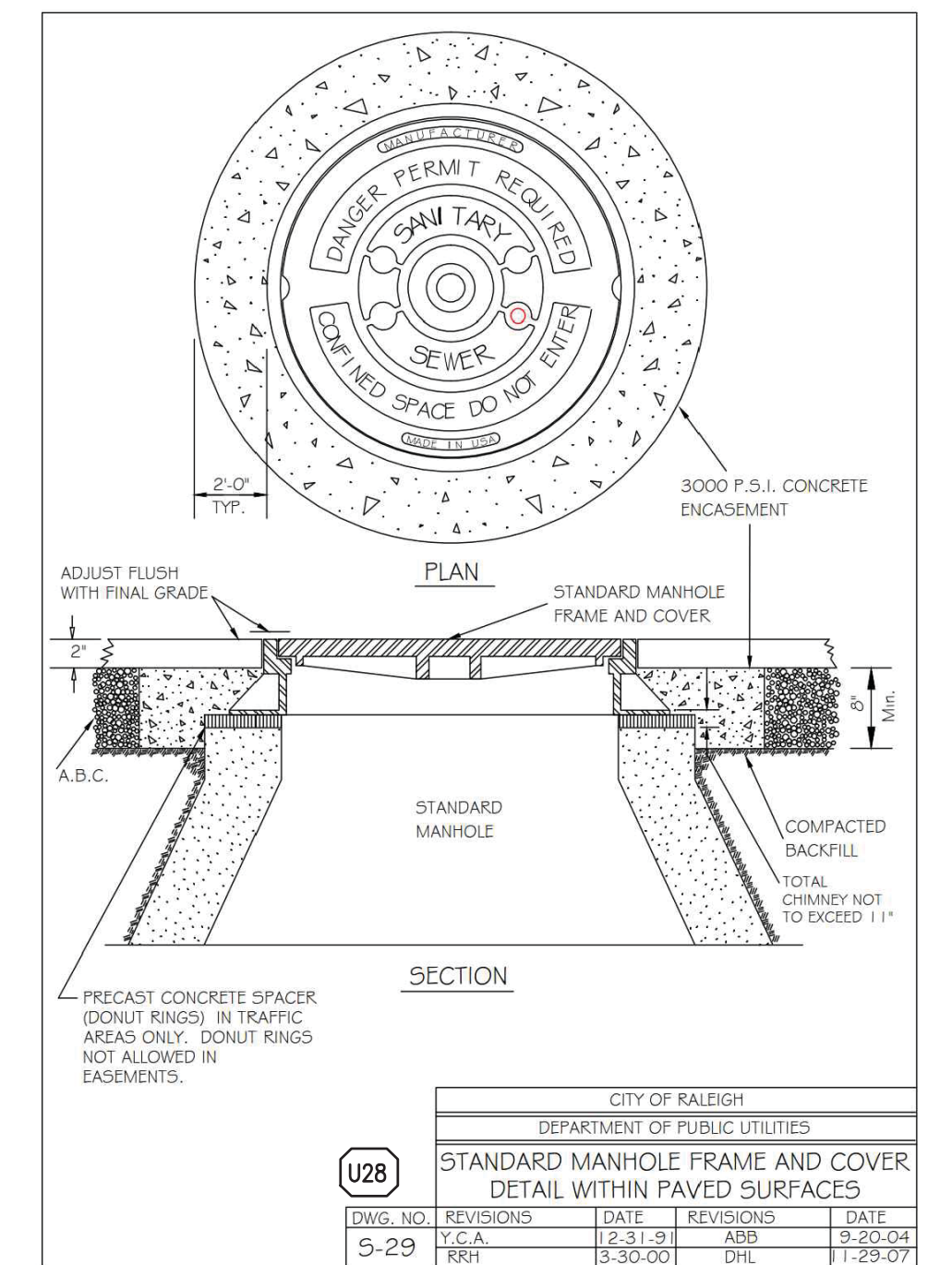
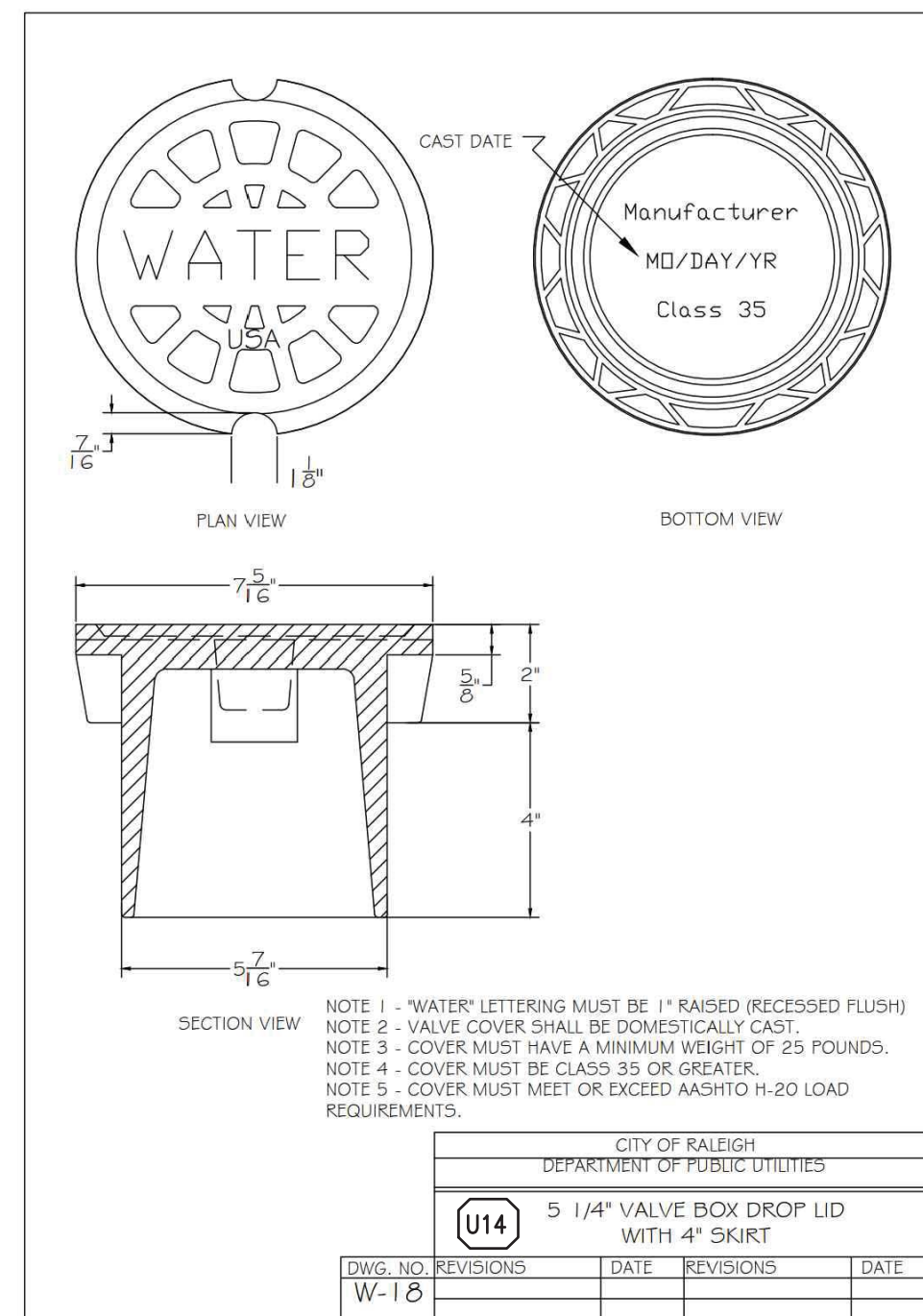
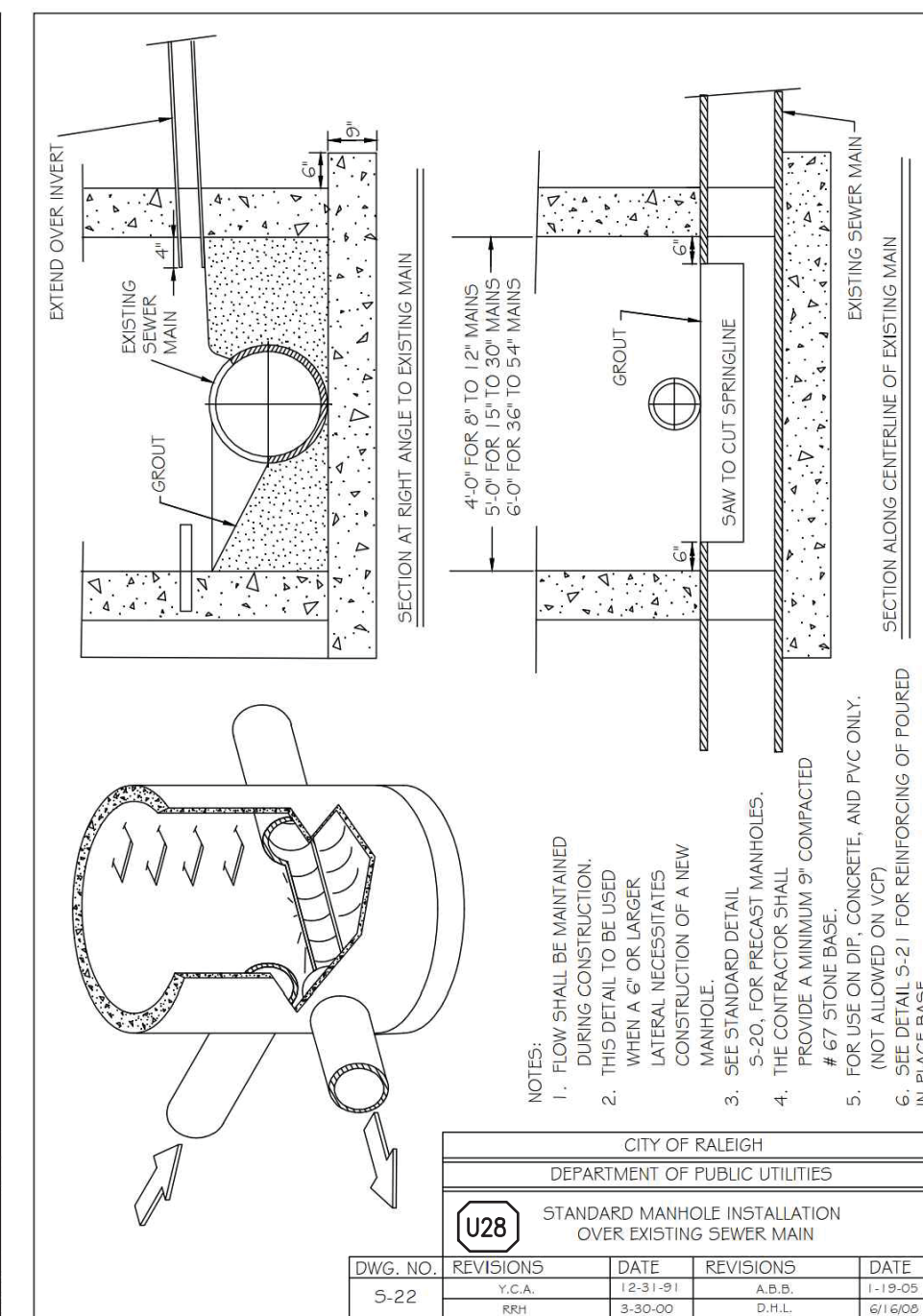
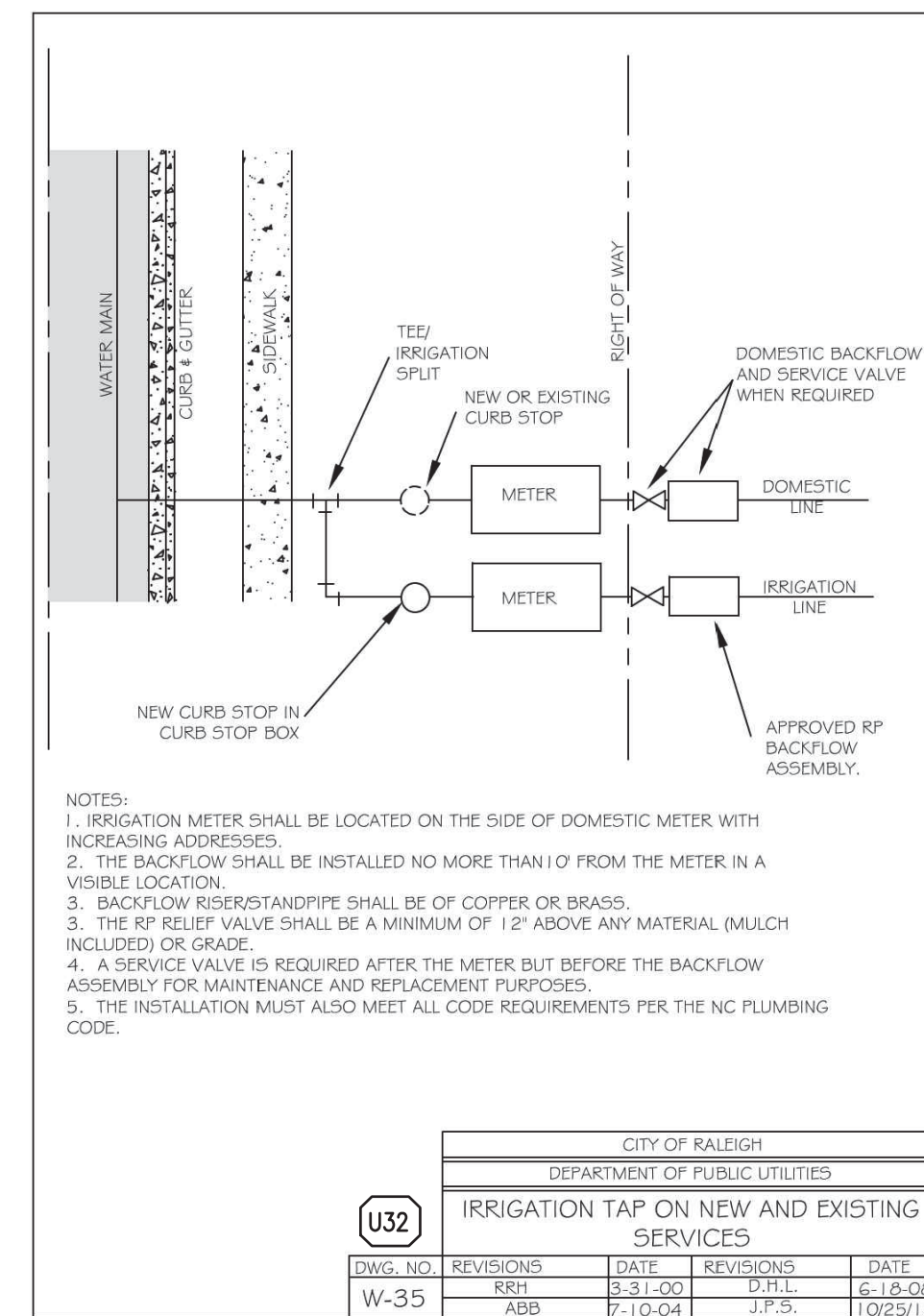
**SHEET TITLE**

**RALEIGH UTILITIES DETAILS**

**SHEET NUMBER**

**C-7.2**

NOT ISSUED FOR CONSTRUCTION



**SITE PERMITTING APPROVAL**

**WATER AND SEWER PERMITS (IF APPLICABLE)**

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 # \_\_\_\_\_

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 # \_\_\_\_\_

THE CITY OF RALEIGH CONSENTS TO THE CONNECTION TO ITS PUBLIC SEWER SYSTEM AND EXTENSION OF THE PRIVATE SEWER COLLECTION SYSTEM AS SHOWN ON THIS PLAN. THE MATERIAL AND CONSTRUCTIONS 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 # \_\_\_\_\_

**CITY OF RALEIGH -- PLANS AUTHORIZED FOR CONSTRUCTION**

ELECTRONIC APPROVAL: THIS APPROVAL IS BEING ISSUED ELECTRONICALLY. THIS APPROVAL IS VALID ONLY UPON THE SIGNATURE OF A CITY OF RALEIGH REVIEW OFFICER BELOW. THE CITY WILL RETAIN A COPY OF THE APPROVED PLANS. ANY WORK AUTHORIZED BY THIS APPROVAL MUST PROCEED IN ACCORDANCE WITH THE PLANS KEPT ON FILE WITH THE CITY. THIS ELECTRONIC APPROVAL MAY NOT BE EDITED ONCE ISSUED. ANY MODIFICATION TO THIS APPROVAL ONCE ISSUED WILL INVALIDATE THIS APPROVAL.

CITY OF RALEIGH DEVELOPMENT APPROVAL  
Raleigh Water Review Officer

Cydney S. Terry  
Raleigh Water Review Officer

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: Samuel A. MacDonell TOWN ENGINEER DATE: \_\_\_\_\_

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

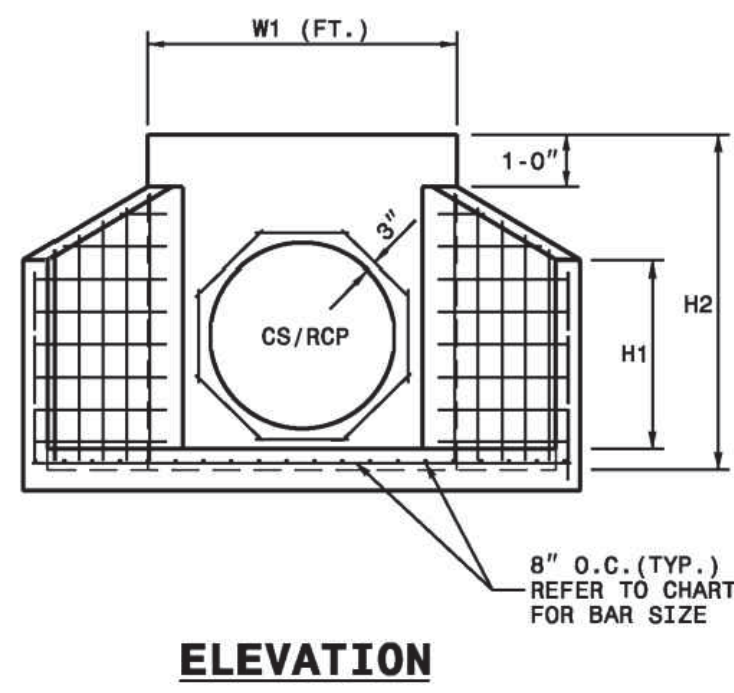
BY: ADMINISTRATOR DATE: \_\_\_\_\_

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

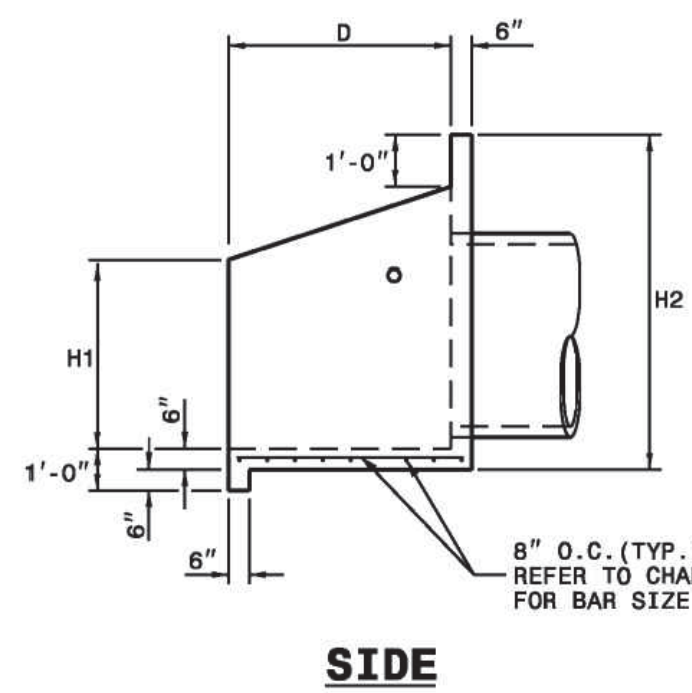
ENGLISH STANDARD DRAWING FOR  
**PRECAST CONCRETE ENDWALL**  
FOR SINGLE 12" THRU 72" PIPE - 90° SKEW

ST6

SHEET 1 OF 1  
**838.80**



**ELEVATION**



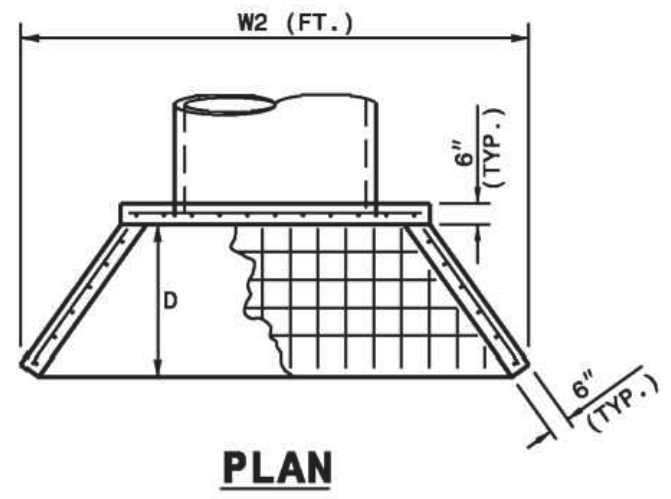
**SIDE**

**NOTES:**

- THIS PRECAST ENDWALL MAY BE USED FOR THE FOLLOWING STANDARDS: 838.01, 838.11, 838.21, 838.27, 838.33, 838.39, 838.51, 838.57, 838.63 AND 838.69.
- INSTALL PRECAST ENDWALLS WITH WINGS AND PAY FOR IN ACCORDANCE WITH SPECIFICATION SECTION 838.
- USE 4000 PSI CONCRETE.
- PROVIDE ALL REINFORCING STEEL WHICH MEETS ASTM A615 FOR GRADE 60 AND WELDED WIRE FABRIC CONFORMING TO ASTM A185 WITH 2" MIN. CLEARANCE.
- PLACE LIFT HOLES OR PINS IN ACCORDANCE WITH OSHA STANDARD 1926.704.
- PIPE TO BE GROUTED INTO HEADWALL AT JOB SITE BY CONTRACTOR.
- ALL ELEMENTS PRECAST TO MEET ASTM C913.
- WELDED WIRE FABRIC MAY BE SUBSTITUTED FOR REBAR AS LONG AS THE SAME AREA OF STEEL IS PROVIDED.
- CHAMFER ALL CORNERS 1" OR HAVE A RADIUS OF 1".

NOTE: THE MINIMUM BAR SIZE SHALL BE #5 BARS AT 8" CTS. THE CONTRACTOR WILL HAVE THE OPTION TO INCREASE THIS BAR SIZE AS NEEDED.

ENDWALL DIMENSIONS							
PIPE DIA.	BAR SIZE	H1 (FT.)	H2 (FT.)	D (FT.)	W1	W2	
1.0	#5 @ 8"	1.25/2.00	2.00/3.75	1.25/1.75	3.00/3.75	5.50/6.00	
1.25	#5 @ 8"	1.25/2.00	3.00/3.75	1.25/2.00	3.50/3.75	6.50/6.75	
1.50	#5 @ 8"	1.25/2.00	3.00/4.25	1.50/2.50	3.50/3.75	6.50/6.75	
2.0	#5 @ 8"	1.50/2.50	4.00/4.75	1.75/2.50	4.00/4.25	7.50/8.25	
2.5	#5 @ 8"	2.50/3.50	4.00/6.00	2.00/3.00	4.50/5.50	10.00/11.50	
3.0	#5 @ 8"	3.00/3.50	5.00/6.00	2.75/3.50	5.25/5.75	11.50/11.75	
3.5	#5 @ 8"	3.25/4.50	6.00/6.75	3.25/3.50	6.00/6.75	12.00/13.25	
4.0	#5 @ 8"	3.50/4.50	6.50/7.00	3.25/3.50	6.50/6.75	13.00/13.25	
4.5	#5 @ 8"	4.00/5.00	6.50/8.50	3.25/4.00	7.00/9.25	13.50/15.75	
5.0	#5 @ 8"	4.50/5.00	7.00/8.50	3.25/4.00	7.25/9.25	13.75/15.75	
5.5	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.25/9.25	14.00/15.75	
6.0	#5 @ 8"	4.50/5.00	7.50/8.50	3.25/4.00	7.75/9.25	14.75/16.75	



**PLAN**

ENGLISH STANDARD DRAWING FOR  
**PRECAST CONCRETE ENDWALL**  
FOR SINGLE 12" THRU 72" PIPE - 90° SKEW

SHEET 1 OF 1  
**838.80**

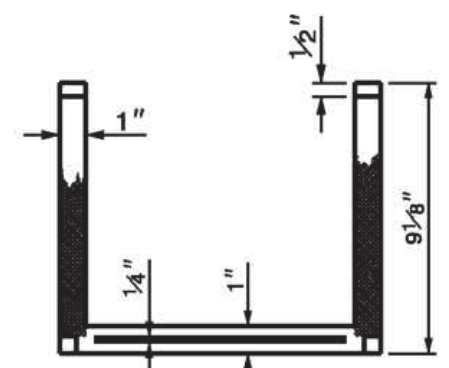
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**DRAINAGE STRUCTURE STEPS**

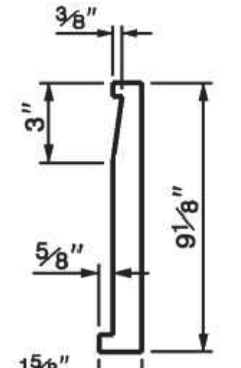
ST2

SHEET 1 OF 1  
**840.66**

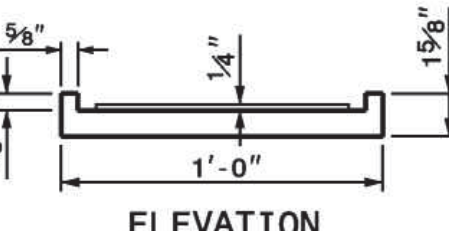
- NOTES:**  
INSTALL ALL STEPS PROTRUDING 4" FROM INSIDE FACE OF STRUCTURE WALL.  
STEPS DIFFERING IN DIMENSIONS, CONFIGURATION, OR MATERIALS FROM THOSE SHOWN MAY ALSO BE USED PROVIDED THE CONTRACTOR HAS FURNISHED THE ENGINEER WITH DETAILS OF THE PROPOSED STEPS AND HAS RECEIVED WRITTEN APPROVAL FROM THE ENGINEER FOR THE USE OF SUCH STEPS.



**PLAN**

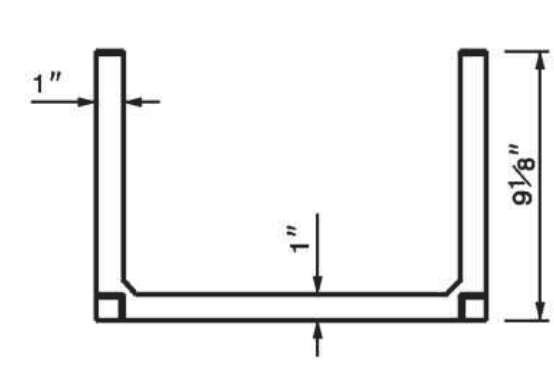


**SIDE ELEVATION**

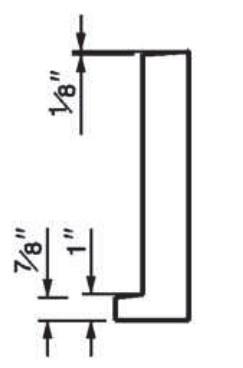


**ELEVATION**

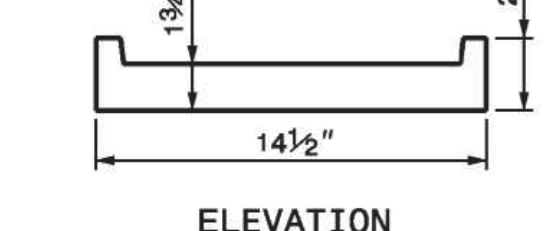
CAST IRON



**PLAN**

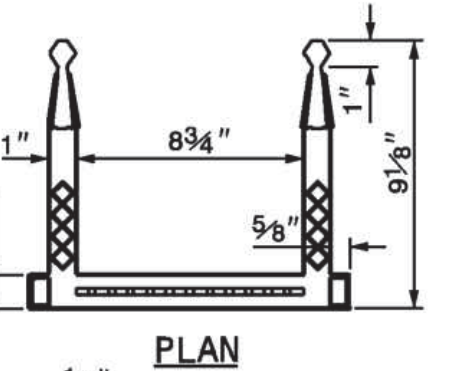


**SIDE ELEVATION**

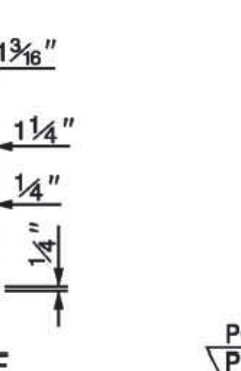


**ELEVATION**

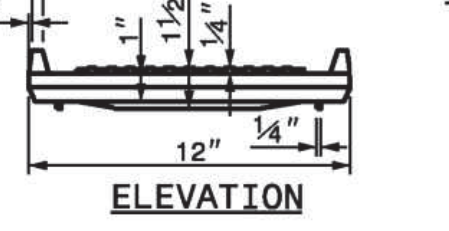
CAST IRON



**PLAN**



**SIDE ELEVATION**

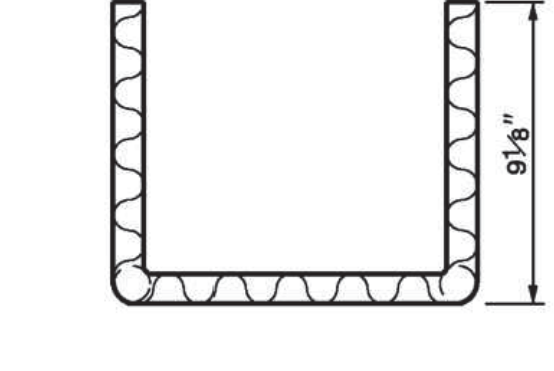


**ELEVATION**

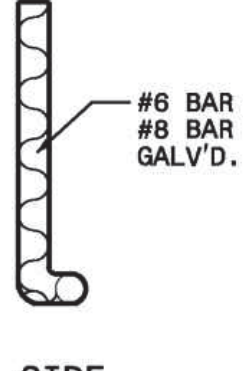
POLYPROPYLENE PLASTIC

SECTION A-A

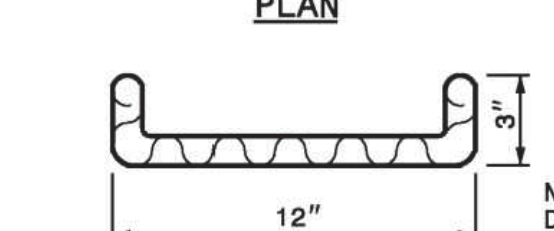
#3 DEFORMED STEEL ROD



**PLAN**



**SIDE ELEVATION**



**ELEVATION**

REINFORCING STEEL

NOTE: DO NOT USE IN SANITARY SEWER MANHOLES.

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**DRAINAGE STRUCTURE STEPS**

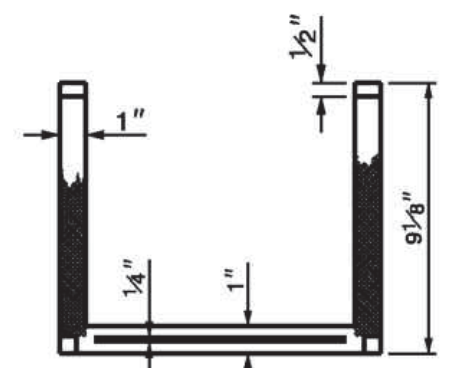
SHEET 1 OF 1  
**840.66**

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

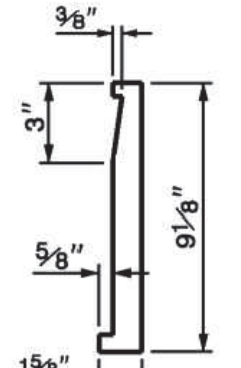
ENGLISH STANDARD DRAWING FOR  
**PRECAST MANHOLE 4', 5' AND 6' DIAMETER**  
12" THRU 48" PIPE

SHEET 1 OF 1  
**840.52**

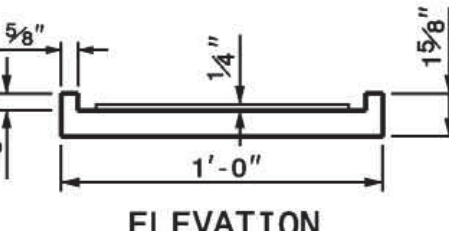
- GENERAL NOTES:**  
USE 4000 PSI MINIMUM COMPRESSIVE STRENGTH CONCRETE.  
FABRICATE, ASSEMBLE AND DESIGN PRECAST MANHOLE COMPONENTS ACCORDANCE WITH AASHTO M199.  
ASSEMBLE RISER AND GRADE RINGS WITH THE STEPS SPACED 12" FROM THE TOP TO THE BOTTOM OF THE MANHOLE.  
WHERE THE MANHOLE IS EXPOSED TO ROAD TRAFFIC, CONSTRUCT THE TOP OF THE MANHOLE FLUSH WITH THE GROUND AND A MINIMUM OF 9" ABOVE THE GROUND AT OTHER LOCATIONS.  
LIMIT DEPTH OF FILL TO 30'-0" FROM FINISH GRADE TO TOP OF BOTTOM SLAB.  
THE MIN. SLAB THICKNESS 'T' IS THE DIMENSION OF THE THINNEST PORTION OF THE TOP/BOTTOM SLAB.  
\* TOP MAT OF REINFORCEMENT MAY BE NEGLECTED IF TOP SLAB HAS A DISTINGUISHABLE TOP AND BOTTOM.



**PLAN**

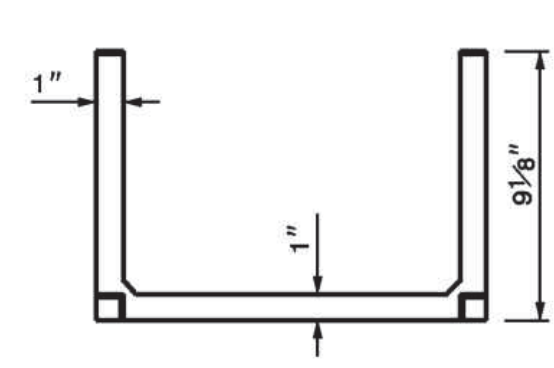


**SIDE ELEVATION**

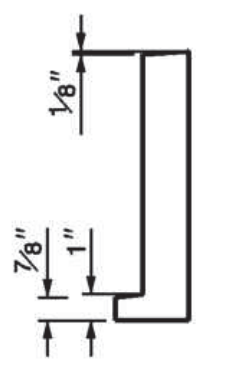


**ELEVATION**

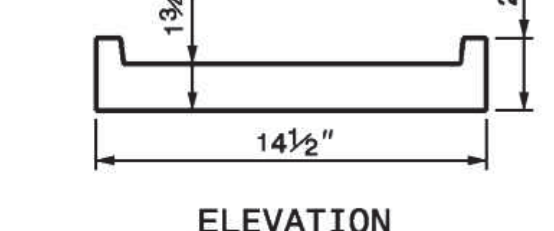
CONCENTRIC CONE SECTION



**PLAN**

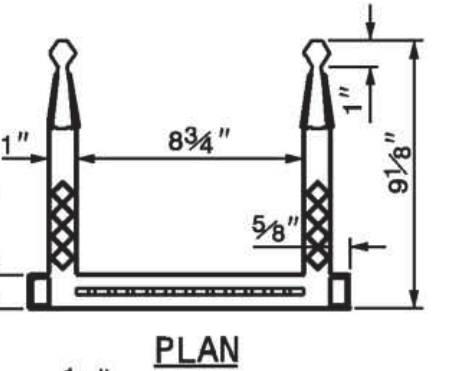


**SIDE ELEVATION**

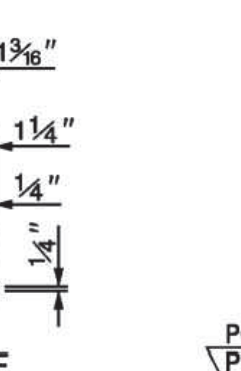


**ELEVATION**

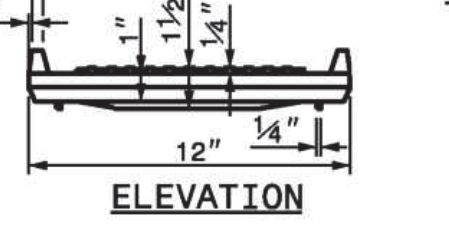
FLAT TOP SLAB



**PLAN**



**SIDE ELEVATION**



**ELEVATION**

ADDITIONAL #4 EACH SIDE OF OPENING (1" CLEAR OF BOTTOM FACE PLACE BARS DIAGONAL TO CORNERS (TYP.))

ADDITIONAL #4 REBAR

USE MIN. AREA OF STEEL IN TOP SLAB OF #4'S @ 8" CTS. EACHWAY EACH FACE

LOCATE WALL REINFORCEMENT IN MIDDLE THIRD OF WALL

MIN. AREA OF STEEL IS 0.07 in.<sup>2</sup>

6" MAX. SPACING OF CIRCUM. R/F

STEP STD. NO. 840.66

As (CIRCUMFERENTIAL REINFORCEMENT)

LONGITUDINAL REINFORCEMENT

BASE

REINFORCED CONC. FIG. (SEE STD. 1926.01 IF REQUIRED)

USE MIN. AREA OF STEEL IN BASE SLAB OF 0.12 in.<sup>2</sup> PER LINEAR FOOT EACH WAY

SEE STD. 840.54 FOR MANHOLE RING AND COVER

FRAME & GRATE

GRATED INLET OPTION

MANHOLE OPTION

TYPICAL MANHOLE SECTION

TABLE

FRAME AND GRATES	STD. NO.
TRAFFIC BEARING	840.37
NONTRAFFIC BEARING	840.22
	840.24
	840.25
	840.29
	840.33

TABLE

D	W	T	As
INTERNAL DIAMETER (FT.)	MIN. WALL THICKNESS (IN.)	MIN. TOP/BOTTOM SLAB THICKNESS (IN.)	MIN. CIRCUMFERENTIAL AREA OF STEEL PER VERTICAL FT. (SQ. IN.)
4	4	6	0.12
5	5	8	0.15
6	6	8	0.18

MINIMUM WEIGHTS - LBS.

FRAME - 180

COVER - 120

TOTAL - 300

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**MANHOLE FRAME AND COVER**

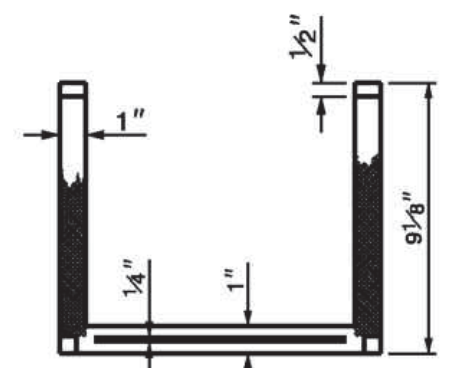
SHEET 1 OF 1  
**840.54**

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

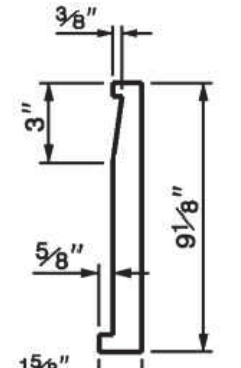
ENGLISH STANDARD DRAWING FOR  
**MANHOLE FRAME AND COVER**

SHEET 1 OF 1  
**840.54**

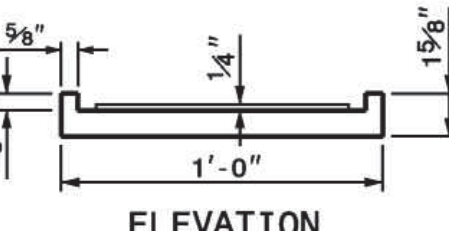
- GENERAL NOTES:**  
SOLID COVER SHOWN PERFORATED. PERFORATED AVAILABLE IF SPECIFIED.  
STATE USE OF SYSTEM ON COVER (I.E.: SEWER, STORM DRAIN, ELECTRICAL)



**PLAN OF FRAME**



**PLAN OF COVER**

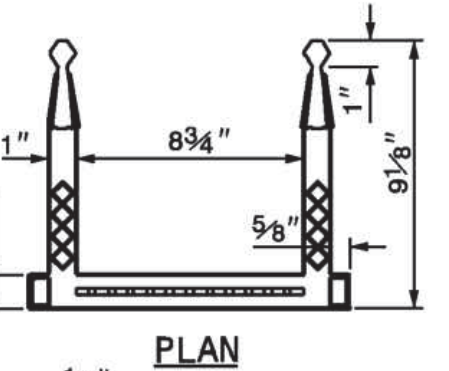


**SECTION A-A**

TYPE #1

ALTERNATE

TYPE #2



**SECTION B-B**

MINIMUM WEIGHTS - LBS.

FRAME - 180

COVER - 120

TOTAL - 300

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**MANHOLE FRAME AND COVER**

SHEET 1 OF 1  
**840.54**

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
**MANHOLE FRAME AND COVER**

SHEET 1 OF 1  
**840.54**

**GF**  
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**PROJECT TEAM**

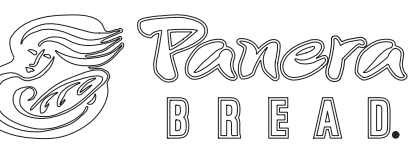
DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**  
KERI WILLIAMS, PE  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
VICTOR LU

**PROJECT NAME**  
**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**  
20211261.0  
**SHEET TITLE**  
**CONSTRUCTION DETAILS**

**SHEET NUMBER**  
**C-7.3**  
NOT ISSUED FOR CONSTRUCTION

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: \_\_\_\_\_

TOWN ENGINEER

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

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

ADMINISTRATOR



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**PROJECT TEAM**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
8/09/19	PERMIT SET
2/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITAL
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	LDP COMMENT RESPONSE
	ADDENDUM 1

**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**

KERI WILLIAMS, PE

**PROJECT MANAGER**

HAMILTON WILLIAMS

**QUALITY CONTROL**

WILLIAM LOTZ

**DRAWN BY**

VICTOR LU

**PROJECT NAME**

**PANERA BREAD**  
KNIGHTDALE  
NORTH CAROLINA  
6800 KNIGHTDALE BLVD



**PROJECT NUMBER**

20211261.0

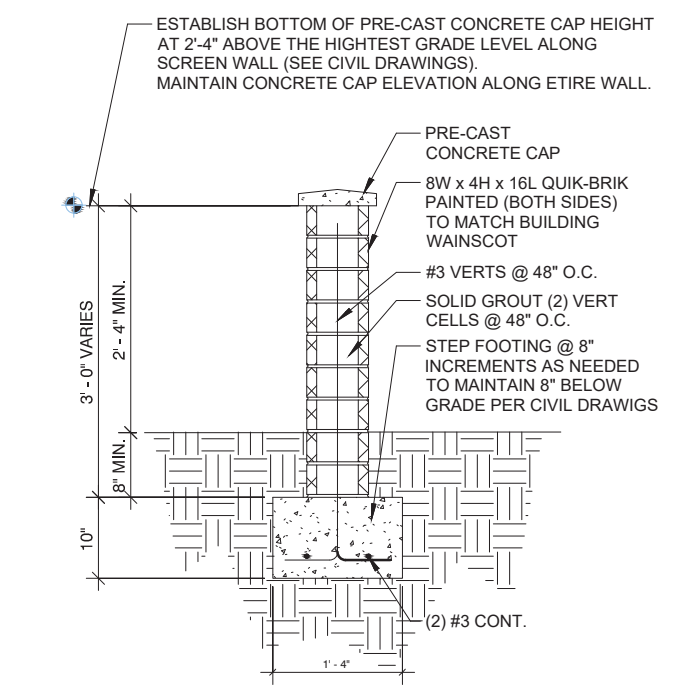
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**CONSTRUCTION DETAILS**

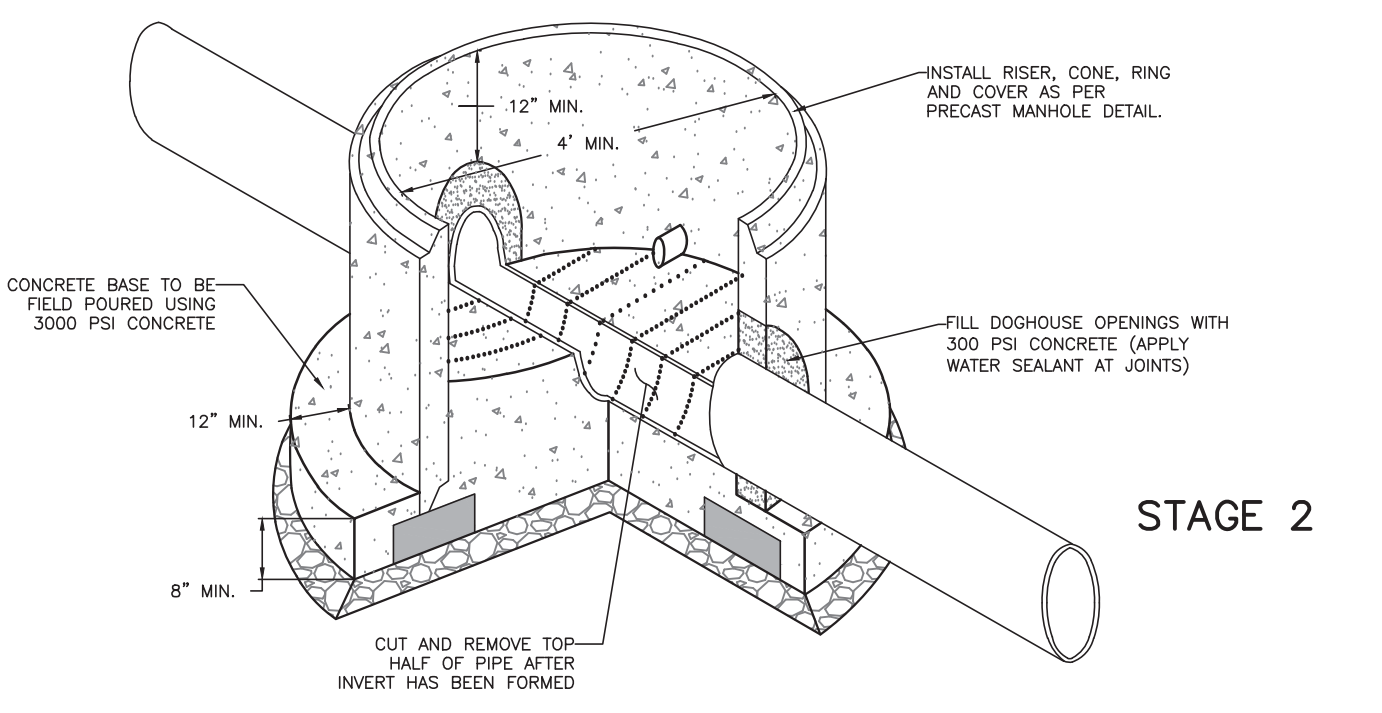
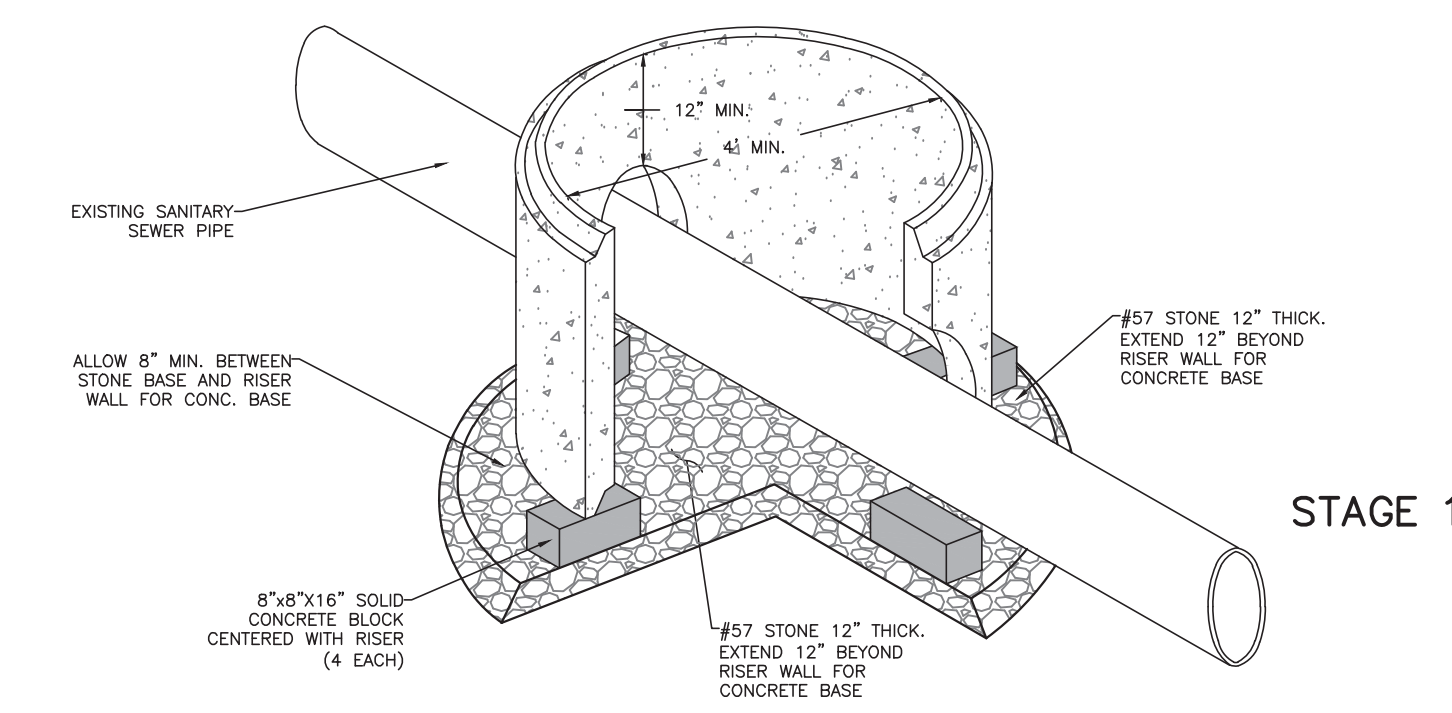
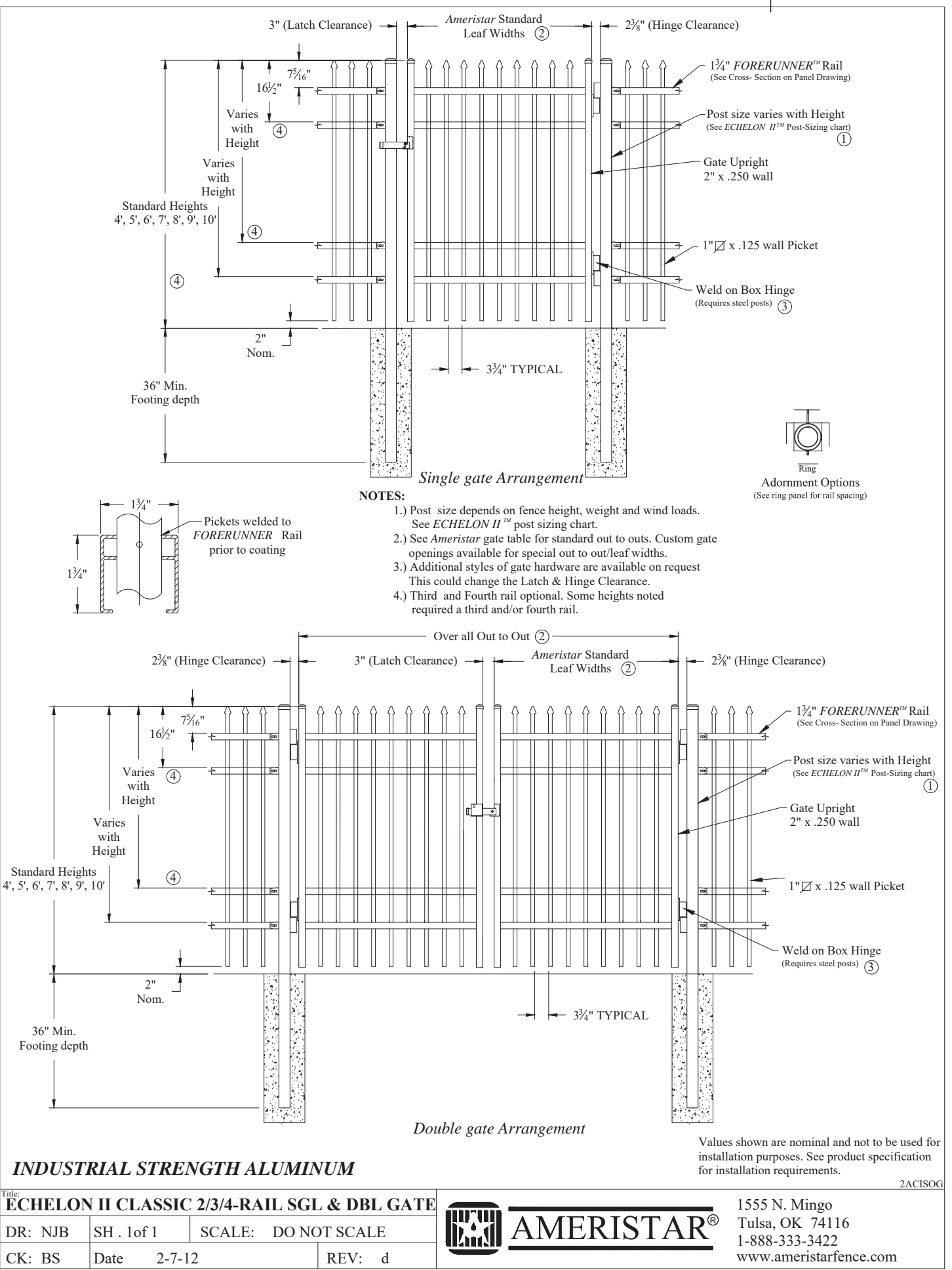
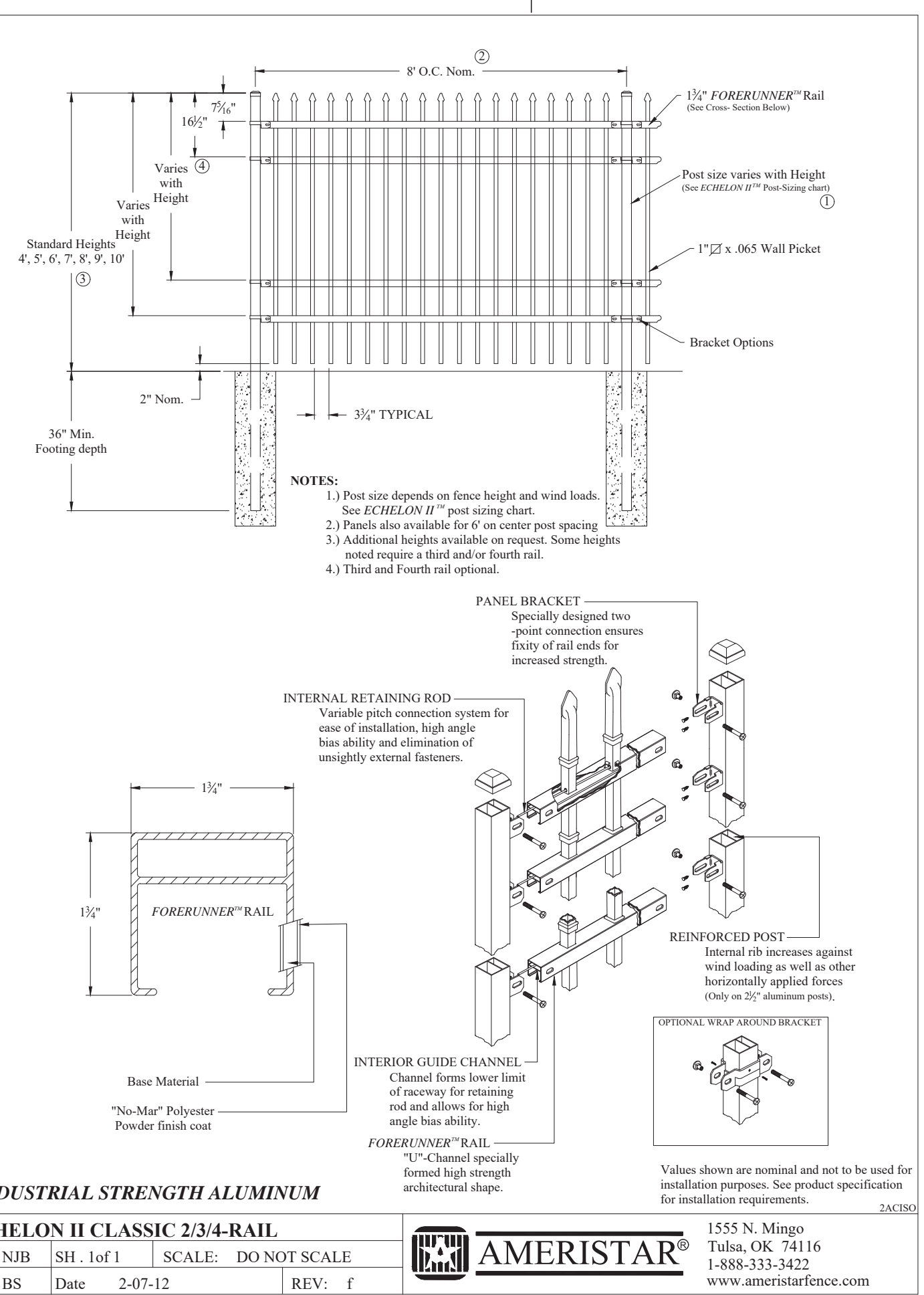
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**C-7.4**

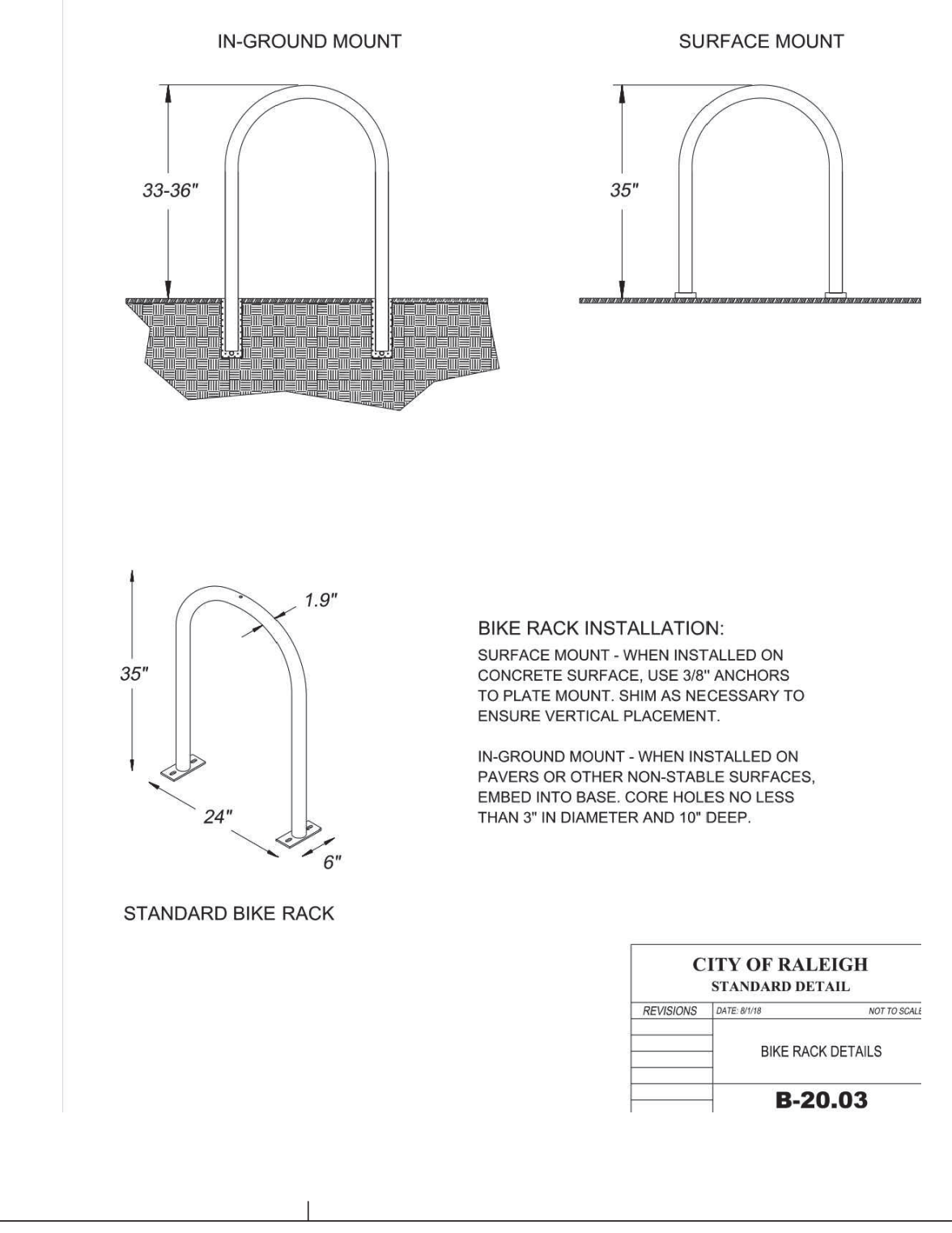
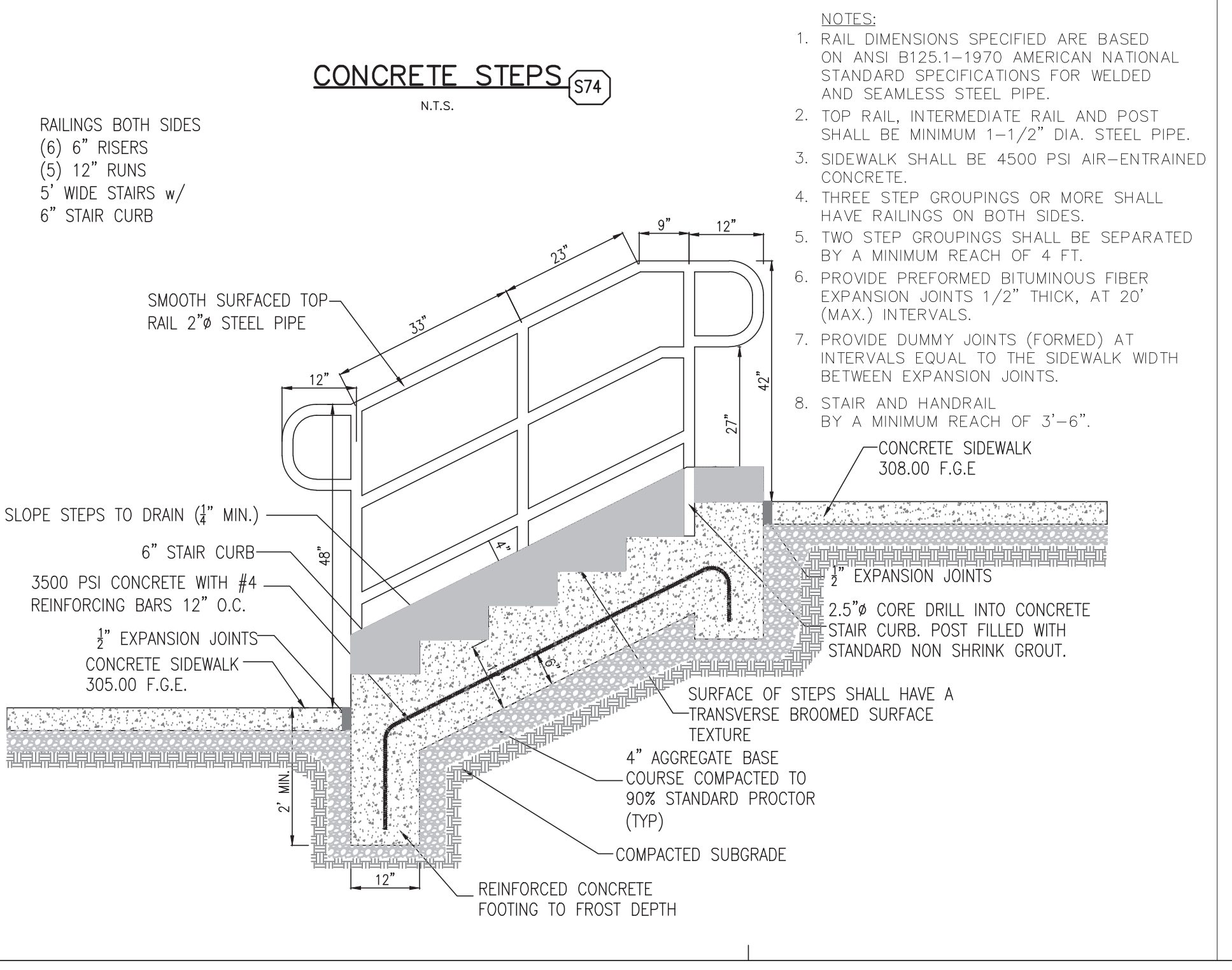
NOT ISSUED FOR CONSTRUCTION



KNIGHTDALE BOULEVARD SCREEN WALL - S73



CROSS SECTION AT EXISTING MAIN - S18



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: TOWN ENGINEER DATE: \_\_\_\_\_

BY: ADMINISTRATOR DATE: \_\_\_\_\_

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

# KNIGHTDALE BOULEVARD

A.K.A. U.S. HIGHWAY 64 BUSINESS  
VARIABLE PUBLIC RIGHT-OF-WAY  
PER B.M. 2017, PG. 1996

(1) CATAWBA CRAPE MYRTLE  
WILLOW OAK (2)

(5,774 sf) BERMUDA GRASS

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.

Samuel A. MacDonell  
Professional Engineer  
No. 10010  
State of North Carolina  
DATE: \_\_\_\_\_

BY: TOWN ENGINEER

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

DATE: \_\_\_\_\_

BY: ADMINISTRATOR

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**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
10/28/21	PERMIT SET
02/25/22	CIP COMMENT RESPONSE
06/10/22	CIP COMMENT RESPONSE
07/22/22	CIP COMMENT RESPONSE / LDP SUBMITTAL
09/14/22	CIP COMMENT RESPONSE / LDP COMMENT RESPONSE / ADDENDUM 1

**KNIGHTDALE PANERA - LANDSCAPE CALCULATIONS**

LOT AREA:	ACRES	SF.
	2.349	102,322

**BUFFERYARD LANDSCAPE REQUIREMENTS**

KNIGHTDALE BLVD. (TYPE 'B' BUFFER EXEMPTION- 10') 328 LF	REQUIRED	PROVIDED
6' MIN. SEMI-OPAQUE SCREEN	YES	YES
3 CANOPY TREES PER 100 LF = 328/100 X 3 = 10 TREES	10	10
5 UNDERSTORY TREES PER 100 LF = 328/100 X 5 = 18 TREES	16	16
20 SHRUBS PER 100 LF = 328/100 X 20 = 66 SHRUBS	66	171

**PARKSTONE TOWNE BLVD. (TYPE 'A' BUFFER- 10') 75 LF**

	REQUIRED	PROVIDED
6' MIN. SEMI-OPAQUE SCREEN	YES	YES
3 CANOPY TREES PER 100 LF = 75/100 X 3 = 2 TREES	2	2
2 UNDERSTORY TREES PER 100 LF = 75/100 X 2 = 6 TREES	2	2
20 SHRUBS PER 100 LF = 277/100 X 20 = 55 SHRUBS	15	59

**PLAN WEST ENTRY DRIVE (TYPE 'A' BUFFER- 10') 170 LF**

	REQUIRED	PROVIDED
6' MIN. SEMI-OPAQUE SCREEN	YES	YES
3 CANOPY TREES PER 100 LF = 170/100 X 3 = 5 TREES	5	5
2 UNDERSTORY TREES PER 100 LF = 170/100 X 2 = 3 TREES	3	3
20 SHRUBS PER 100 LF = 170/100 X 20 = 55 SHRUBS	34	35

**STREET TREES**

WIDEWATERS COMMON DRIVEWAY 226'	REQUIRED	PROVIDED
1 CANOPY TREES PER 40 LF = 226/40 = 6 TREES	7	1 + 6 EXISTING

**PARKSTONE TOWNE BLVD. 195 LF**

	REQUIRED	PROVIDED
1 CANOPY TREES PER 40 LF = 195/40 = 5 TREES	5	5

**PARKING LOT LANDSCAPING REQUIREMENTS**

	REQUIRED	PROVIDED
60 MAX' FROM PARKING SPACE TO BASE OF DECIDUOUS CANOPY TREE	YES	YES
(1) CANOPY TREE PER LANDSCAPE ISLAND	13	13

**GENERAL BUFFER PLANTING REQUIREMENTS**

	REQUIRED	PROVIDED
40-60% OF CANOPY AND UNDERSTORY TREES TO BE EVERGREEN	12-19	13 (41%)
80% OF SHRUBS TO BE EVERGREEN	230	205 (89%)

**PROPOSED TREE REPLACEMENT AND CANOPY CALCULATIONS**

	ACRE	SF
TOTAL SITE AREA	2.349	102,322.44
AREA OF DISTURBANCE	1.89	82,328.40
AREA WITHIN STREAM BUFFER	0.41	17,859.60
AREA WITHIN BUFFER YARD	0.29	12,632.40

**TREE REPLACEMENT CALCULATIONS (PER TOWN OF KNIGHTDALE CODE OF ORDINANCES)**

TIER 1 REPLACEMENT RATE = N/A  
TIER 2 REPLACEMENT RATE = (1) TREE PER 12" OF DBH REMOVED (2.5" CAL. MIN.)  
TIER 3 REPLACEMENT RATE = (1) TREE PER 12" OF DBH REMOVED (2.5" CAL. MIN.)

**TIER 2 TREE REPLACEMENT CALCULATIONS (TO BE REMOVED)**

DBH TYPE	# TREES REMOVED	SUBTOTAL DBH OF TREES REMOVED	REPLACEMENT TREES REQUIRED
10 HW	1	10	1
18 HW	3	54	5
20 HW	2	40	3
24 HW	1	24	2
<b>TOTAL REPLACEMENT TREES REQUIRED:</b>			<b>11</b>

**TOTAL REPLACEMENT TREES PROVIDED:** 11  
**TOTAL REPLACEMENT TREES REQUIRED:** 11  
**SITE TREES REQUIRED:** 63  
**SUBTOTAL TREES REQUIRED:** 74  
**TOTAL TREES PROPOSED:** 74

**LANDSCAPE NOTES:**

- AT TIME OF INSTALLATION, CANOPY TREES SHALL BE A MINIMUM OF 2" CALIPER AND 8' IN HEIGHT; UNDERSTORY TREES SHALL BE A MINIMUM OF 1 1/4" CALIPER AND 6' IN HEIGHT; SHRUBS SHALL BE AT LEAST 18" IN HEIGHT AND AT LEAST A 3 GALLON CONTAINER SIZE.
- ALL ABOVE GROUND UTILITIES MUST BE SCREENED IN ACCORDANCE WITH UDO CH. 8.7.
- PLEASE NOTE THAT 40-60% OF THE CANOPY AND UNDERSTORY TREES AND 80% OF THE SHRUBS MUST BE EVERGREEN PER UDO CH. 8.6 SPECIES MUST BE FROM THE APPROVED TREE LIST.

**PROFESSIONAL SEAL**

FRED A. MADDOX  
Professional Engineer  
No. 10010  
State of North Carolina  
10/03/2022

**PROFESSIONAL IN CHARGE**  
FRED A. MADDOX  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
FRED A. MADDOX

**PROJECT**  
**PANERA BREAD**

**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD.**

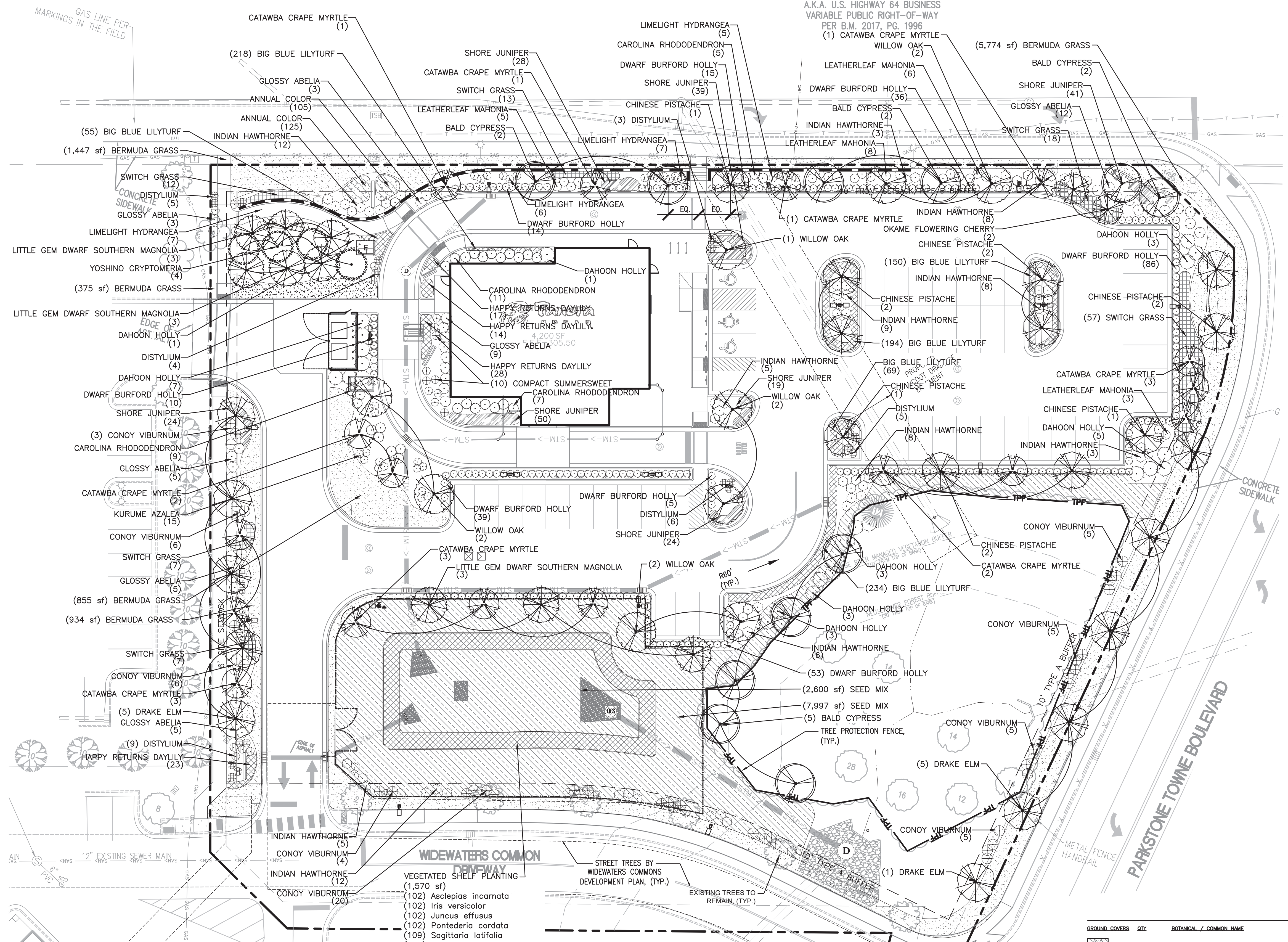
**CLIENT**

**Panera BREAD.**

**PROJECT NUMBER**  
20211261

**SHEET TITLE**  
**LANDSCAPE PLAN**

**SHEET NUMBER**  
**L-1.0**



**PLANT SCHEDULE LANDSCAPE**

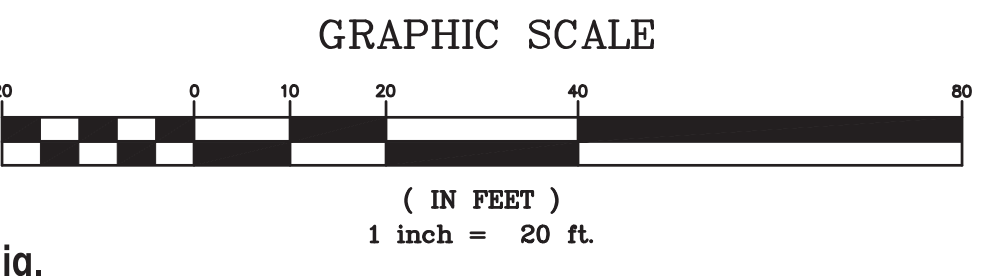
TREES	QTY	BOTANICAL / COMMON NAME	CONT.	SIZE	REMARKS
17		LAGERSTROEMIA INDICA 'CATAWBA' / CATAWBA CRAPE MYRTLE	B & B	2.5" CAL	10'-12" HT UNDERSTORY, BUFFER TREE, MULTI-TRUNK
11		PISTACIA CHINENSIS / CHINESE PISTACHE	B & B	3" CAL	12'-15" HT CANOPY BUFFER & PARKING LOT TREE
2		PRUNUS X 'OKAME' / OKAME FLOWERING CHERRY	B & B	2.5" CAL	10'-12" HT UNDERSTORY BUFFER TREE
11		TAXODIUM DISTICHUM / BALD CYPRESS	B & B	2.5" CAL	12'-15" HT CANOPY BUFFER TREE
<b>EVERGREEN TREES</b>					
QTY	BOTANICAL / COMMON NAME	CONT.	SIZE	REMARKS	
4	CRYPTOMERIA JAPONICA 'YOSHINO' / YOSHINO CRYPTOMERIA	B & B	2" CAL	10'-12" HT CANOPY BUFFER TREE, FULL TO GROUND, DENSE, BUSHY, EVERGREEN	
9	MAGNOLIA GRANDIFLORA 'LITTLE GEM' / LITTLE GEM DWARF SOUTHERN MAGNOLIA	B & B	2.5" CAL	12'-15" HT UNDERSTORY BUFFER TREE	
9	QUERCUS PHellos / WILLOW OAK	B & B	3" CAL	12'-15" HT CANOPY STREET & BUFFER TREE	
11	ULMUS PARVIFOLIA 'DRAKE' / DRAKE ELM	B & B	3" CAL	12'-15" HT SINGLE TRUNK, TRAINED TO CENTRAL LEADER, EVERGREEN	

SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	REMARKS
10		CLETHRA ALNIFOLIA 'COMPACTA' / COMPACT SUMMERSWEET	5 GAL		
25		HYDRANGEA PANICULATA 'LIMELIGHT' TM / LIMELIGHT HYDRANGEA	10 GAL	3'-4'	TREE FORM SINGLE TRUNK
<b>EVERGREEN SHRUBS</b>					
QTY	BOTANICAL / COMMON NAME	SIZE	HEIGHT	REMARKS	
42	ABELIA X GRANDIFLORA / GLOSSY ABELIA	7 GAL	30" MIN.	WELL ROOTED, FULL TO GROUND, EVERGREEN	
15	AZALEA KURUME HYBRID 'CORAL BELLS' / KURUME AZALEA	5 GAL	30" MIN.		
42	DISTYLIMUM MYRICOIDES BLUE LEAF ISU / DISTYLIMUM	5 GAL	18" MIN.		
18	ILEX CASSINE / DAHOON HOLLY	B & B	6" MIN.	WELL ROOTED, FULL TO GROUND, EVERGREEN	
258	LEX CORNUTA 'BURFORDI NANK' / DWARF BURFORD HOLLY	7 GAL	30" MIN.	WELL ROOTED, FULL TO GROUND, EVERGREEN	
22	MAHONIA BEALEI / LEATHERLEAF MAHONIA	7 GAL	4'-5'	WELL ROOTED, FULL TO GROUND, EVERGREEN	
79	RHAPHOLEPIS INDICA 'BALLERINA PINK DANCER' / INDIAN HAWTHORNE	5 GAL	24"-30" HT. MIN.	WELL ROOTED, FULL TO GROUND	
32	RHODODENDRON CAROLINIANUM / CAROLINA RHODODENDRON	7 GAL	4'-5'	EVERGREEN	
59	VIBURNUM X BURKWOODII 'CONOY' / CONOY VIBURNUM	10 GAL	42" MIN.		

**VEGETATED SHELF SCHEDULE**

GROUND COVERS	QTY	BOTANICAL / COMMON NAME	CONT.	REMARKS
	230	ANNUAL COLOR / ANNUAL COLOR	4" POT	
	9,385 SF	CYNODON DACTYLON 'TIF 419' / BERMUDA GRASS	500	CERTIFIED PURE, WEED FREE
	82	HEMEROCALLIS X 'HAPPY RETURNS' / HAPPY RETURNS DAYLILY	1 GAL	
	225	JUNIPERUS CONFERTA / SHORE JUNIPER	1 GAL	
	920	LIRIOPE MUSCARI 'BIG BLUE' / BIG BLUE LILYTURF	4" POT	
	114	PANICUM VIRGATUM 'SHENANDOAH' / SWITCH GRASS	5 GAL	
	10,597 SF	SEED MIX / SEED MIX	SEED	

**811**  
Know what's below.  
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**PLANTING NOTES**

- LANDSCAPE PLANS ARE FOR THE LOCATION AND IDENTIFICATION OF PLANT MATERIAL ONLY. NO OTHER WORK IS TO BE PERFORMED BASED ON THESE PLANS.
- QUANTITIES ON THE PLANT SCHEDULE ARE PROVIDED FOR CONVENIENCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS/HER OWN QUANTITY CALCULATIONS. IN THE EVENT OF A DISCREPANCY BETWEEN THE LANDSCAPE PLANS AND THE PLANT SCHEDULE, THE LANDSCAPE PLAN WILL TAKE PRECEDENCE. THE CONTRACTOR SHALL INFORM THE LANDSCAPE ARCHITECT IMMEDIATELY UPON DISCOVERING ANY QUANTITY DISCREPANCIES.
- THE CONTRACTOR SHALL NOT CHANGE OR SUBSTITUTE PLANT VARIETIES OR SPECIES WITHOUT PRIOR WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT.
- CONTRACTOR SHALL TAKE 3 REPRESENTATIVE SOIL SAMPLES OF EACH PROPOSED PLANT BED AND SUBMIT COPIES OF THE RESULTS TO THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING WORK.
- CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE OF ALL PLANTING HOLES AND PLANT BEDS PRIOR TO INSTALLATION.
- STUMPS LABELED FOR REMOVAL SHALL BE EXCAVATED, NOT GROUND. REMOVE ANY DEBRIS FROM THE HOLE, FILL WITH TOP SOIL, COMPACT AND RAKE SMOOTH PRIOR TO INSTALLING NEW PLANT MATERIAL.
- TOPSOIL WILL NOT BE STOCKPILED FOR RE-USE IN LANDSCAPE WORK. CONTRACTOR SHALL IMPORT TOPSOIL AS REQUIRED TO COMPLETE LANDSCAPE WORK.

PROVIDE NEW TOPSOIL THAT IS FERTILE, FRIABLE, NATURAL LOAM, SURFACE SOIL, REASONABLY FREE OF ROOTS, STUMPS AND LARGE STONES AND FREE OF BRUSH, WEEDS, LITTER, AND OTHER EXTRANEOUS OR TOXIC MATTER HARMFUL TO PLANT GROWTH.

OBTAIN TOPSOIL FROM LOCAL SOURCES OR FROM AREAS HAVING SIMILAR SOIL CHARACTERISTICS TO THAT FOUND AT PROJECT SITE. OBTAIN TOPSOIL ONLY FROM NATURALLY, WELL DRAINED SITES WHERE TOPSOIL OCCURS IN A DEPTH OF NOT LESS THAN 4 INCHES. DO NOT OBTAIN FROM BOGS OR MARSHES. PLANT MATERIAL SHALL BE PLACED AS SHOWN ON THE LANDSCAPE PLANS.

- PLANTING SOIL MIX** FOR TREES, SHRUBS, AND GROUNDCOVERS SHALL CONSIST OF THE FOLLOWING:

- 80% TOPSOIL
- 20% PREPARED ADDITIVES (BY VOLUME AS FOLLOWS):
  - 3 PARTS - ORGANIC SOIL CONDITIONER (NATURE'S HELPER OR EQUAL)
  - 1 PART - STERILIZED COW MANURE (OR EQUAL)
  - COMMERCIALY AVAILABLE STARTER FERTILIZER @ RATES SPECIFIED BY MANUFACTURER
  - LIME (AS RECOMMENDED IN SOIL ANALYSIS)

- QUALITY OF PLANT MATERIAL:** ALL PLANTS SHALL CONFORM TO THE CURRENT VERSION OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1).

PLANT MATERIAL SHALL BE FREE OF DISEASE AND/OR INSECTS, AND SHALL HAVE A HEALTHY ROOT SYSTEM WITH NO CIRCLING OR KINKED ROOTS. CONTAINER PLANTS SHALL NOT BE ROOT BOUND. PLANT MATERIAL SHALL CONFORM TO THE CURRENT STANDARDS OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-2004).

TREES SHALL HAVE STRAIGHT TRUNKS, DENSE CANOPIES AND STRONG BRANCHING WITH GOOD CROTCH ANGLES. CONTRACTOR SHALL SUBMIT GRADE PHOTOS OF EACH TREE TO LANDSCAPE ARCHITECT PRIOR TO DELIVERY.

ALL PLANT MATERIAL SHALL BE SUFFICIENTLY WATERED TO WET THE ENTIRE ROOT BALL WITHIN TWO HOURS OF PLANTING.

- INSPECTION AND APPROVAL OF PLANT MATERIAL:** ALL PLANT MATERIAL SHALL BE INSPECTED AND APPROVED BY THE LANDSCAPE ARCHITECT UPON DELIVERY TO THE SITE, PRIOR TO INSTALLATION. CONTRACTOR SHALL GIVE LANDSCAPE ARCHITECT AT LEAST ONE WEEK NOTICE PRIOR TO PLANT DELIVERY.

- NEW SHRUB AND GROUNDCOVER PLANTING SHALL BE A MINIMUM OF 36" AWAY FROM EXISTING TREES.

- CONTRACTOR SHALL REMOVE ALL PLANT TAGS AFTER APPROVAL OF PLANT INSTALLATION BY LANDSCAPE ARCHITECT

- MULCH ALL PLANT BEDS AND TREE RINGS WITH FRESH, CLEAN HARDWOOD MULCH TO A MINIMUM DEPTH OF THREE (3) INCHES OVER COMMERCIAL GRADE WEED BARRIER. PRIOR TO MULCHING APPLY PRE-EMERGENT HERBICIDE AS RECOMMENDED BY MANUFACTURER. DO NOT PILE MULCH AROUND THE BASE OF PLANTS OR TREE TRUNKS. ALL MULCH EDGES SHALL BE NEAT. DUST SHRUBS AND GROUND COVER AFTER MULCHING TO REMOVE LOOSE MULCH FROM THE PLANTS.

- BED PREPARATION FOR SOD INSTALLATION:** REMOVE EXISTING VEGETATION WITHIN THE APPROVED BEDLINE. IF THE EXISTING SOIL IS COMPACTED OR OTHERWISE UNSUITABLE FOR PLANTING, REMOVE THE TOP 4 INCHES OF SOIL. TILL SUBGRADE TO A MINIMUM DEPTH OF 6 INCHES. REMOVE LARGE STONES, STICKS, ROOTS, RUBBISH, AND OTHER EXTRANEOUS MATERIAL.

SPREAD 2 INCHES OF TOPSOIL OVER THE PREPARED BED AND TILL INTO THE TOP 4 INCHES OF LOOSENEED SUBGRADE. SPREAD THE REMAINING 2 INCHES OF TOPSOIL, RAKE SMOOTH AND ROLL COMPACT. BEDS SHALL BE FINISHED WITH A SLIGHT CROWN AT THE CENTER TO ALLOW WATER TO SHEET FLOW TO THE SIDES.

WATER THE BED IMMEDIATELY BEFORE LAYING THE SOD SO THAT THE TOP INCH OF SOIL IS MOIST. ALLOW WATER TO PERCOLATE SO THERE IS NO STANDING WATER. LIMIT PREPARATION TO AREAS THAT WILL BE SODDED THAT SAME DAY.

- MAINTENANCE:** CONTRACTOR SHALL MAINTAIN ALL PLANT MATERIAL FROM THE TIME IT IS INSTALLED UNTIL FINAL ACCEPTANCE OR WHEN THE OWNER TAKES OVER MAINTENANCE, WHICHEVER OCCURS FIRST. MAINTENANCE SHALL INCLUDE BUT NOT BE LIMITED TO MOWING, EDGING, WEEDING, WATERING, PRUNING, FERTILIZING, ETC.

- WARRANTY:** CONTRACTOR SHALL PROVIDE A ONE-YEAR WARRANTY ON ALL PLANT MATERIAL AND LABOR. WARRANTY PERIOD SHALL BEGIN UPON FINAL COMPLETION OR WHEN THE OWNER TAKES OVER MAINTENANCE, WHICHEVER OCCURS FIRST.

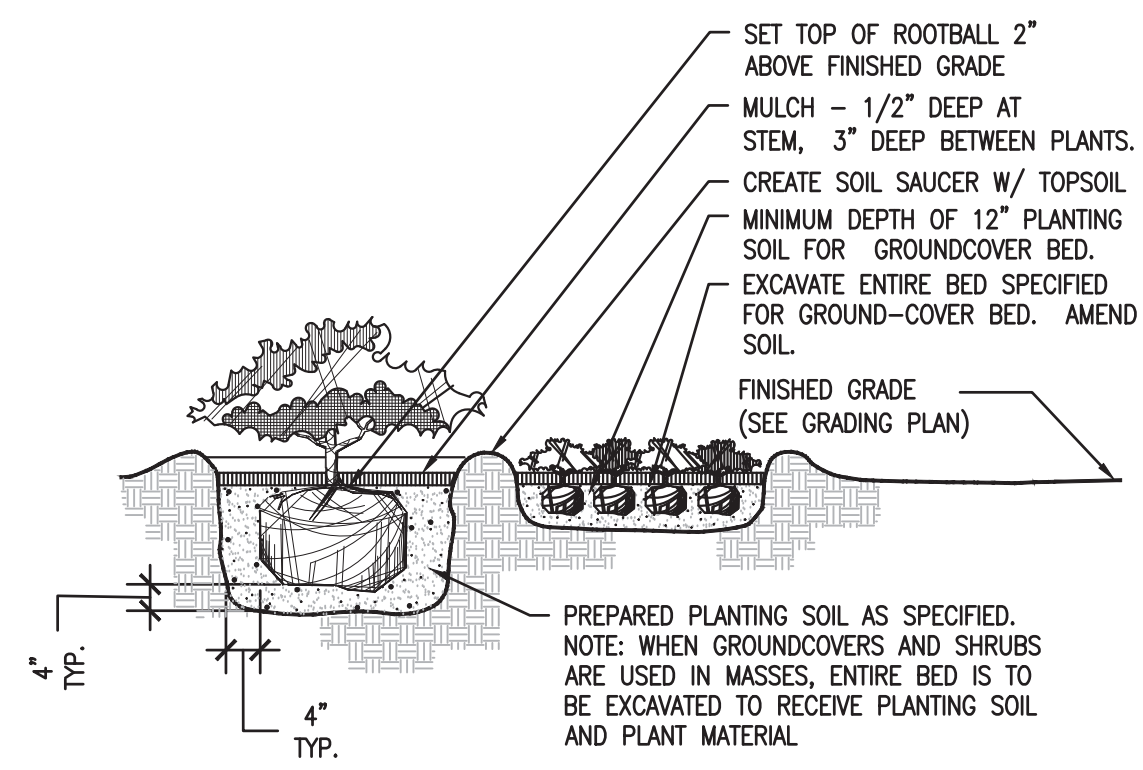
THE CONTRACTOR SHALL MAKE PERIODIC INSPECTIONS OF THE PROJECT DURING THE WARRANTY PERIOD TO ENSURE THAT THE ESTABLISHMENT RATE OF GROWTH IS ADEQUATE. ANY METHODS OR PRODUCTS DEEMED NOT NORMAL OR DETRIMENTAL TO GOOD PLANT GROWTH SHALL BE REPORTED TO THE LANDSCAPE ARCHITECT IN WRITING. FAILURE TO INSPECT AND REPORT WILL BE INTERPRETED AS APPROVAL, AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL REPLACEMENTS.

**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: Samuel A. MacDonell DATE: \_\_\_\_\_  
TOWN ENGINEER

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

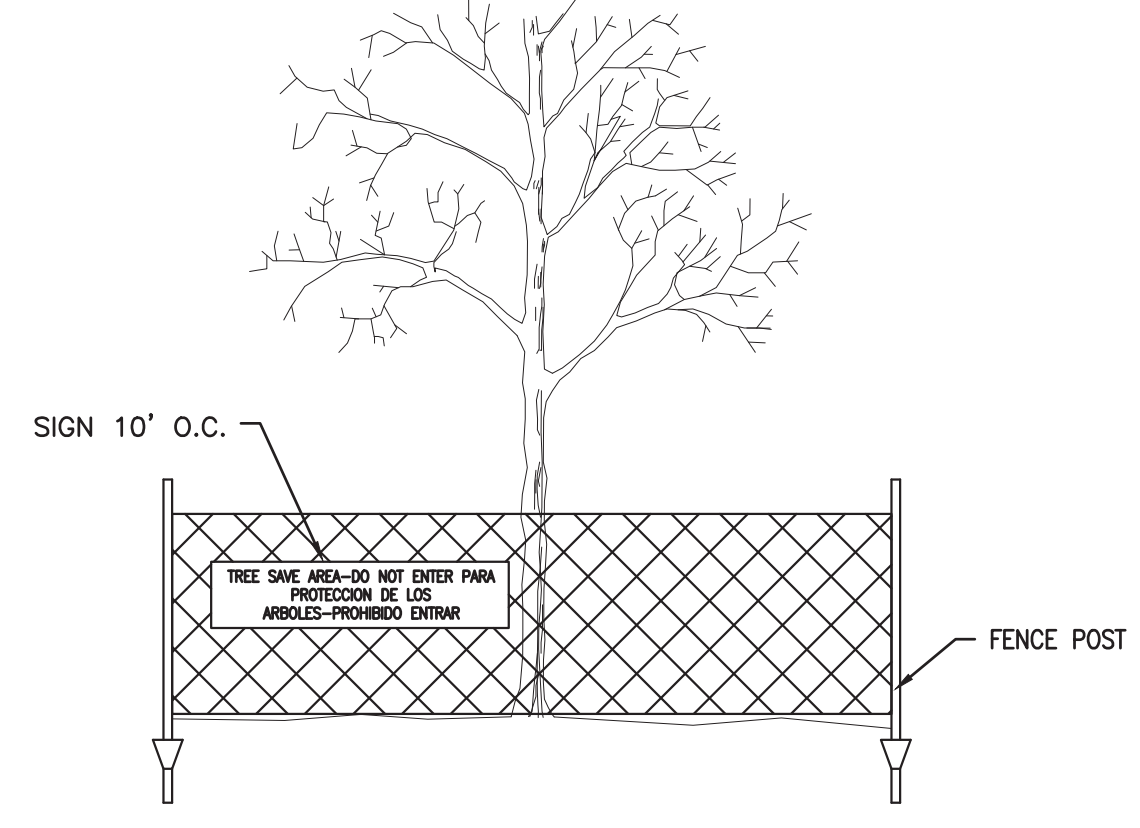
By: \_\_\_\_\_ DATE: \_\_\_\_\_  
ADMINISTRATOR



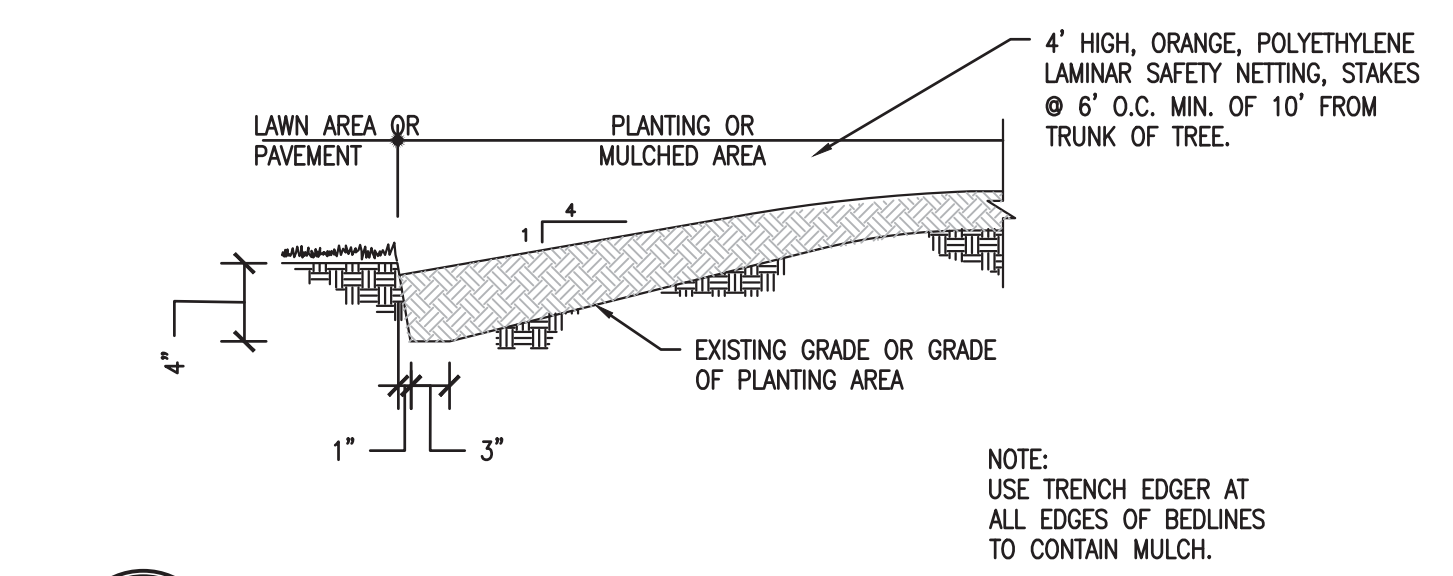
**1 SHRUB PLANTING**  
SCALE: NTS

**TREE PROTECTION NOTES:**

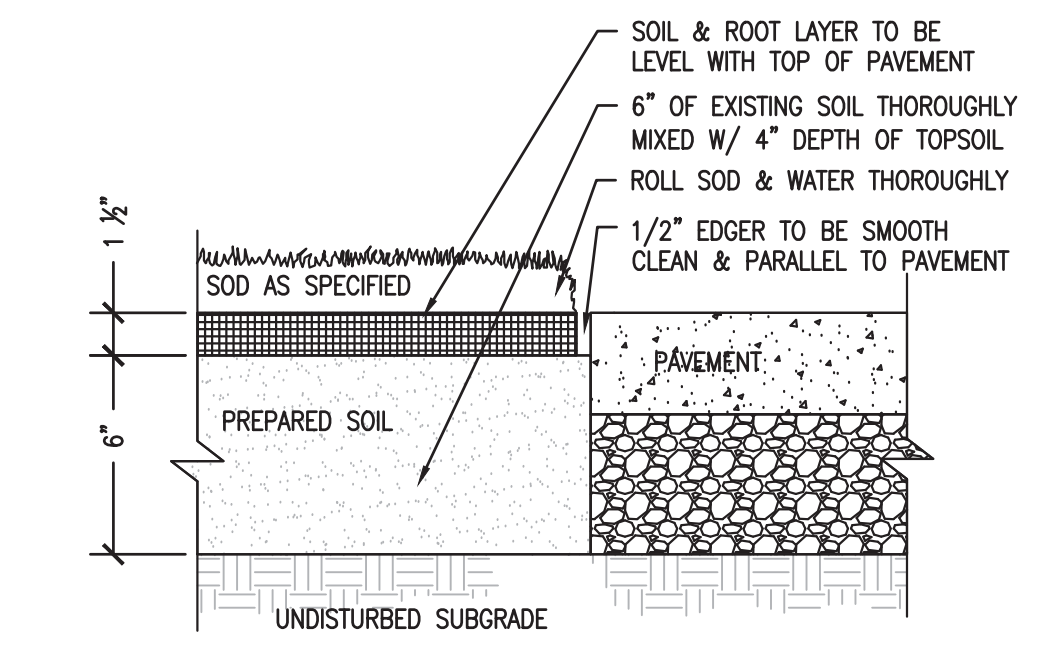
- ALL TREES SHOWN ON THIS PLAN TO BE RETAINED SHALL BE PROTECTED DURING ALL PHASES OF DEMOLITION/CONSTRUCTION WITH TEMPORARY FENCING. IT SHALL BE THE GENERAL CONTRACTORS RESPONSIBILITY TO COORDINATE WITH LANDSCAPE CONTRACTOR.
- TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING OR GRADING). CLEARING SHALL BE DONE BY HAND.
- ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED WITH A CLEAN CUT FLUSH WITH THE SOIL. BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL IMMEDIATELY. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN 2 DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION.
- PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIP LINES, MAKE A CLEAN CUT BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH A ROCK SAW OR SIMILAR EQUIPMENT TO MINIMIZE DAMAGE TO REMAINING ROOTS.
- TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES SHOULD BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS SHOULD BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.
- DAMAGE TO TREES OR ANY NATURAL RESOURCE DUE TO CONTRACTOR'S NEGLIGENCE DURING THE CONSTRUCTION PHASE SHALL BE APPRAISED BY THE OWNERS REPRESENTATIVE AND ORDERED REPAIRED, REPLACED, OR COMPENSATED.



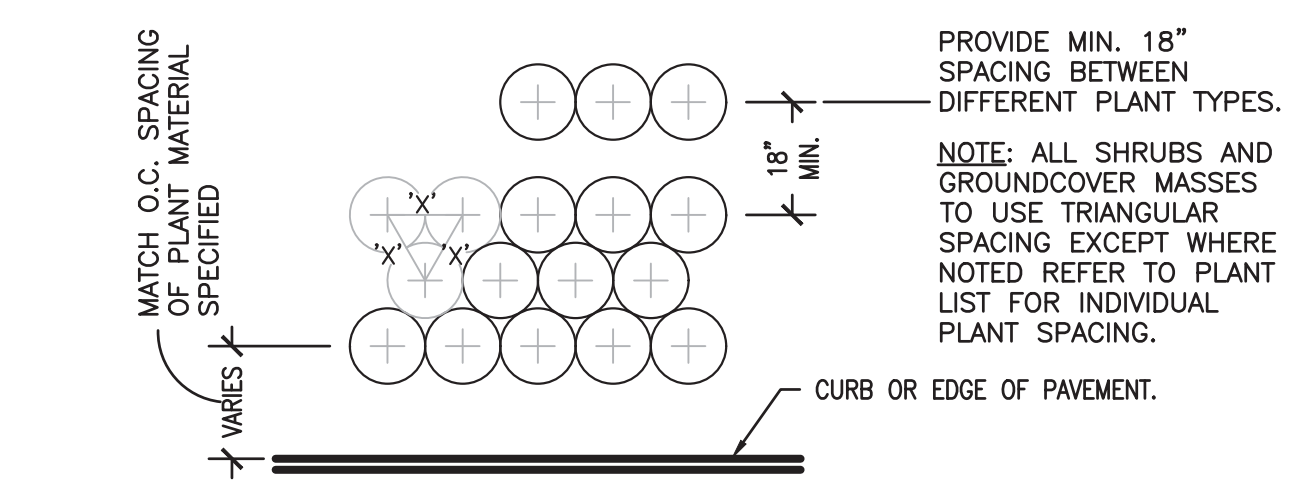
**2 TREE PROTECTION DETAIL**  
SCALE: NTS



**3 TRENCH EDGER**  
SCALE: NTS



**4 SOD EDGE DETAIL**  
SCALE: NTS



**5 TYP. PLANT SPACING**  
SCALE: NTS

**NOTES:**

- REMOVE WIRE OR NYLON TWINE FROM BALL.
- SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION.
- FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL, SUB-BASE, AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.
- REMOVE COMPACTED SOIL AND ADD 24" NEW TOPSOIL WITH PLANT MIX OR UNCOMPACT AND AMEND TO 24" OF EXISTING SOIL TO MEET TOPSOIL WITH PLANTING MIX STANDARDS FOR TREES.
- MULCH SHALL NOT BE STACKED AGAINST BASE OF PLANTING.

**NOTES:**

- 300 SF MIN. TOTAL REQUIRED AREA PER TREE.
- FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL, SUB-BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.
- REMOVE COMPACTED SOIL AND ADD 24" NEW OR TOPSOIL/PLANTING MIX OR UNCOMPACT AND AMEND TOP 24" OF EXISTING SOIL TO MEET TOPSOIL/PLANTING MIX STANDARDS FOR TREES.

**NOTES:**

- REMOVE TYPICAL EXCESS SOIL FROM BROWER OVER ROOT SYSTEM UP TO 1" DEPTH. REJECT PLANTS WITH MORE THAN 3".
- REMOVE TOP 1/2 BURGLAP AND ANY MULCHING, ETC.
- REMOVE TOP 2/3 OF WIRE MESH WHERE PRESENT.
- RAISE PIT BOTTOM TO SET BUTTRESS ROOTS AT THE CORRECT HEIGHT. FIRM SOIL UNDER ROOT BALL.

ALL TREES SHALL MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI, 1990, PART 1, "SHADE AND FLOWERING TREES")

FOR EXAMPLE:	CALIPER	HEIGHT (RANGE)	MAX. HEIGHT	MIN. ROOT BALL DIA.	MIN. ROOT BALL DEPTH
	2"	12'-14'	16'	16"	16"
	3"	14'-16'	18'	24"	21"

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**ISSUE/REVISION RECORD**

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10/28/21	PERMIT SET
02/25/22	CIP COMMENT RESPONSE
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09/14/22	CIP COMMENT RESPONSE / LDP COMMENT RESPONSE / ADDENDUM 1

**PROFESSIONAL SEAL**

10/03/2022

**PROFESSIONAL IN CHARGE**  
FRED A. MADDOX  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
FRED A. MADDOX

**PROJECT**  
**PANERA BREAD**  
**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD.**

**CLIENT**

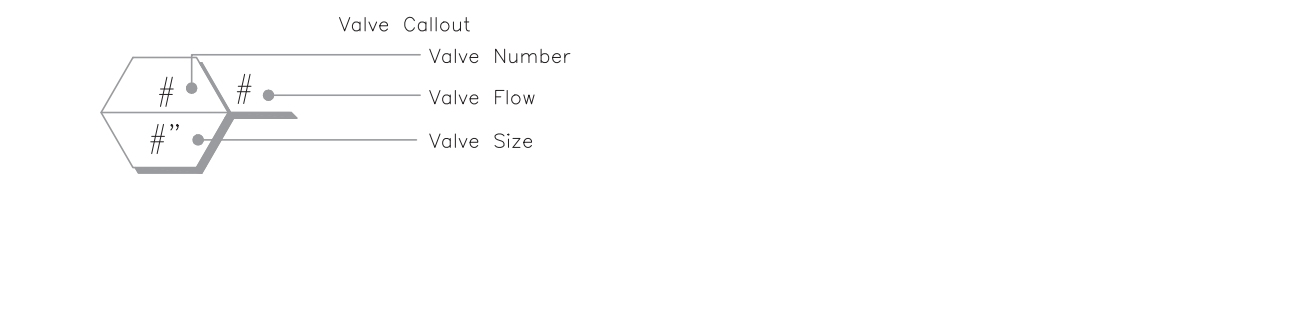
**PROJECT NUMBER**  
20211261

**SHEET TITLE**  
**LANDSCAPE DETAILS**

**SHEET NUMBER**  
**L-1.1**

**IRRIGATION SCHEDULE**

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
EST LCS RCS CST SST	RAIN BIRD 1806-U-SAM-PRS 15 STRIP SERIES TURF SPRAY 6" POP-UP SPRINKLER WITH CO-MOLDED WIPER SEAL 1/2" NPT FEMALE THREADED INLET. WITH SEAL-A-MATIC CHECK VALVE, AND PRESSURE REGULATING.	
08HE-VAN 12HE-VAN 10HE-VAN 15HE-VAN	RAIN BIRD 1806-U-SAM-PRS HE-VAN SERIES TURF SPRAY 6" POP-UP SPRINKLER WITH CO-MOLDED WIPER SEAL 1/2" NPT FEMALE THREADED INLET. WITH SEAL-A-MATIC CHECK VALVE, AND PRESSURE REGULATING.	
1401 1402 1404 1408	RAIN BIRD 1802-1400 FLOOD 1401 FLOOD BUBBLER 2.0" POPUP	
	RAIN BIRD XCZ-LF-100-PRF LOW FLOW DRIP CONTROL KIT, 1" LOW FLOW VALVE, 3/4" PRESSURE REGULATING RBY FILTER, AND 50PSI PRESSURE REGULATOR. 0.2GPM-5GPM.	10
	PIPE TRANSITION POINT IN DRIP BOX PIPE TRANSITION POINT FROM PVC LATERAL TO DRIP TUBING WITH RISER IN 6" (150MM) DRIP BOX.	20
	AREA TO RECEIVE DRIP EMITTERS RAIN BIRD XB-PC-1032 SINGLE OUTLET, PRESSURE COMPENSATING DRIP EMITTERS. FLOW RATES: 0.5GPH=BLUE, 1.0GPH=BLACK, AND 2.0GPH=RED. COMES WITH A 10-32 THREADED INLET X BARB OUTLET. Emitter Notes: 20PC1032 emitters (1 assigned to each 5 gal plant) 05PC1032 emitters (1 assigned to each 4" pot plant) 05PC1032 emitters (1 assigned to each 1 gal plant) 05PC1032 emitters (1 assigned to each 3 gal plant) 05PC1032 emitters (2 assigned to each 7 gal plant) 05PC1032 emitters (1 assigned to each B & B, 6' MIN. plant)	10,258 S.F.
	RAIN BIRD PEB 1" 1-1/2" 2" PLASTIC INDUSTRIAL VALVES. LOW FLOW OPERATING CAPABILITY, GLOBE CONFIGURATION.	
	RAIN BIRD PEB 1" 1" 1-1/2" 2" PLASTIC INDUSTRIAL VALVES. LOW FLOW OPERATING CAPABILITY, GLOBE CONFIGURATION.	
	WATTS U009 1" REDUCED PRESSURE BACKFLOW PREVENTER	
	RAIN BIRD ESPBLXMEF WITH (02) ESPLXSM4 16 STATION COMMERCIAL CONTROLLER. MOUNTED ON A PLASTIC WALL MOUNT. FLOW SENSING AND WATER MANAGEMENT CAPABILITIES.	
	RAIN BIRD WR2-RFC WIRELESS RAIN AND FREEZE SENSOR COMBO, INCLUDES 1 RECEIVER AND 1 RAIN/FREEZE SENSOR TRANSMITTER.	
	CREATIVE SENSOR TECHNOLOGY FSI-T15-001 1.5" (40MM) PVC TEE TYPE FLOW SENSOR W/SOCKET ENDS. CUSTOM MOUNTING TEE AND ULTRA LIGHTWEIGHT IMPELLER ENHANCES LOW FLOW MEASUREMENT 2 WIRE DIGITAL OUTPUT COMPATIBLE W/ALL IRRIGATION CONTROLLERS. FLOW RANGE 1.8-108 GPM.	
	WATER METER 1" REFER TO CIVIL PLANS	
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21	
	IRRIGATION MAINLINE: PVC SCHEDULE 40	
	PIPE SLEEVE: PVC SCHEDULE 40	



**GENERAL IRRIGATION NOTES**

- THE SYSTEM SHALL BE DESIGNED TO PROVIDE 100% COVERAGE. ANY CHANGES MADE IN THE LAYOUT DUE TO FIELD CONDITIONS SHALL BE IN ACCORDANCE WITH THESE STANDARDS.
- VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF IRRIGATION SYSTEM. ALL UTILITIES AND STRUCTURES MAY NOT BE SHOWN ON THESE PLANS. CONTRACTOR SHALL FIELD VERIFY.
- CONTRACTOR TO FIELD VERIFY ALL POINT OF CONNECTION SOURCE INFORMATION INCLUDING PSI AND GPM PRIOR TO CONSTRUCTION.
- INSTALLATION OF WORK SHALL BE COORDINATED WITH OTHER CONTRACTORS IN SUCH A MANNER AS TO ALLOW FOR A SPEEDY AND ORDERLY COMPLETION OF ALL WORK ON SITE.
- IRRIGATION DESIGN IS SCHEMATIC ONLY. FULL AND COMPLETE SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW AND BY THE OWNERS REPRESENTATIVE.
- CONTRACTOR SHALL COORDINATE WITH THE PLANTING PLAN FOR PLANTER BED AND TREE LOCATIONS TO ENSURE ALL PLANT MATERIAL IS COVERED BY 100% HEAD TO HEAD COVERAGE.
- CONTRACTOR SHALL PROVIDE "AS-BUILT" DRAWINGS OF THE FINAL INSTALLATION TO OWNER AT SUBSTANTIAL COMPLETION BEFORE FINAL PAYMENT.
- IRRIGATION CONTRACTOR TO PROVIDE POWER SUPPLY TO ELECTRIC CONTROLLERS.
- IRRIGATION CONTRACTOR SHALL SECURE ANY AND ALL NECESSARY PERMITS FOR WORK PRIOR TO COMMENCEMENT OF THEIR OPERATIONS ON-SITE. COPIES OF THE PERMITS SHALL BE SENT TO OWNER/GENERAL CONTRACTOR. WORK IN THE R.O.W. SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF LOCAL AND STATE JURISDICTIONS.
- IRRIGATION SYSTEM SHALL NOT BE INSTALLED THROUGH PRESERVED PLANT COMMUNITIES OR WITHIN WETLANDS OR THEIR ASSOCIATED BUFFERS.
- IN AN EFFORT TO CREATE GRAPHIC CLARITY, IRRIGATION MAINLINE, LATERAL LINE, VALVES AND OTHER COMPONENTS OF THE IRRIGATION SYSTEM MAY BE SHOWN IN PAVED AREAS OR INSIDE BUILDINGS ON THE PLANS. THESE COMPONENTS ARE TO BE INSTALLED IN APPROPRIATE LANDSCAPE AREAS TO CARRY OUT THE INTENT OF THE PLANS.
- MAINLINE SHALL NOT BE LOCATED WITHOUT PRIOR APPROVAL OF THE OWNERS REPRESENTATIVE.
- CONTRACTOR TO COORDINATE LOCATION OF ALL METERS AND BACKFLOW

**ASSEMBLIES WITH OWNERS REPRESENTATIVE.**

- THE IRRIGATION CONTRACTOR SHALL BE DIRECTLY RESPONSIBLE FOR SLEEVING AND DIRECTIONAL BORES.
- ALL SLEEVES UTILIZED BY THE IRRIGATION CONTRACTOR WHETHER INSTALLED BY THEM OR NOT, SHALL BE LOCATED IN THE AS-BUILT DRAWINGS. THE DEPTH BELOW FINISH GRADE, THE NEAREST FOOT OF EACH END OF THE SLEEVE SHALL BE NOTED AT EACH SLEEVE LOCATION ON THE AS-BUILT DRAWINGS. ALL SLEEVES ON THE PLAN FOR WALL PENETRATIONS AND UNDER SIDEWALKS SHALL BE SIZED TO PIPE SIZES GREATER THE THE PIPE IT CARRIES.
- ALL PRESSURIZED MAINLINES AND LATERALS UNDER PAVEMENT SHALL BE WITHIN SLEEVES A NOTED. WHERE ELECTRIC AND HYDRAULIC VALVE CONTROL LINES PASS THROUGH A SLEEVE WITH OTHER MAIN AND LATERAL LINES THEY SHALL BE CONTAINED WITHIN A SEPARATE, SMALLER CONDUIT.
- SLEEVES UNDER EXISTING PAVEMENT MUST BE DIRECTIONAL BORE. OPEN CUT IS NOT AN OPTION.
- NUMBER THE TOP OF ALL VALVE BOX LIDS WITH MINIMUM 1" HEIGHT BLACK LETTERS TO CORRESPOND TO AUTOMATIC AND GATE VALVE DESIGNATIONS. ALL HOSE BIBB VALVE BOXES SHALL BE LABELLED IN A SIMILAR MANNER WITH THE DESIGNATION "H". LETTER OUTSIDE OF TIME CLOCK CABINETS TO CORRESPOND WITH IRRIGATION CLOCK PROGRAM DESIGNATION.
- THE IRRIGATION CONTRACTOR SHALL INSTALL A COLOR CODED METAL DETECTABLE MARKING TAPE WHICH CLEARLY NOTES: CAUTION: IRRIGATION LINE BURIED BELOW. THE TAPE SHALL BE INSTALLED THE FULL LENGTH OF THE IRRIGATION MAINLINE.
- ALL VALVES, SPLICES WITHIN CONTROL LINES, AND QUICK COUPLERS SHALL BE LOCATED WITHIN HOSE VALVE BOXES AS FOLLOWS: RECTANGULAR 12"X17" HEAVY DUTY BOX. (PURPLE COVER FOR REUSE TO BE PROVIDED WHERE APPROPRIATE)
- EACH TREE AND PALM (AS SHOWN ON THE PLANS) SHALL HAVE TWO FLOOD BUBBLERS. SUCH EMITTERS SHALL BE IN MINIMUM 5' LENGTH OF FLEXIBLE PIPE TO ALLOW FOR POSITIONING AT THE TREE OR PALM. LOCATE BUBBLER ON THE UPHILL SIDE OF TREE OR PALM ON ALL SLOPES.
- ALL IRRIGATION HEADS/DRIP TUBING SHALL BE LOCATED ONE FOOT FROM BACK OF CURB WHEN NEXT TO A ROADWAY. (THIS SHALL NOT INCLUDE PARKING AREAS OR DRIVE AISLES).
- LOCATE ALL VALVES ON PLANTING BEDS WITH A MINIMUM OF 3 FEET FROM BACK OF CURB OR EDGE OF PAVEMENT, UNLESS OTHERWISE NOTED. PIPE SIZES ON EITHER SIDE OF SECTION VALVES CONNECTING MAINLINE TO SECTION LATERAL SHALL BE ONE PIPE SIZE LARGER THAN VALVE SIZE.

**WHERE MAINLINES RUN PARALLEL TO PAVEMENT AND CURBING, THE MAINLINE SHALL BE OFFSET 2 FEET FROM THE EDGE OF PAVEMENT OR CURB.**

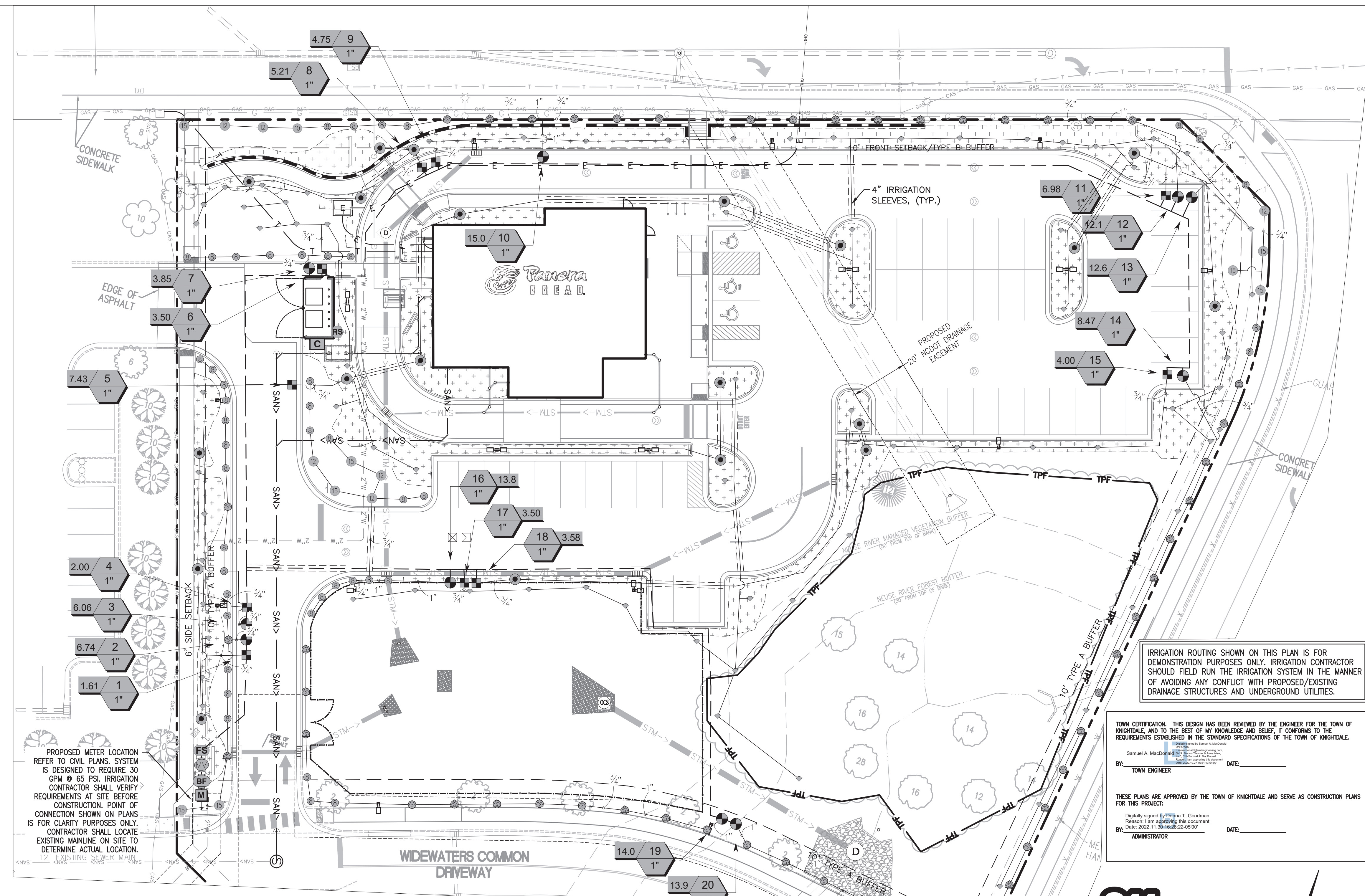
- IRRIGATION ZONES SHALL BE SEPARATED FOR HIGH AND LOW WATER USE REQUIREMENTS AND OPERATED ON DIFFERENT WATERING CYCLES. BUBBLERS, DRIPLINE, AND SPRAY HEADS SHALL BE SEPARATED ON DIFFERENT VALVES. AT NO TIME SHALL MULTIPLE IRRIGATION HEAD TYPES BE LOCATED ON THE SAME VALVE.
- ALL DRIP ZONES SHALL BE INSTALLED WITH A FLUSH VALVE AND AIR RELIEF VALVE. IN THE EVENT THAT A DRIP ZONE HAS MORE THAN ONE HIGH OR LOW POINT, MORE THAN ONE AIR RELIEF VALVE OF FLUSH VALVE WILL BE REQUIRED FOR THAT ZONE. DRIPLINE SHALL PROVIDE 0.5GPH EMITTERS, 18" O.C. WITH 18" LINE SPACING AT A MINIMUM.
- IRRIGATION CONTRACTOR TO COORDINATE WITH OWNER FOR FINAL CONTROLLER AND RAIN SENSOR LOCATIONS. THE CONTROLLER SHALL BE PLACED IN A LOCKING CABINET APPROPRIATE FOR ITS LOCATION. (INDOOR VS. OUTDOOR USE)
- LOCATE THE AUTOMATIC RAIN SENSOR SHUTOFF DEVICE IN AN AREA THAT IS UNOBSTRUCTED BY TREES, ROOF OVERHANGS, OR ANY OTHER OVERHEAD OBJECT. THE SENSOR SHALL NOT BE PLACED WITHIN THE SPRAY ZONE OF ANY SPRINKLER HEAD, INCLUDING OFF SITE IRRIGATION. CONTRACTOR SHALL LOCATE SENSOR WITHIN CLOSE PROXIMITY TO THE IRRIGATION CONTROLLER.
- CONTRACTOR SHALL PERFORM HYDRO-TESTING OF MAINLINES. HYDRO-TESTING TO BE PERFORMED AS LISTED: THE CONTRACTOR SHALL NOTIFY THE OWNERS REPRESENTATIVE FORTY-EIGHT (48) HOURS IN ADVANCE OF TESTING. PRIOR TO BACKFILLING, CONTRACTOR SHALL FILL PIPING WITH WATER. IN THE PRESENCE OF THE OWNERS REPRESENTATIVE, TAKING CARE TO PURGE THE AIR FROM THE PIPE. A SMALL, HIGH PRESSURE PUMP OR OTHER MEANS OF MAINTAINING A CONTINUOUS WATER SUPPLY SHALL BE CONNECTED TO THE PIPING AND SET AS TO MAINTAIN 125 PSI FOR 2 HOURS WITHOUT INTERRUPTION. CONTRACTOR SHALL MAKE ANY NECESSARY CORRECTIONS AND RETEST THE SYSTEM UNTIL THE OWNERS REPRESENTATIVE IS SATISFIED THAT THE SYSTEM IS REASONABLY SOUND.
- ALL WIRING FOR CONNECTION OF THE VALVES TO THE CONTROLLER SHALL FOLLOW MANUFACTURERS SPECIFICATIONS. IF REQUIRED, ALL WIRING FOR A TWO WIRE PATH SHALL BE WITH RED/BLUE TWISTED PAIR 14 AWG. ELECTRIC CONTROL LINES FROM THE DECODER TO THE SOLENOID VALVES SHALL BE TWISTED PAIR 18 AWG. ALL DECODERS SHALL BE GROUNDED EVERY 1,000 LF OR EVERY 10 DEVICES. ALL WIRE SHALL BE FURNISHED IN MINIMUM 2500' REELS AND SPLICES SHALL BE MINIMIZED. BURY SPLICE KIT, ALL 24 VOLT WIRING SHALL BE DONE IN ACCORDANCE WITH EXISTING CODES. SPLICING SHALL BE IN VALVE BOXES OF CONTROLLERS ONLY. IRRIGATION SYSTEM CONTROL SHALL BE TWO WIRE PATH. CONTRACTOR SHALL FOLLOW ALL MANUFACTURERS REQUIREMENTS FOR THIS INSTALLATION. TWO WIRE SYSTEM

**SHALL HAVE 2-WAY COMMUNICATIONS FIELD PROGRAMMABILITY, STATION SPECIFICATIONS AND INTEGRATED SURGE PROTECTION.**

- ALL CONTROL WIRE SHALL BE INSTALLED IN A 1-1/4" ELECTRICAL CONDUIT.
- CONTRACTOR TO MINIMIZE IRRIGATION OVERTHROW TO IMPERVIOUS AND NATURAL AREAS THROUGH FIELD ADJUSTMENTS TO INDIVIDUAL HEADS.
- ALL UNIMPROVED AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR.
- INSTALL ALL BACKFLOW PREVENTION DEVICES AND ALL PIPING BETWEEN THE POINT OF CONNECTION AND THE BACKFLOW PREVENTER PER LOCAL CODES. FINAL LOCATION DETERMINED BY THE OWNERS REPRESENTATIVE.

**VALVE SCHEDULE**

NUMBER	MODEL	SIZE	TYPE	GPM	HEADS	PIPE	WIRE	DESIGN PSI	FRICTION LOSS	VALVE LOSS	PSI	PSI @ POC	PRECIP
1	RAIN BIRD XCZ-LF-100-PRF	1"	AREA FOR DRIP EMITTERS	1.61	9	110.4	129.9	20	0.04	6.99	27.04	41.1	0.66 in/h
2	RAIN BIRD PEB	1"	TURF SPRAY	6.74	9	97.2	124.4	30	0.46	1.73	32.2		0.97 in/h
3	RAIN BIRD PEB	1"	TURF SPRAY	6.06	10	106.6	118.9	30	0.99	1.72	32.71		1.04 in/h
4	RAIN BIRD XCZ-LF-100-PRF	1"	BUBBLER	2.00	8	132.5	113.0	20	0.07	7.3	27.36	41.48	0.85 in/h
5	RAIN BIRD XCZ-LF-100-PRF	1"	AREA FOR DRIP EMITTERS	7.43	4	415.4	34.3	20	1.3	12	33.3	48.33	0.22 in/h
6	RAIN BIRD PEB	1"	BUBBLER	3.50	14	228.2	102.7	20	0.17	9.08	29.24	43.6	0.85 in/h
7	RAIN BIRD PEB	1"	TURF SPRAY	3.85	7	63.8	98.5	30	0.12	1.58	31.7	46.12	0.74 in/h
8	RAIN BIRD XCZ-LF-100-PRF	1"	AREA FOR DRIP EMITTERS	5.21	8	86.0	164.5	20	0.16	12	32.16	46.88	0.87 in/h
9	RAIN BIRD PEB	1"	BUBBLER	4.75	22	151.5	493.5	30	1.66	11.51	33.17	47.8	0.85 in/h
10	RAIN BIRD PEB	1"	TURF SPRAY	14.96	14	183.1	205.9	30	3.07	2.35	35.42	52.59	1.02 in/h
11	RAIN BIRD XCZ-LF-100-PRF	1"	AREA FOR DRIP EMITTERS	6.98	12	121.6	429.2	20	0.57	12	32.57	48.18	0.87 in/h
12	RAIN BIRD PEB	1"	TURF SPRAY	12.10	10	172.5	434.7	30	3.25	2.03	35.28	52.92	1.69 in/h
13	RAIN BIRD PEB	1"	TURF SPRAY	12.64	11	151.7	441.0	30	1.94	2.09	34.03	51.91	0.98 in/h
14	RAIN BIRD PEB	1"	TURF SPRAY	8.47	7	124.5	493.5	30	2.23	1.77	34.01	50.38	1.57 in/h
15	RAIN BIRD XCZ-LF-100-PRF	1"	BUBBLER	4.00	16	385.0	498.2	20	0.22	10.05	30.27	44.97	0.85 in/h
16	RAIN BIRD PEB	1"	TURF SPRAY	13.82	17	193.4	175.6	30	2.28	12	34.5	50.38	1.29 in/h
17	RAIN BIRD PEB	1"	BUBBLER	3.50	15	376.5	180.5	20	0.36	9.08	29.44	43.77	0.85 in/h
18	RAIN BIRD XCZ-LF-100-PRF	1"	AREA FOR DRIP EMITTERS	3.58	14	175.1	185.0	20	0.1	9.23	29.33	43.68	0.77 in/h
19	RAIN BIRD PEB	1"	TURF SPRAY	14.04	14	204.0	352.5	30	3.88	2.24	36.13	53.26	1.47 in/h
20	RAIN BIRD PEB	1"	TURF SPRAY	13.89	13	180.3	357.8	30	3.81	2.23	36.04	53.16	1.42 in/h
	Common Wire												



IRRIGATION ROUTING SHOWN ON THIS PLAN IS FOR DEMONSTRATION PURPOSES ONLY. IRRIGATION CONTRACTOR SHOULD FIELD RUN THE IRRIGATION SYSTEM IN THE MANNER OF AVOIDING ANY CONFLICT WITH PROPOSED/EXISTING DRAINAGE STRUCTURES AND UNDERGROUND UTILITIES.

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.

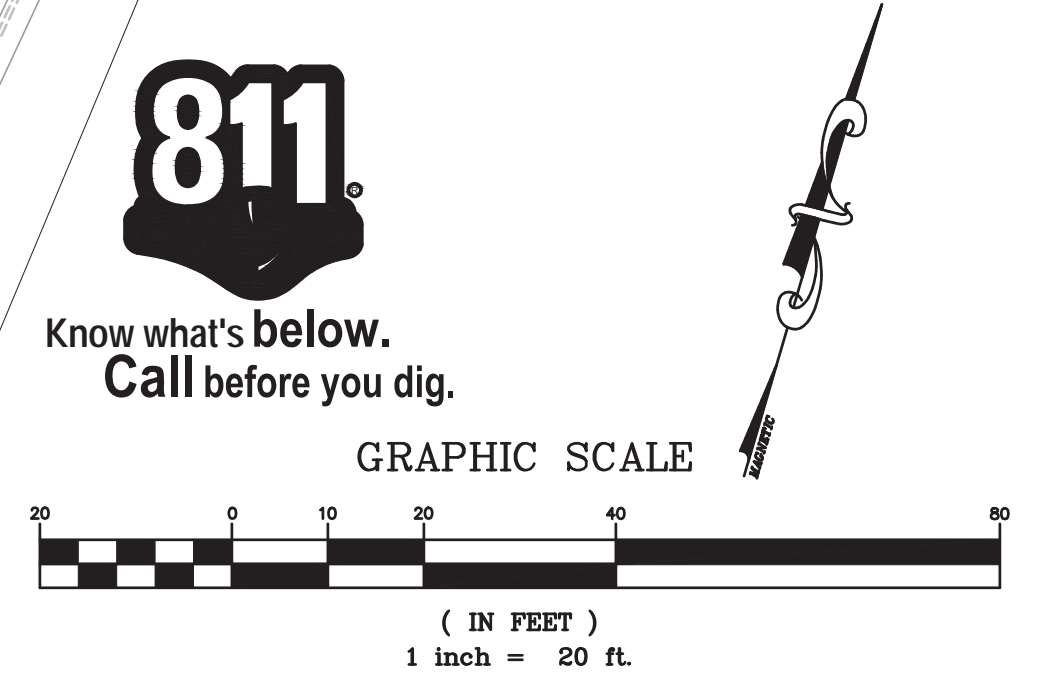
Samuel A. MacDonell  
Professional Engineer  
No. 14717  
Date: 2022.11.30 16:28:22-0507

By: TOWN ENGINEER DATE: \_\_\_\_\_

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

Digitally signed by Dorena T. Goodman  
Reason: I am approving this document  
By: Date: 2022.11.30 16:28:22-0507

ADMINISTRATOR DATE: \_\_\_\_\_

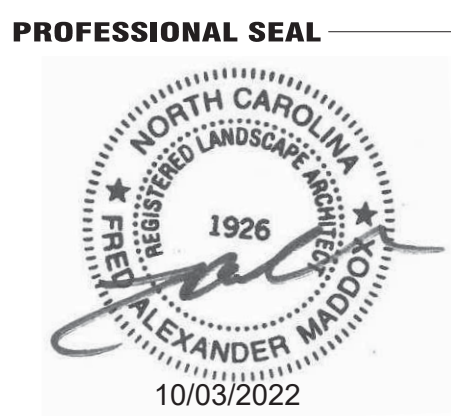


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**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
10/28/21	PERMIT SET
02/25/22	CIP COMMENT RESPONSE
06/10/22	CIP COMMENT RESPONSE
07/22/22	CIP COMMENT RESPONSE / LDP SUBMITTAL
09/14/22	CIP COMMENT RESPONSE / LDP COMMENT RESPONSE
	ADDENDUM 1



**PROFESSIONAL IN CHARGE**  
FRED A. MADDOX  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
FRED A. MADDOX

**PROJECT**  
**PANERA BREAD**

**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD.**

**CLIENT**

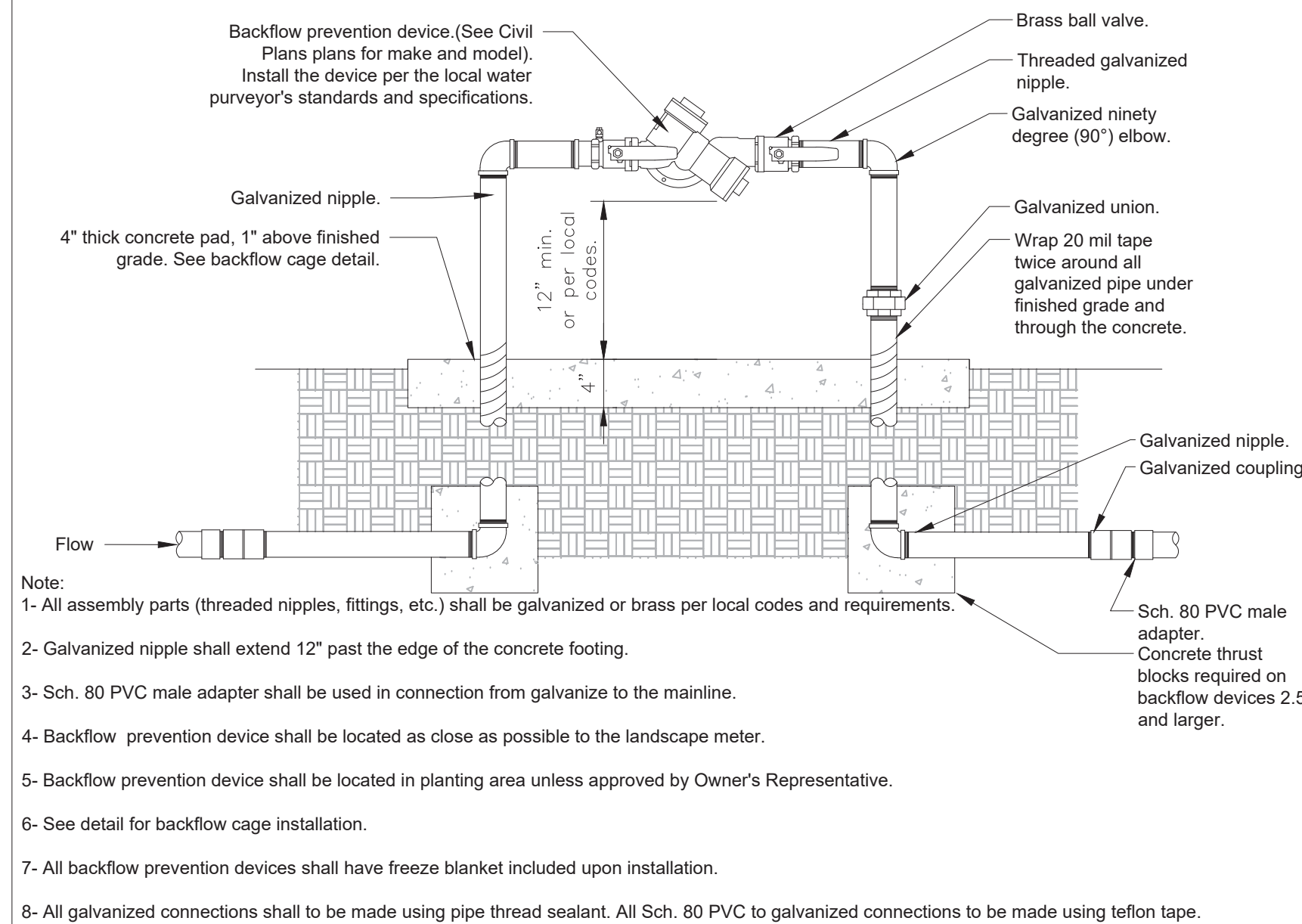


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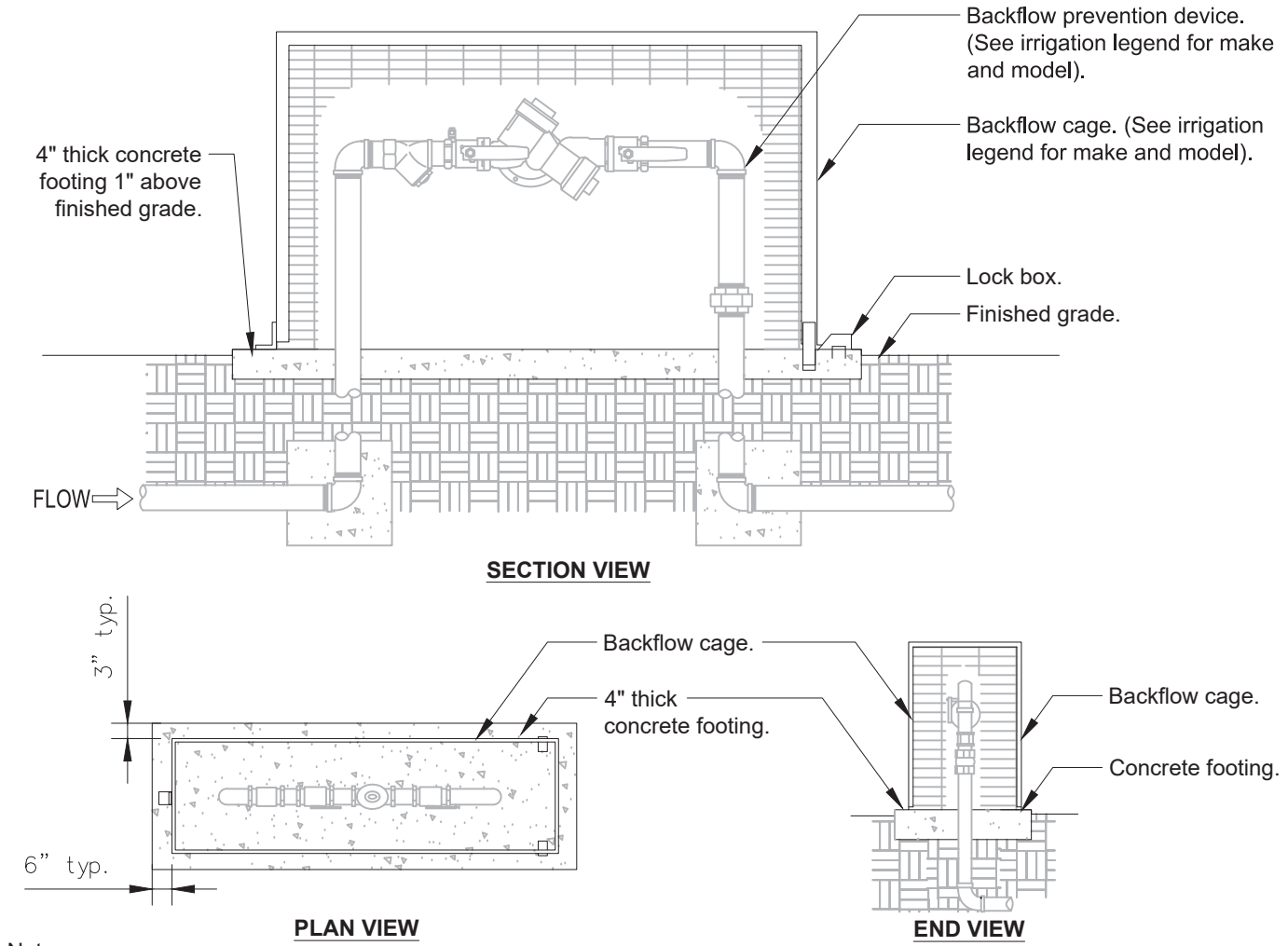
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**IRRIGATION PLAN**

**SHEET NUMBER**  
**I-1.0**

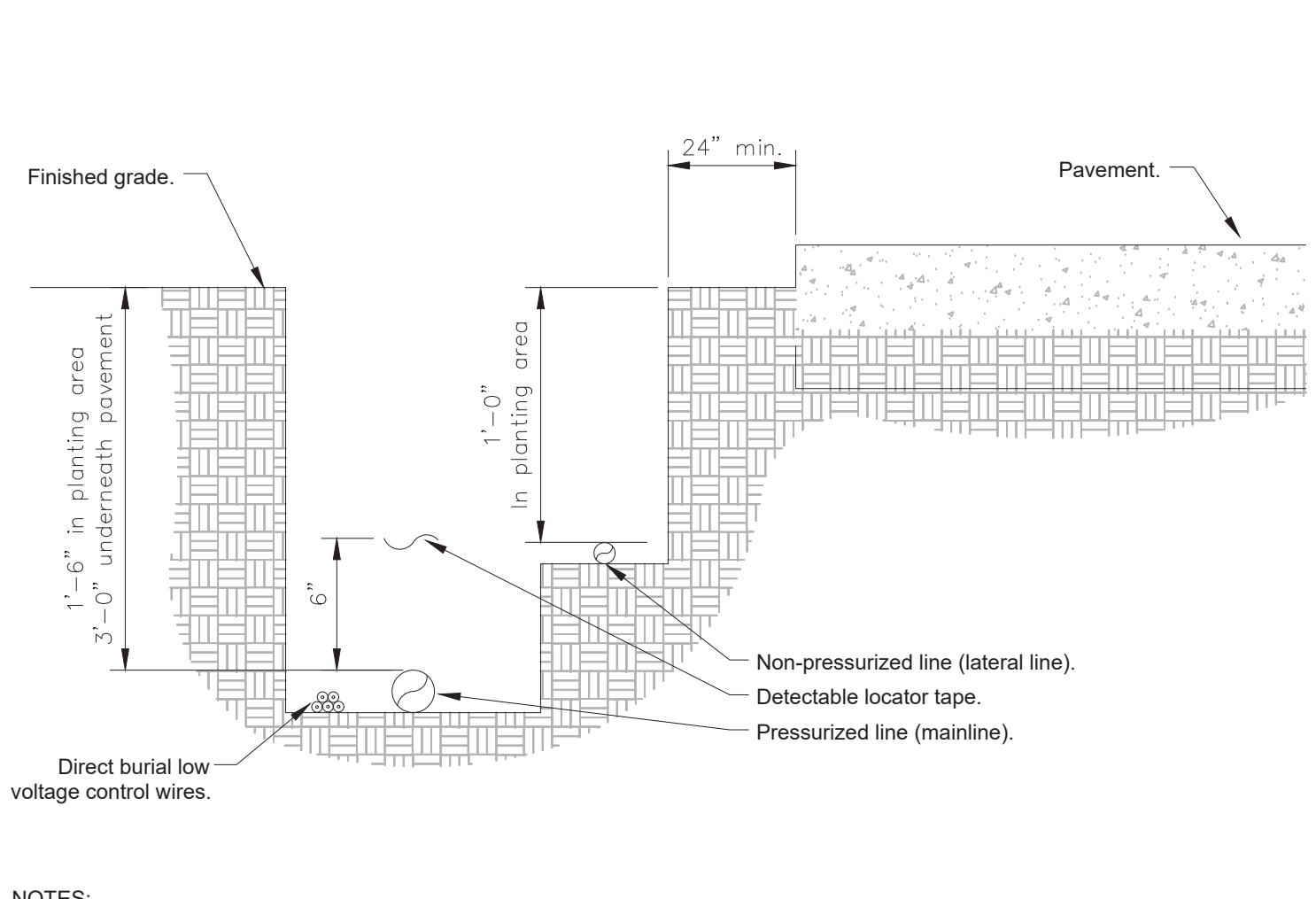




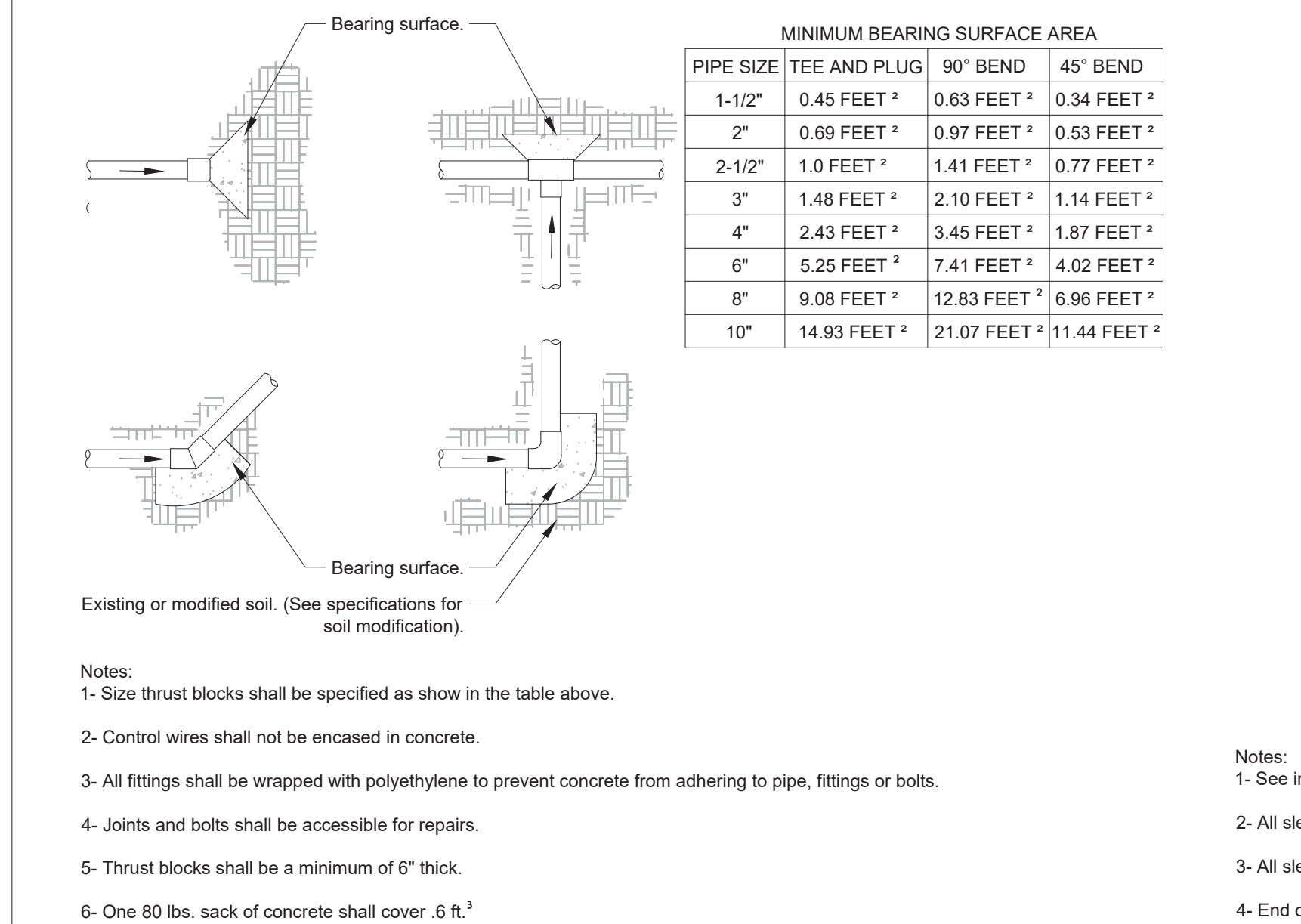
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DETAIL-SCALE



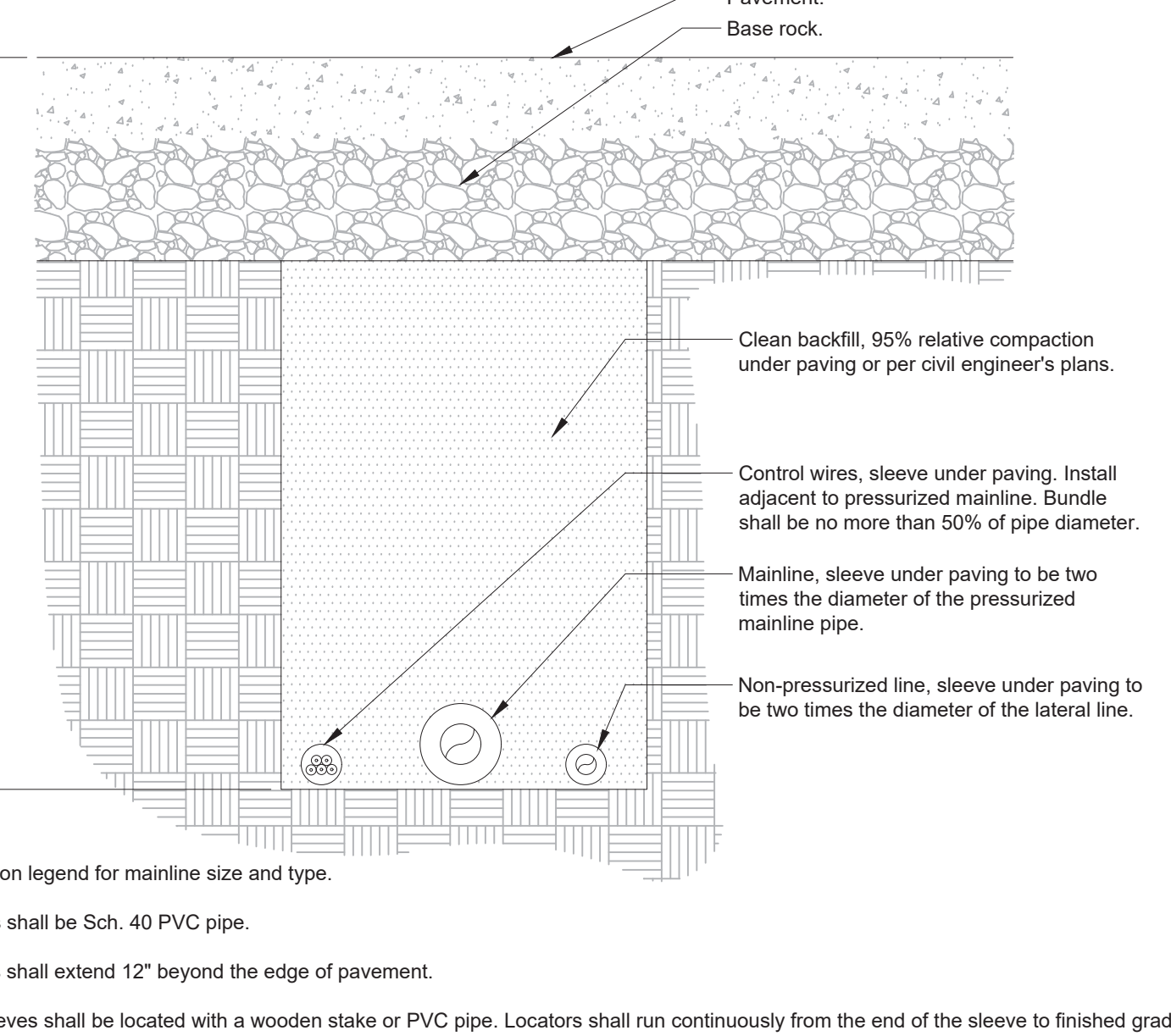
**2 BACKFLOW CAGE**  
DETAIL-SCALE



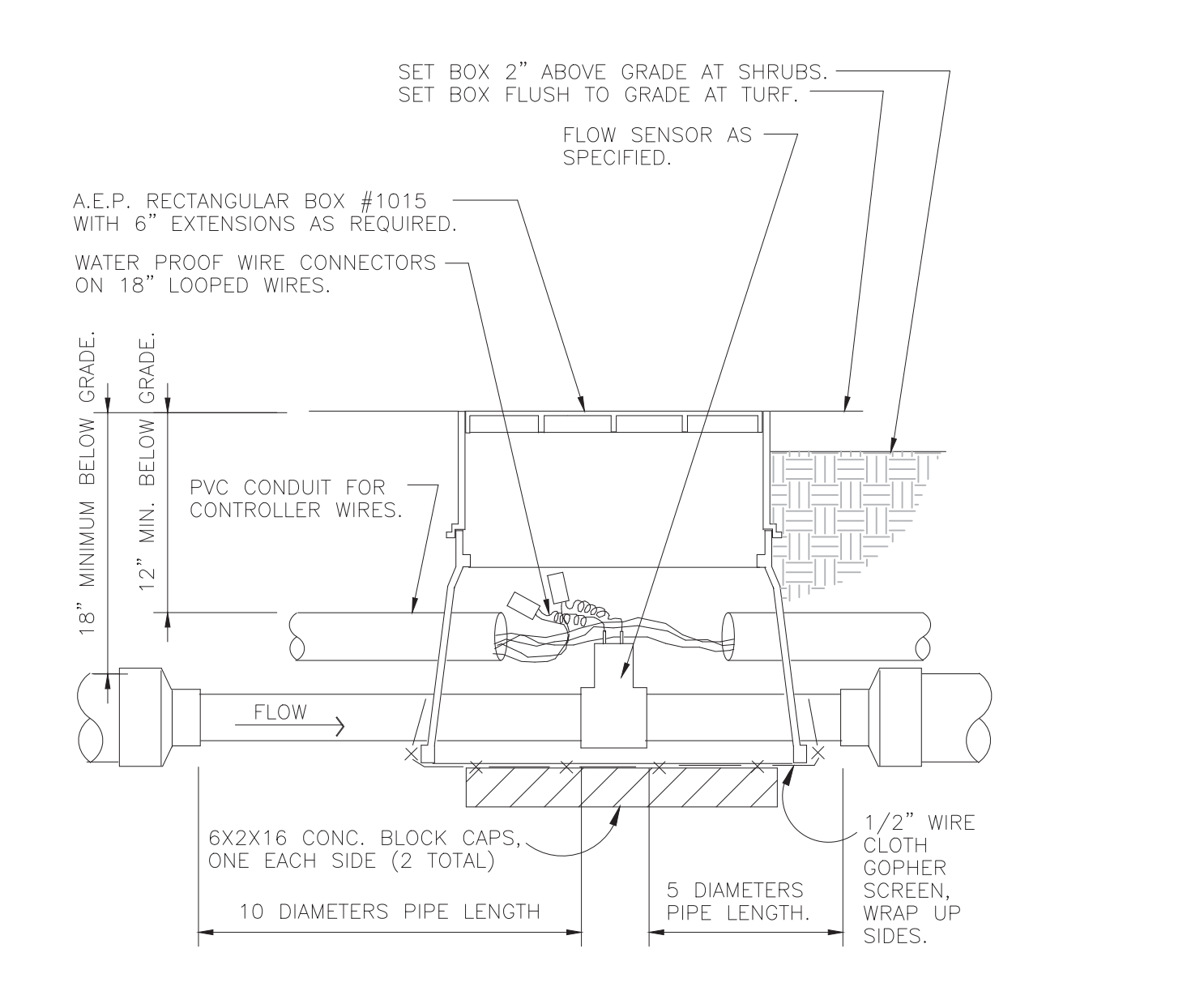
**3 IRRIGATION TRENCHING**  
DETAIL-SCALE



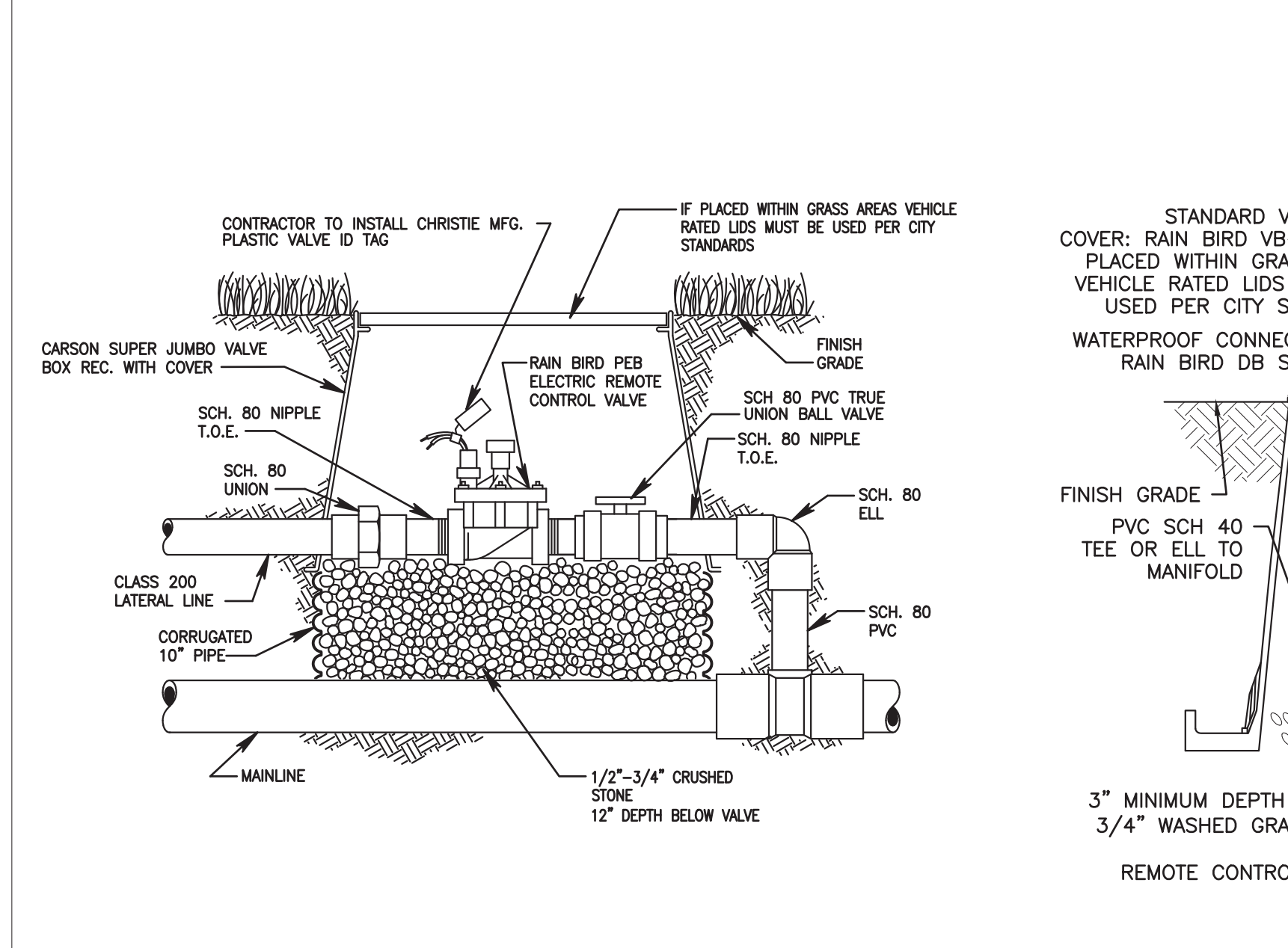
**4 THRUST BLOCK**  
NTS



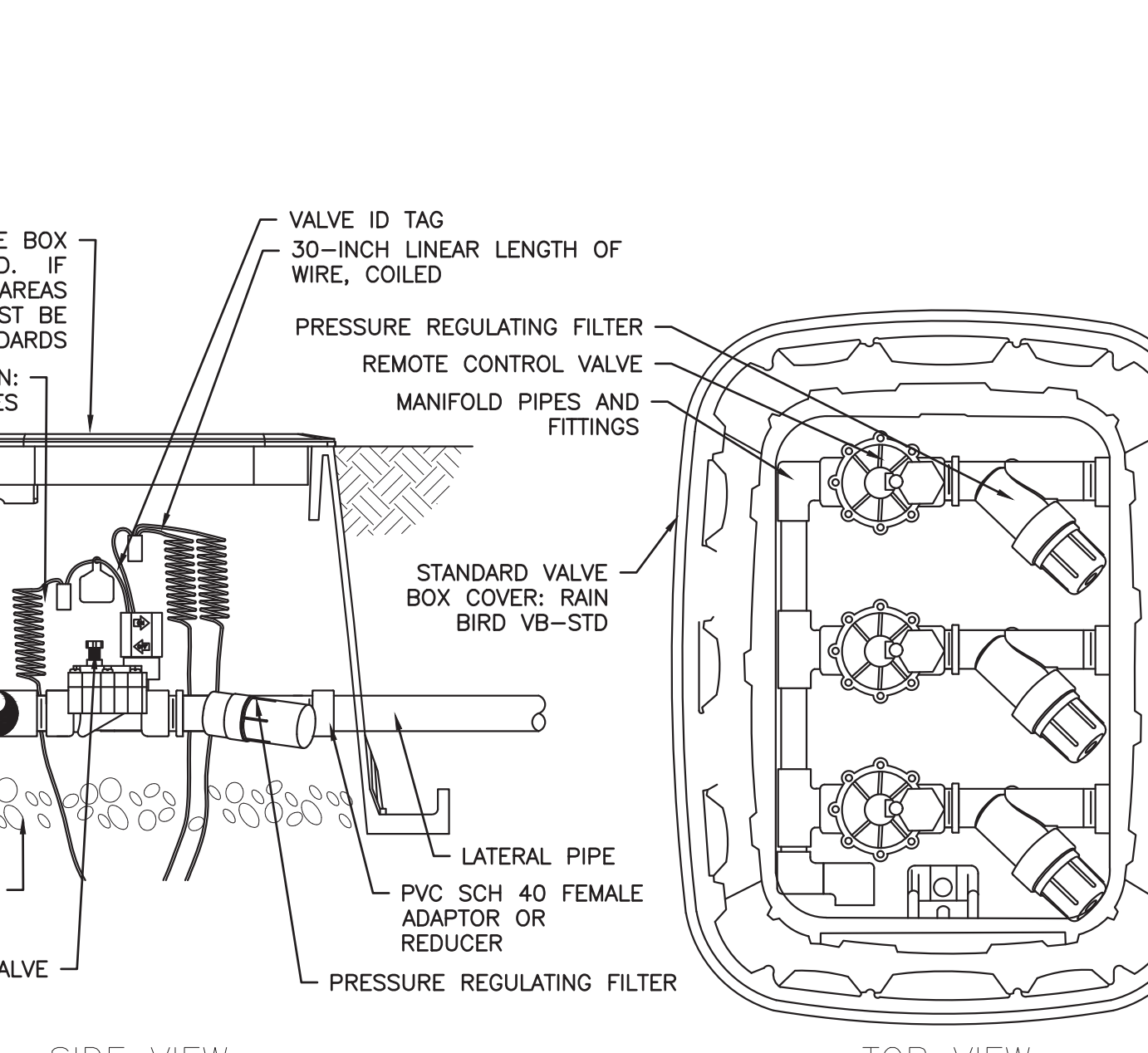
**5 PIPE BENEATH PAVEMENT**  
NTS



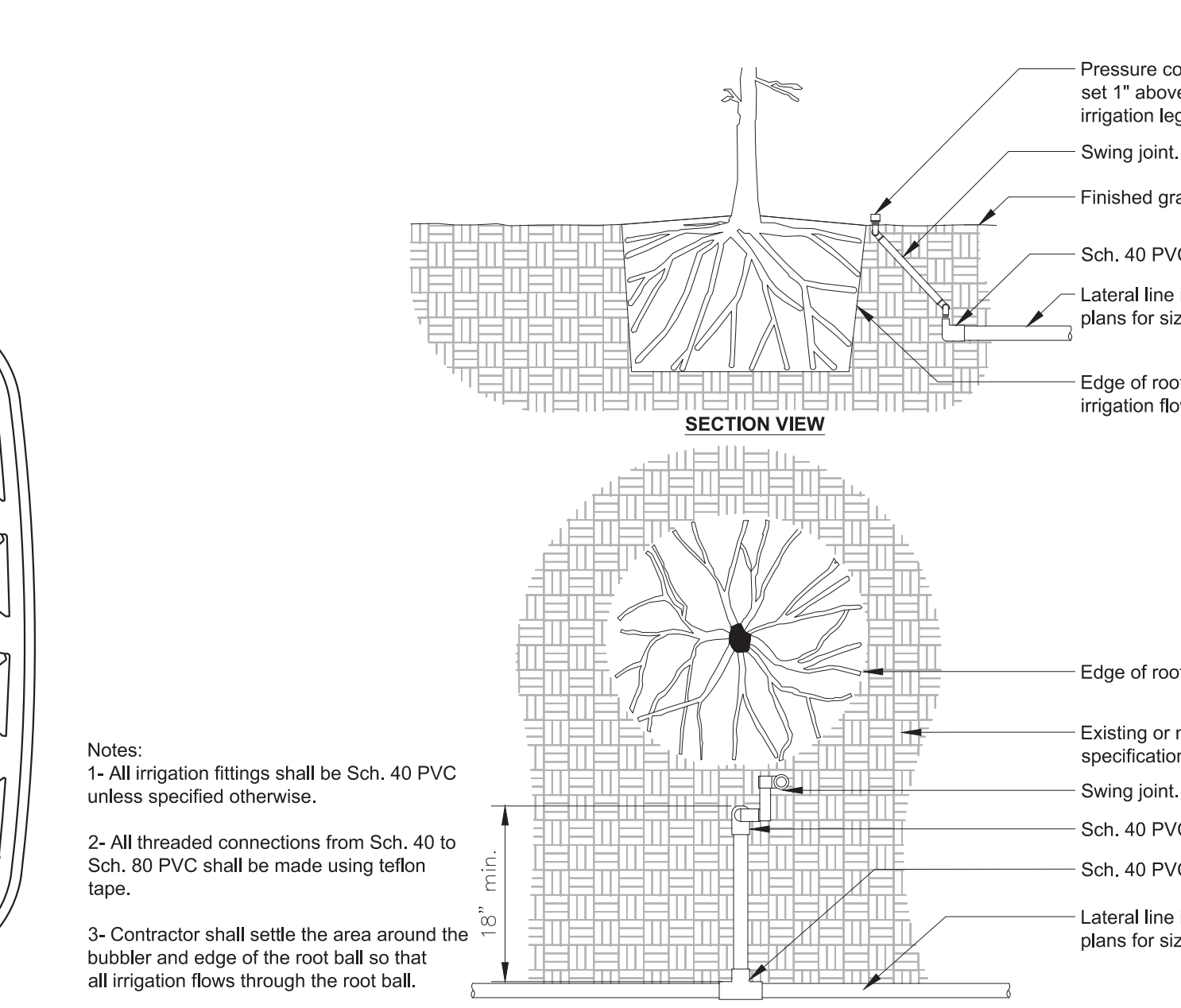
**7 FLOW SENSOR ASSEMBLY**  
NTS



**8 CONTROL VALVE**  
1" = 1'-0"



**9 X CZ-100-PRF 1" CONTROL ZONE KIT**  
NTS



**10 BUBBLER ON ROOT BALL LAYOUT**  
NTS

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: Samuel A. Maddox, TOWN ENGINEER DATE: 10/03/2022

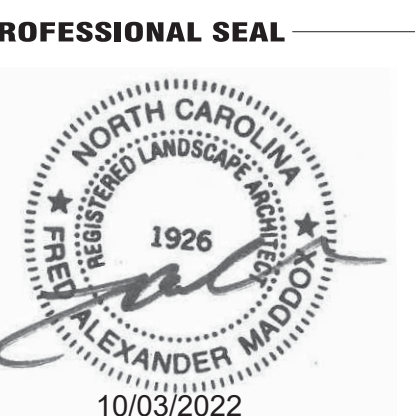
THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT:

BY: [Signature], ADMINISTRATOR DATE: [Blank]

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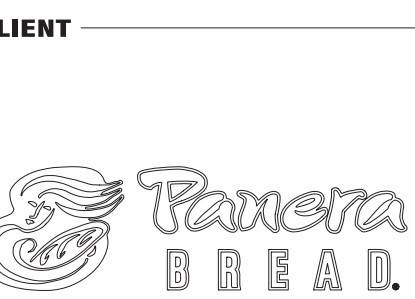
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	ADDENDUM 1



**PROFESSIONAL IN CHARGE**  
FRED A. MADDOX  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
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**PROJECT**  
**PANERA BREAD**

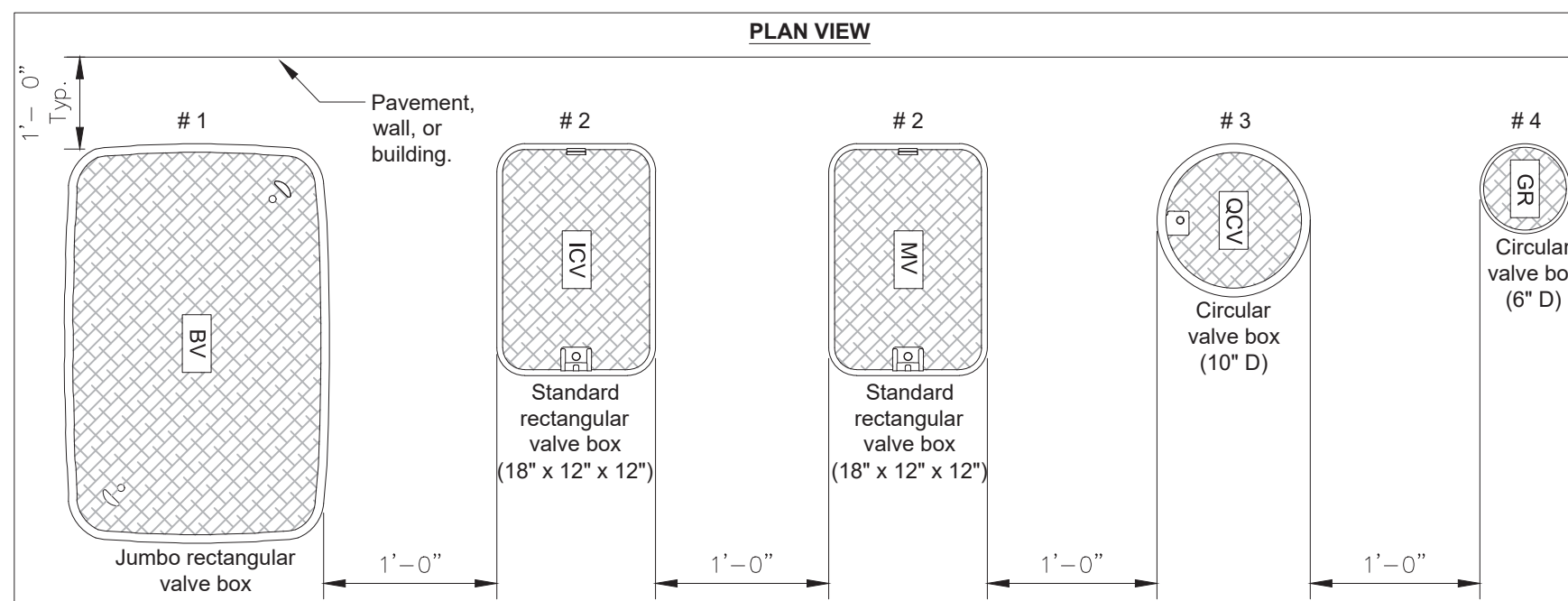
**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD.**



**PROJECT NUMBER**  
20211261

**SHEET TITLE**  
**IRRIGATION DETAILS**

**SHEET NUMBER**  
**I-1.1**

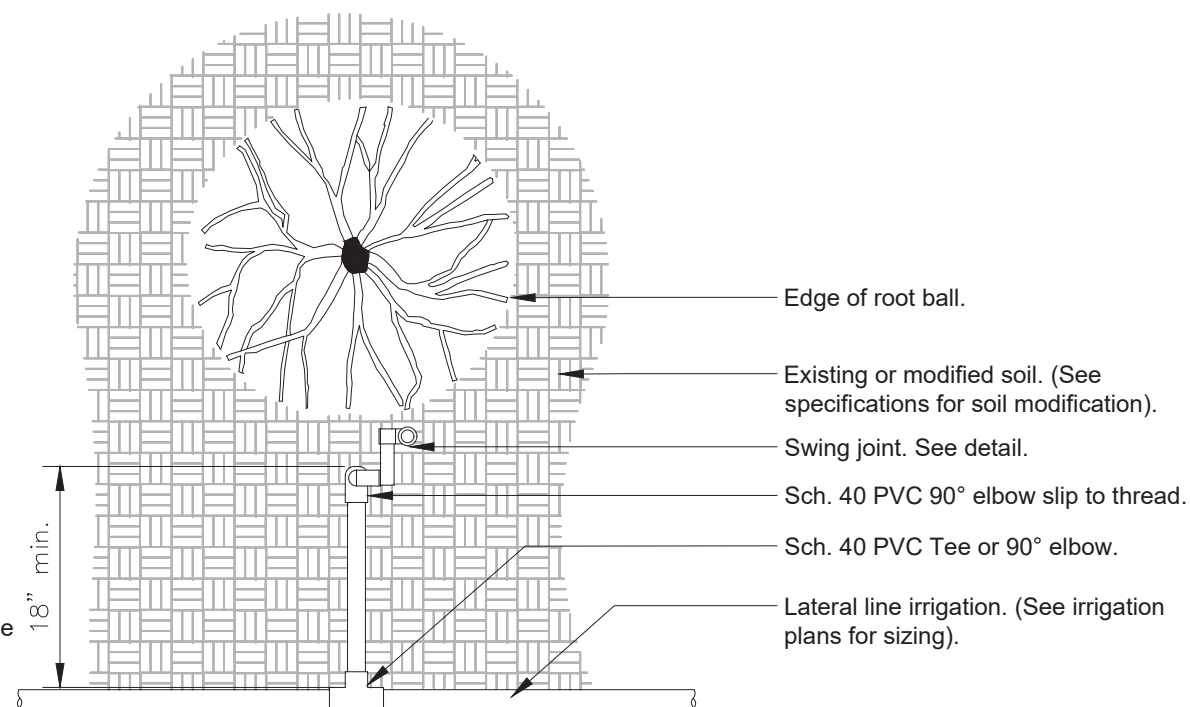
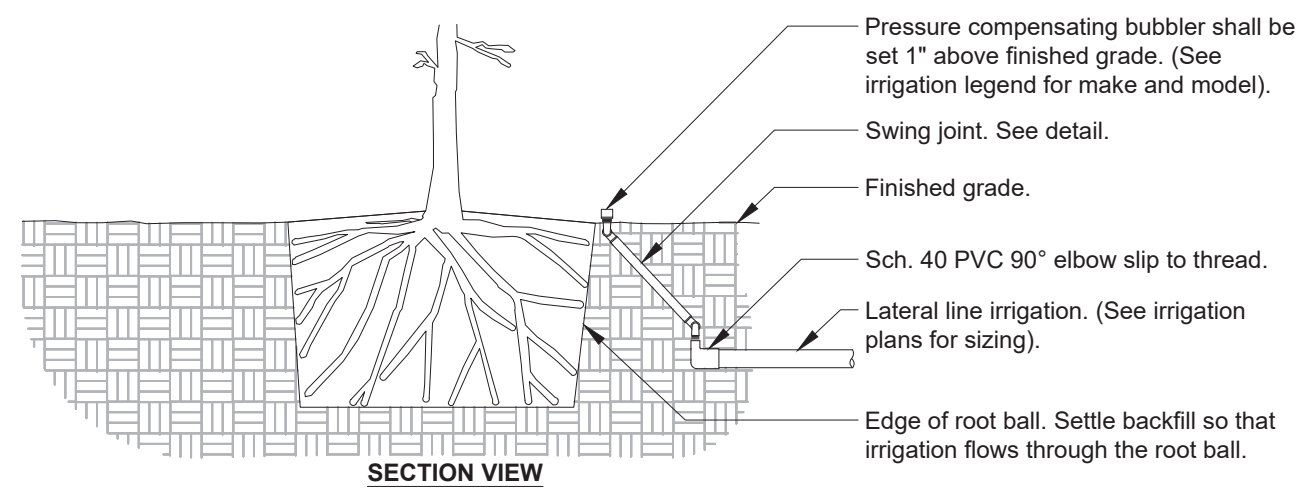


Water Type	Controller	Designation	Box size	Lid Color	Identification Guide
PW	A	MV	# 2	Green	Master valve
PW	A	FS	# 2	Green	Flow sensor
PW	A	HM	# 2	Green	Hydrometer
PW	A	BV	# 2	Green	Ball valve 3" or less
PW	A	BV	# 1	Green	Ball valve 4" or more
PW	A	GV	# 2	Green	Gate valve
PW	A	ARV	# 2	Green	Air release valve
PW	A	QCV	# 3	Green	Quick coupler valve
PW	A	RCV	# 2	Green	Remote control valve
PW	A	MS	# 2	Green	Moisture sensor
PW	A	GR	# 4	Green	Grounding rod
PW	A	SB	# 3	Green	Splice box
PW	A	FC	# 3	Green	Future connection

**EXAMPLE**  
Potable water system on Controller 'A', Remote control valve station # 3.  
Notes:  
1- Valve box # 1 thru # 3 shall have stainless steel locking hardware.  
2- Valve boxes shall be labeled by hot iron branding or aluminum asphaltic base water proof paint.  
3- Locate valve assemblies in planting area.  
4- Valve locations shall be approved by the Owner's Representative prior to installation.  
5- Valve boxes shall be centered above valve assemblies to facilitate access and maintenance.  
6- Valve boxes shall be flush with finished grade.  
7- Valve boxes shall be set parallel to each other and perpendicular to the edge of pavement.  
8- See other irrigation details for further information.

**1 VALVE BOX LAYOUT**

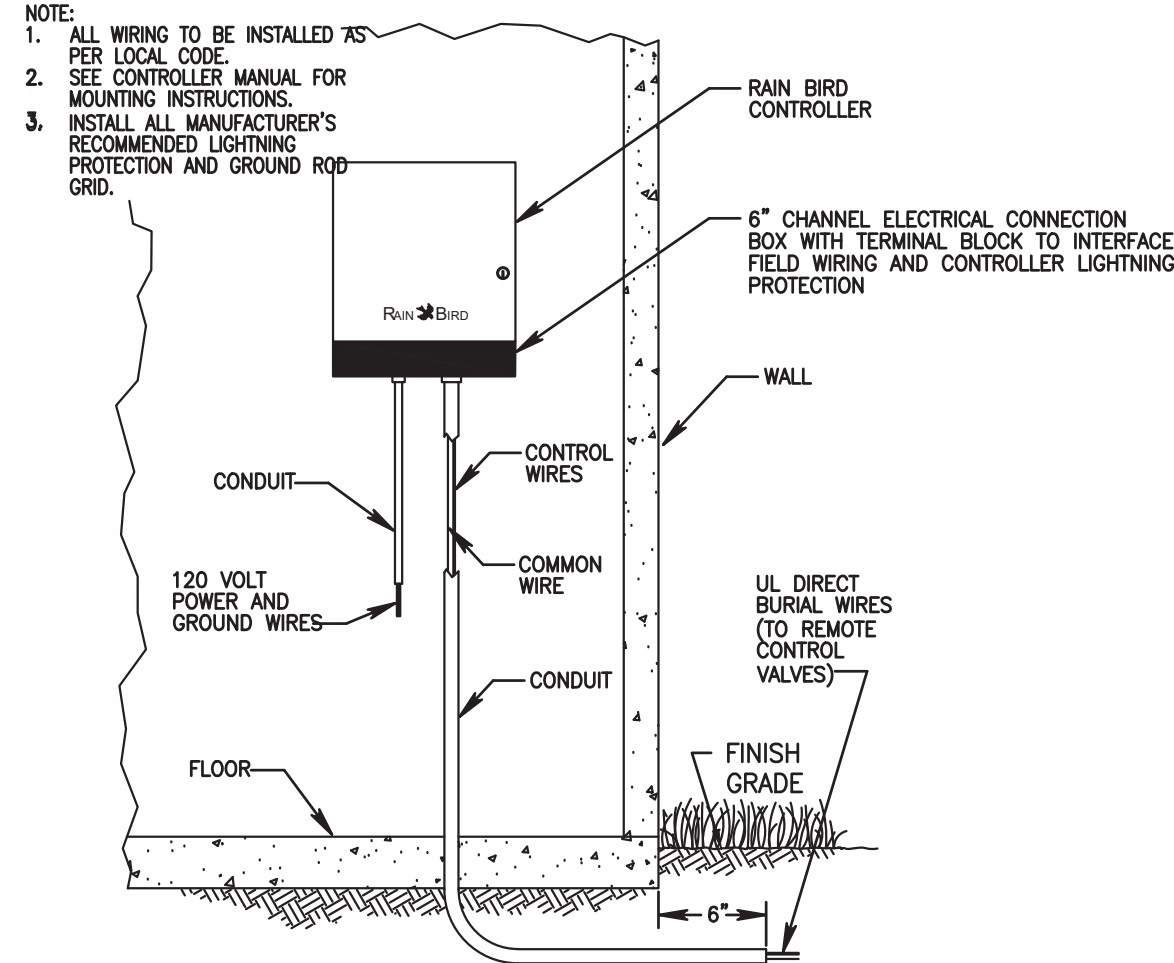
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Notes:  
1- All irrigation fittings shall be Sch. 40 PVC unless specified otherwise.  
2- All threaded connections from Sch. 40 to Sch. 80 PVC shall be made using teflon tape.  
3- Contractor shall settle the area around the bubbler and edge of the root ball so that all irrigation flows through the root ball.

**2 XCZ-LF-100-PRF 1" CONTROL ZONE KIT**

NTS



NOTE:  
1. ALL WIRING TO BE INSTALLED AS PER LOCAL CODE.  
2. SEE CONTROLLER MANUAL FOR MOUNTING INSTRUCTIONS.  
3. INSTALL ALL MANUFACTURER'S RECOMMENDED LIGHTNING PROTECTION AND GROUND ROD GRID.

**3 CONTROLLER**

1" = 1'-0"

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: Samuel A. MacDonnell DATE: \_\_\_\_\_  
TOWN ENGINEER

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

Digitally signed by Phillip T. Goodman  
Reason: I am approving this document  
Date: 2022.11.08 10:44:56-0500'

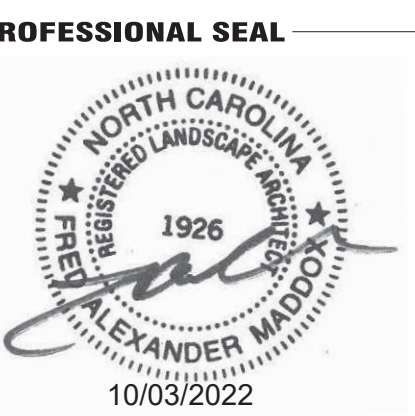
BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
ADMINISTRATOR

**GF**  
www.greenbergfarrow.com  
1230 Peachtree Street, NE  
Suite 2900  
Atlanta, GA 30309  
t: 404 601 4000

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**ISSUE/REVISION RECORD**

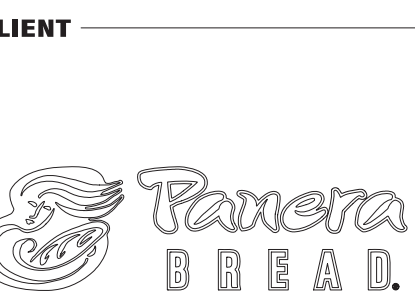
DATE	DESCRIPTION
10/28/21	PERMIT SET
02/25/22	CIP COMMENT RESPONSE
06/10/22	CIP COMMENT RESPONSE
07/22/22	CIP COMMENT RESPONSE / LDP SUBMITTAL
09/14/22	CIP COMMENT RESPONSE / LDP COMMENT RESPONSE
	ADDENDUM 1



**PROFESSIONAL IN CHARGE**  
FRED A. MADDOX  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
WILLIAM LOTZ  
**DRAWN BY**  
FRED A. MADDOX

**PROJECT**  
**PANERA BREAD**

**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD.**



**PROJECT NUMBER**  
20211261

**SHEET TITLE**  
**IRRIGATION DETAILS**

**SHEET NUMBER**  
**I-1.2**

**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
08/09/19	PERMIT SET
02/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
	LDP SUBMITTAL
9/14/22	CIP COMMENT RESPONSE
	LDP COMMENT RESPONSE
	ADDENDUM 1

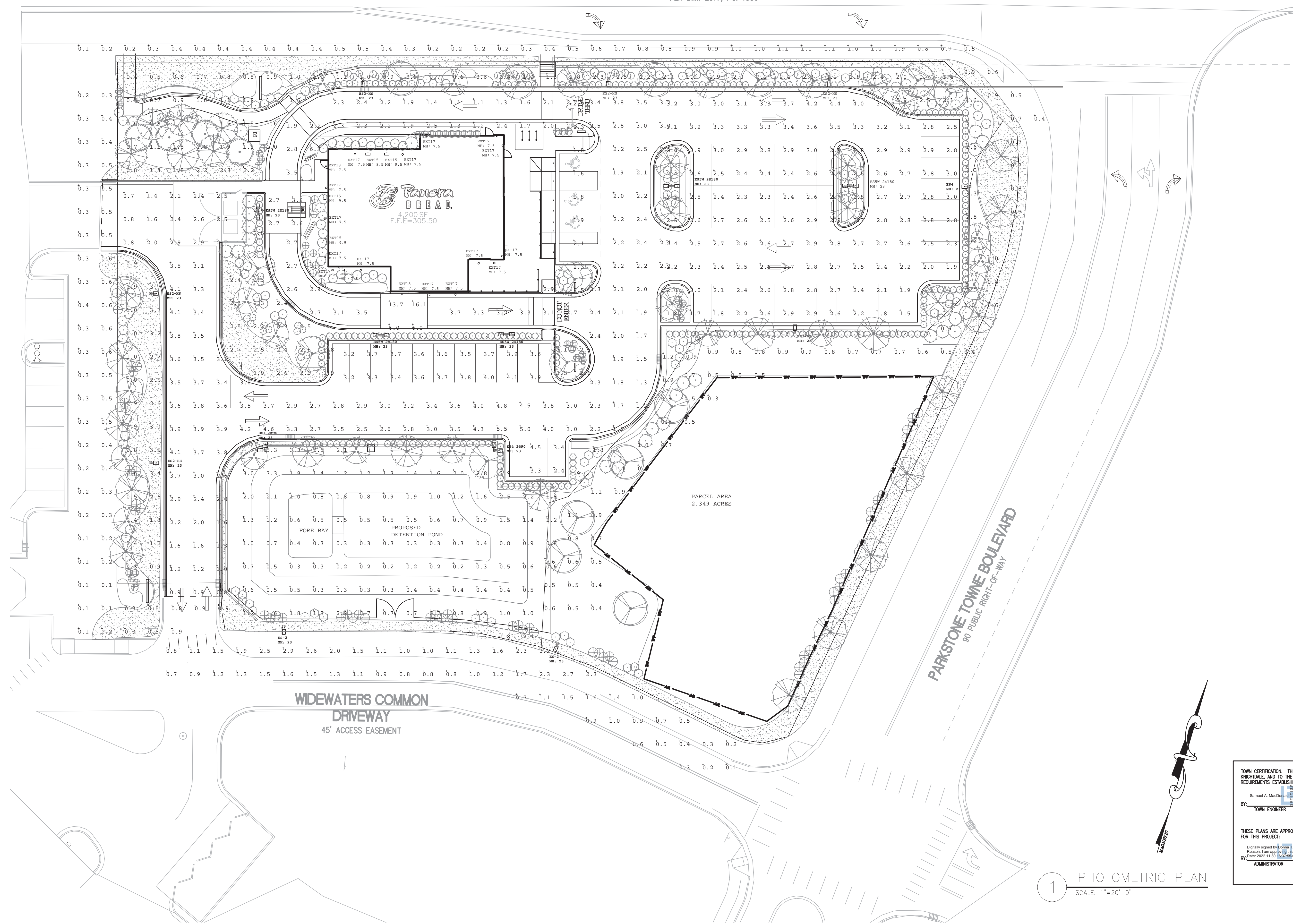
**Calculation Summary**

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
DRIVE THRU CANOPY	Illuminance	Fc	10.45	16.1	6.0	1.74	2.68
DRIVEWAYS	Illuminance	Fc	2.67	6.3	0.7	3.81	9.00
LANDLORD DRIVEWAY	Illuminance	Fc	1.25	3.2	0.1	12.50	32.00
LANDSCAPING	Illuminance	Fc	1.34	5.3	0.2	6.70	26.50
LANDSCAPING 2	Illuminance	Fc	2.56	3.3	2.3	1.11	1.43
ORDER BOARD	Illuminance	Fc	2.80	3.2	2.6	1.08	1.23
PARKING AREA 1	Illuminance	Fc	3.60	4.5	2.4	1.50	1.88
PARKING AREA 2	Illuminance	Fc	2.66	4.4	1.5	1.77	2.93
PROPERTY LINE	Illuminance	Fc	0.55	1.1	0.1	5.50	11.00

**LIGHTING FIXTURE SCHEDULE**

Symbol	Qty	Label	Arrangement	Total Lamp Lumens	LLF	Description	(MANUFACT)
1	1	ES4	SINGLE	N.A.	1.000	ECF-S-32L-530-WW-G2-4	SIGNIFY GARDCO
2	2	ES3-HS	SINGLE	N.A.	1.000	ECF-S-32L-530-WW-G2-3-HIS	Gardco
4	4	ES2-HS	SINGLE	N.A.	1.000	ECF-S-32L-530-WW-G2-2-HIS	Gardco
2	2	ES4 2890	2 @ 90 DEGREES	N.A.	1.000	ECF-S-32L-530-WW-G2-4	SIGNIFY GARDCO
5	5	EXT15	SINGLE	865.76	1.000	WB-W20506	WAC Lighting
15	15	EXT17	SINGLE	N.A.	1.000	ES675-3130K	PROGRESS
2	2	EXT18	SINGLE	N.A.	1.000	SLIM26Y_SLIM26Y_D10	RAB LIGHTING INC. RC LIGHTING
5	5	ESW 28180	BACK-PAK	N.A.	1.000	ECF-S-32L-700-WW-G2-5W	SIGNIFY GARDCO
2	2	ES-2	SINGLE	N.A.	1.000	ECF-S-32L-530-WW-G2-2	SIGNIFY GARDCO

**KNIGHTDALE BOULEVARD**  
A.K.A. U.S. HIGHWAY 64 BUSINESS  
VARIABLE PUBLIC RIGHT-OF-WAY  
PER B.M. 2017, PG. 1996



**PROFESSIONAL SEAL**



**PROFESSIONAL IN CHARGE**  
KERI WILLIAMS, PE  
**PROJECT MANAGER**  
HAMILTON WILLIAMS  
**QUALITY CONTROL**  
CHARLES J. BEADLES, PE  
**DRAWN BY**  
FRANK TROWBRIDGE

**PROJECT**  
**PANERA BREAD**

**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
**6800 KNIGHTDALE BLVD.**

**CLIENT**



**PROJECT NUMBER**  
202112610  
**SHEET TITLE**

**PHOTOMETRIC PLAN**

**SHEET NUMBER**  
**EL-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.

Samuel A. MacDonald  
DATE: \_\_\_\_\_  
BY: \_\_\_\_\_ TOWN ENGINEER

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

Digitally signed by E-Donna T. Goodman  
Reason: I am approving this document  
Date: 2022.11.30 16:22:48-0500  
BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
ADMINISTRATOR

**1 PHOTOMETRIC PLAN**  
SCALE: 1"=20'-0"

Gardco EcoForm Gen-2 combines economy with performance in an LED area luminaire. Capable of delivering up to 27,800 lumens or more in a compact, low profile LED luminaire. EcoForm offers a new level of customer value. EcoForm features an innovative retrofit arm kit, simplifying site conversions to LED by eliminating the need to drill additional holes in most existing poles. Integral control systems available for further energy savings. Includes Service Tag, our innovative way to provide assistance throughout the life of the product.

Ordering guide example: ECF-S-64L-900-NW-G2-AR-S-120-HIS-MGY

Part	Number of LEDs	Drive Current	LED Color - Generation	Mounting	Orientation	Image
ECF-S	32 LEDs (2 modules)	366 365mA	NW-G2	AR	Standard	
ECF-S	48 LEDs (3 modules)	500 500mA	NW-G2	AR	Standard	
ECF-S	64 LEDs (4 modules)	500 500mA	NW-G2	AR	Standard	

Ordering Code	Total LEDs	Current (mA)	Color Temp. (K)	System Watts	Average Lumen Output	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,068	82-101-01	139	5,068	82-101-01	143	5,068	82-101-01	143	5,068	82-101-01	143
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,068	82-101-01	143	5,068	82-101-01	143	5,068	82-101-01	143	5,068	82-101-01	143

1. Not available with Type 4 or 5.
2. Not available with Type 4 or 5.
3. Not available with Type 4 or 5.
4. Not available with Type 4 or 5.
5. Not available with Type 4 or 5.
6. Not available with Type 4 or 5.
7. Not available with Type 4 or 5.
8. Not available with Type 4 or 5.
9. Not available with Type 4 or 5.
10. Not available with Type 4 or 5.
11. Not available with Type 4 or 5.
12. Not available with Type 4 or 5.
13. Not available with Type 4 or 5.
14. Not available with Type 4 or 5.
15. Not available with Type 4 or 5.
16. Not available with Type 4 or 5.
17. Not available with Type 4 or 5.
18. Not available with Type 4 or 5.
19. Not available with Type 4 or 5.
20. Not available with Type 4 or 5.
21. Not available with Type 4 or 5.



### ECF-S EcoForm small Area luminaire

ECF-S EcoForm Accessories (ordered separately, field installed)

Accessories	Footnotes
ECF-S-32L-365-WW-G2-AR-S-120-HIS-MGY	20. Not available with Type 4 or 5.
ECF-S-32L-365-WW-G2-AR-S-120-HIS-MGY	21. Consult Signify to confirm whether specific accessories are BAA-compliant.

Ready to Go configurations (when ordered with the "RS-" catalog code, the following configurations will ship in 2 weeks):

Catalog Number	DNOC	Catalog Number	DNOC
RS-ECF-S-32L-1A-WW-G2-AR-3-UNV-BZ	91240466902	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BK	91240466560
RS-ECF-S-32L-1A-WW-G2-AR-3-UNV-MGY	91240466903	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BZ	91240466561
RS-ECF-S-32L-1A-WW-G2-AR-3-UNV-MGY	91240466904	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-MGY	91240466562
RS-ECF-S-32L-1A-WW-G2-AR-4-UNV-BZ	91240466905	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BK	91240466563
RS-ECF-S-32L-1A-WW-G2-AR-4-UNV-MGY	91240466906	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-MGY	91240466564
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-BZ	91240466907	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BK	91240466565
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-MGY	91240466908	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-MGY	91240466566
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-BZ	91240466909	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BK	91240466567
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-MGY	91240466910	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-MGY	91240466568
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-BZ	91240466911	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BK	91240466569
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-MGY	91240466912	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-MGY	91240466570
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-BZ	91240466913	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-BK	91240466914
RS-ECF-S-32L-1A-WW-G2-AR-5-UNV-MGY	91240466915	RS-ECF-S-64L-1A-WW-G2-AR-5-UNV-MGY	91240466916

### ECF-S EcoForm small Area luminaire

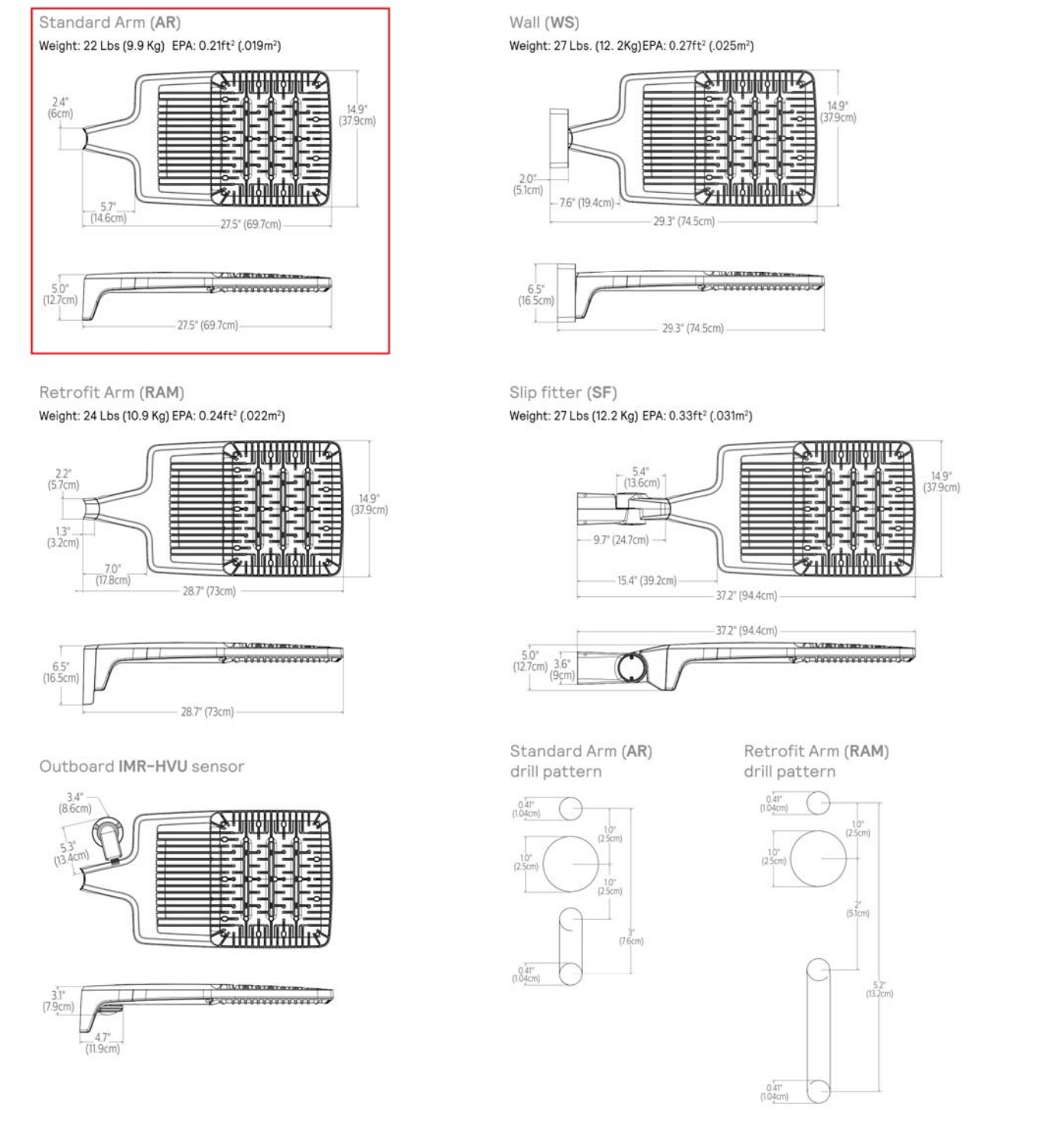
3000K LED Wattage and Lumen Values

Ordering Code	Total LEDs	Current (mA)	Color Temp. (K)	System Watts	Average Lumen Output	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,068	82-101-01	139	5,068	82-101-01	143	5,068	82-101-01	143	5,068	82-101-01	143
ECF-S-32L-365-WW-G2-x	32	365	3000	40	5,068	82-101-01	143	5,068	82-101-01	143	5,068	82-101-01	143	5,068	82-101-01	143

4000K LED Wattage and Lumen Values

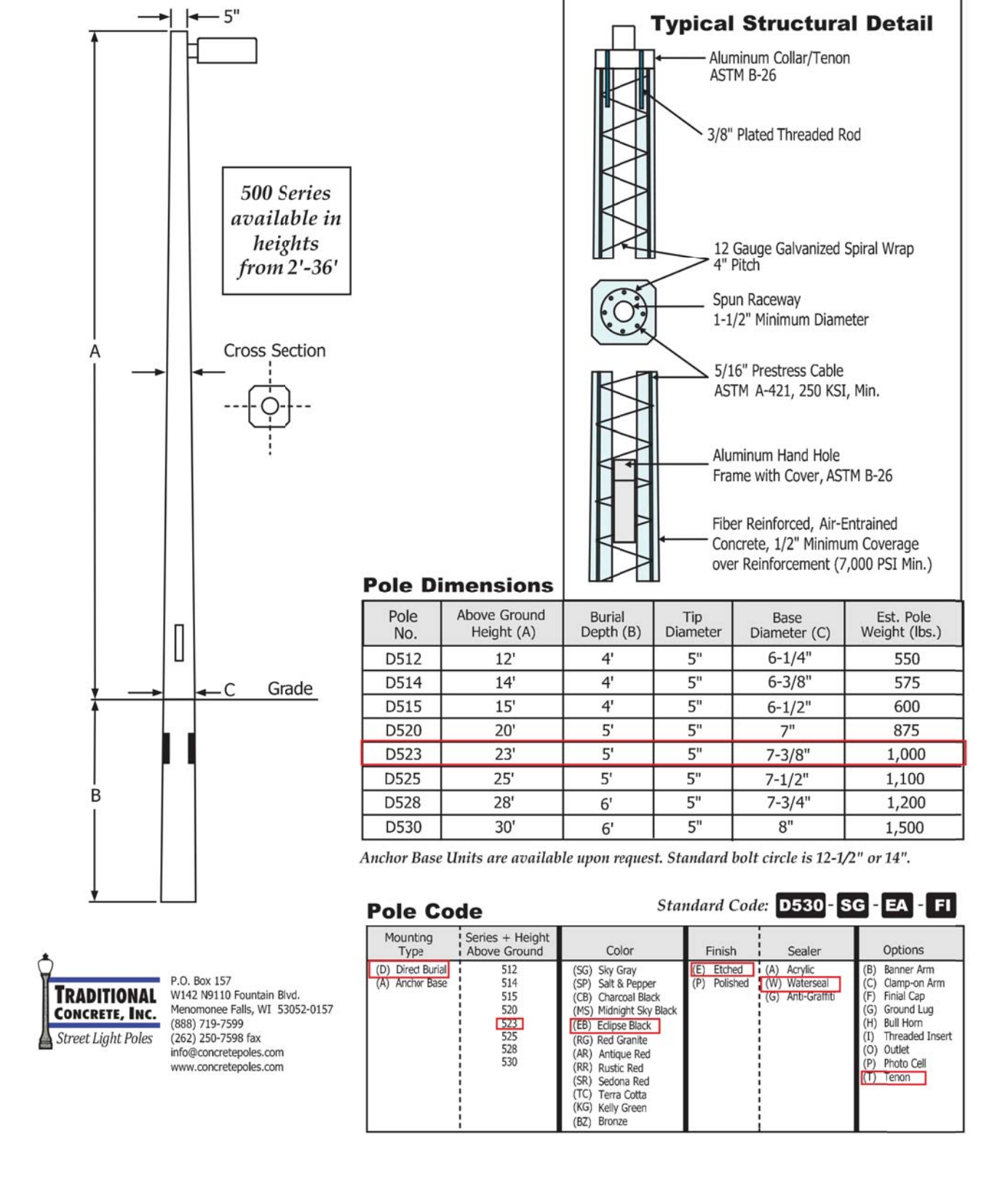
Ordering Code	Total LEDs	Current (mA)	Color Temp. (K)	System Watts	Average Lumen Output	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)	Lumen Output (LPW)	BUS Rating (LPW)	Efficiency (LPW)
ECF-S-32L-400-WW-G2-x	32	365	4000	40	5,788	82-101-01	145	5,788	82-101-01	149	5,788	82-101-01	149	5,788	82-101-01	149
ECF-S-32L-400-WW-G2-x	32	365	4000	40	5,788	82-101-01	149	5,788	82-101-01	149	5,788	82-101-01	149	5,788	82-101-01	149

### ECF-S EcoForm small Area luminaire



### 500 Series

Spun square, 1/10" taper per foot



1430 West Peachtree Street NW  
Suite 200  
Atlanta, GA 30309  
t: 404 601 4000 f: 404 601 3980

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**ISSUE/REVISION RECORD**

DATE	DESCRIPTION
08/09/19	PERMIT SET
02/25/22	CIP COMMENT RESPONSE
6/10/22	CIP COMMENT RESPONSE
7/22/22	CIP COMMENT RESPONSE
9/14/22	CIP COMMENT RESPONSE

**PROFESSIONAL SEAL**

**PROFESSIONAL IN CHARGE**  
KERI WILLIAMS, PE

**PROJECT MANAGER**  
HAMILTON WILLIAMS

**QUALITY CONTROL**  
CHARLES J. BEADLES, PE

**DRAWN BY**  
FRANK TROWBRIDGE

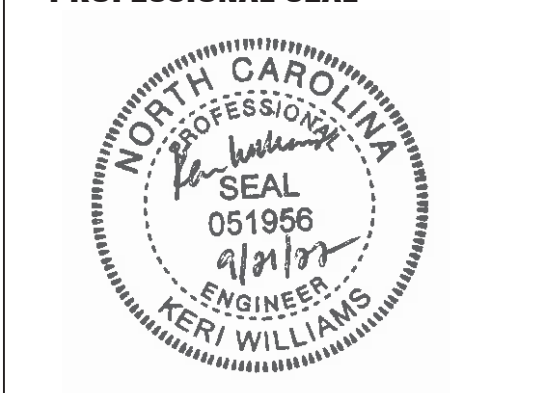
**PROJECT**  
**PANERA BREAD**

**ADDRESS**  
**KNIGHTDALE NORTH CAROLINA**  
6800 KNIGHTDALE BLVD.

**PROJECT NUMBER**  
202112610

**SHEET TITLE**  
**EXTERIOR LIGHT FIXTURE CUT SHEETS**

**SHEET NUMBER**  
**EL-2**



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: \_\_\_\_\_

TOWN ENGINEER

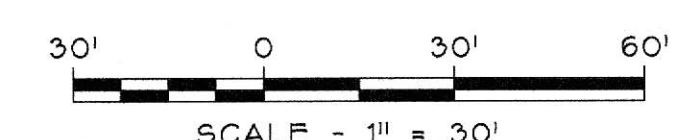
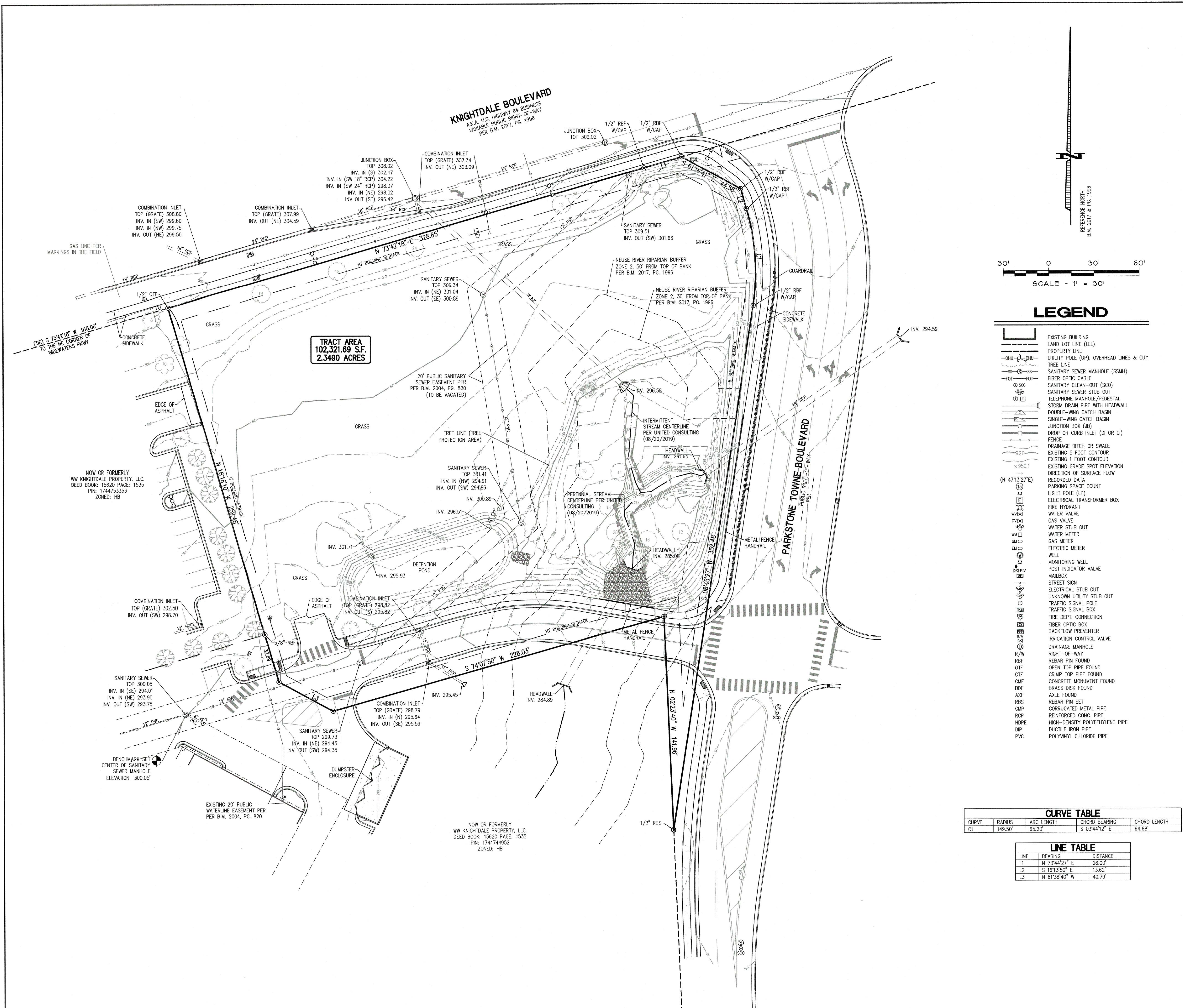
THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.

Digitally signed by Reason: I am approving this document Date: 2023.11.18 16:43:05-0500

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

ADMINISTRATOR

### TYPE 'ES' LIGHT FIXTURE



### LEGEND

- EXISTING BUILDING
- LAND LOT LINE (LLL)
- PROPERTY LINE
- UTILITY POLE (UP), OVERHEAD LINES & GUY
- TREE LINE
- SANITARY SEWER MANHOLE (SSMH)
- FIBER OPTIC CABLE
- SANITARY CLEAN-OUT (SCO)
- SANITARY SEWER STUB OUT
- TELEPHONE MANHOLE/PEDESTAL
- STORM DRAIN PIPE WITH HEADWALL
- DOUBLE-WING CATCH BASIN
- SINGLE-WING CATCH BASIN
- JUNCTION BOX (JB)
- DROP OR CURB INLET (DI OR CI)
- FENCE
- DRAINAGE DITCH OR SWALE
- EXISTING 5 FOOT CONTOUR
- EXISTING 1 FOOT CONTOUR
- DIRECTION OF SURFACE FLOW
- RECORDED DATA
- PARKING SPACE COUNT
- LIGHT POLE (LP)
- ELECTRICAL TRANSFORMER BOX
- FIRE HYDRANT
- WATER VALVE
- GAS VALVE
- WATER STUB OUT
- WATER METER
- GAS METER
- ELECTRIC METER
- WELL
- MONITORING WELL
- POST INDICATOR VALVE
- MAILBOX
- STREET SIGN
- ELECTRICAL STUB OUT
- UNKNOWN UTILITY STUB OUT
- TRAFFIC SIGNAL POLE
- TRAFFIC SIGNAL BOX
- FIRE DEPT. CONNECTION
- FIBER OPTIC BOX
- BACKFLOW PREVENTER
- IRRIGATION CONTROL VALVE
- DRAINAGE MANHOLE
- RIGHT-OF-WAY
- REBAR PIN FOUND
- OTF
- OPEN TOP PIPE FOUND
- CRIMP TOP PIPE FOUND
- CONCRETE MONUMENT FOUND
- BRASS DISK FOUND
- AXF
- AXLE FOUND
- REBAR PIN SET
- CORRUGATED METAL PIPE
- REINFORCED CONC. PIPE
- HDPE
- DUCTILE IRON PIPE
- PVC

### GENERAL NOTES

- SURVEY PROCEDURES: THIS SURVEY IS BASED ON MEASUREMENTS OBTAINED USING AN INSTRUMENT CAPABLE OF READING ANGULAR MEASUREMENTS DIRECTLY TO A MINIMUM OF 5 SECONDS OF ARC AND LINEAR DIMENSIONS DIRECTLY TO 0.01 FEET.
  - THIS PLAT HAS BEEN CALCULATED FOR CLOSURE AND IS FOUND TO BE ACCURATE WITHIN ONE FOOT IN 329,486.10 FEET.
  - TITLE TO THE SURVEYED PROPERTY IS CURRENTLY VESTED IN WIDEWATERS KNIGHTDALE II COMPANY, LLC, BY VIRTUE OF A NORTH CAROLINA SPECIAL WARRANTY DEED RECORDED IN D.B. 10924, PG. 1312, WAKE COUNTY, NORTH CAROLINA RECORDS.
  - I HAVE EXAMINED FEMA FLOOD INSURANCE RATE MAP NO. 3720174400J DATED MAY 05, 2008 AND HAVE DETERMINED BASED SOLELY BY GRAPHICALLY SCALING THE LOCATION ON THE MAP THAT THIS PROPERTY IS SHOWN NOT TO BE LOCATED WITHIN THE LIMITS OF A DESIGNATED FLOOD HAZARD AREA.
  - THE BASIS OF BEARINGS USED FOR THIS SURVEY IS FROM A RECOMBINATION PLAT OF PARKSTONE AT WIDEWATERS, BY RWK, PA ENGINEERING - SURVEYING, DATED JULY 17, 2017 AND RECORDED IN BOOK OF MAPS 2017, PAGE 1996, WAKE COUNTY, NORTH CAROLINA RECORDS. ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON GPS OBSERVATION (NAVD 88).
  - THE SURVEYED PROPERTY IS ZONED HB (HIGHWAY BUSINESS) ACCORDING TO THE TOWN OF KNIGHTDALE PLANNING & ZONING DEPARTMENT AND IS SUBJECT TO THE REQUIREMENTS AND RESTRICTIONS OF THIS ZONING CLASSIFICATION. THE SEBACK REQUIREMENTS FOR THIS ZONING CLASSIFICATION ARE:
 

FRONT	10 FT.
SIDE	6 FT.
REAR	10 FT.
  - THE TAX PARCEL ID FOR THE SUBJECT PROPERTY IS 1744756480.
  - UTILITY INFORMATION SHOWN ON THIS SURVEY IS BASED ON ABOVE GROUND EVIDENCE OBSERVED AT THE TIME OF FIELD SURVEY. NO CERTIFICATION, GUARANTEE, OR WARRANTY OF ANY KIND IS MADE AS TO THE ACCURACY OR THOROUGHNESS OF THE INFORMATION CONCERNING UTILITIES SHOWN OR NOT SHOWN ON THIS SURVEY.
  - ALL REBARS AND NAILS SHOWN AS SET BEAR A CAP OR WASHER READING "ROD ARNEY L-4510".
  - THE CONTOURS SHOWN ON THIS SURVEY ARE AT 1.0 FOOT INTERVALS.
  - AREA COMPUTED BY COORDINATES.
  - ALL DISTANCES SHOWN ON THIS SURVEY ARE GROUND DISTANCES.
  - AT THE TIME OF THIS SURVEY, THERE WAS NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
  - AT THE TIME OF THIS SURVEY, THERE WERE NO KNOWN PROPOSED CHANGES IN STREET RIGHT OF WAY LINES, IF SUCH INFORMATION IS MADE AVAILABLE TO THE SURVEYOR BY THE CONTROLLING JURISDICTION.
  - AT THE TIME OF THIS SURVEY, THERE WAS NO EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.
  - THIS SURVEY IS OF AN EXISTING PROPERTY AND DOES NOT CREATE A NEW STREET OR CHANGE AN EXISTING STREET.
- I CERTIFY THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN D.B. 10924, PG. 1312 AND B.M. 2017, PG. 1996 WAKE COUNTY, NORTH CAROLINA RECORDS) THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED AS DASHED LINES AND ARE DRAWN FROM INFORMATION IN OTHER REFERENCED SOURCES (B.M. 2004, PG. 820 WAKE COUNTY, NORTH CAROLINA RECORDS); THAT THE RATIO OF PRECISION OR POSITIONAL ACCURACY IS 1:19,318.40; AND THAT THIS MAP MEETS THE REQUIREMENTS OF A CLASS A SURVEY PER THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA (21 N.C.A.C. 06.1600).
- AND I CERTIFY FURTHER THAT THIS PROJECT WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS GROUND SURVEY WAS PERFORMED AT THE 95 PERCENT CONFIDENCE LEVEL (2 SIGMA) TO MEET FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THE VERTICAL ACCURACY MEETS AND EXCEEDS THE VERTICAL ACCURACY REQUIREMENTS OF THE NATIONAL MAP ACCURACY STANDARDS AND THAT THE ORIGINAL DATA WAS OBTAINED ON APRIL 22, 2019; THAT THE SURVEY WAS COMPLETED ON APRIL 29, 2019; THAT CONTOURS SHOWN AS BROKEN LINES MAY NOT MEET THE STATED STANDARD; AND ALL COORDINATES ARE BASED ON NAD 83 (2011) AND ALL ELEVATIONS ARE BASED ON NAVD 88.
- THIS 29TH DAY OF APRIL, 2019

#### CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD BEARING	CHORD LENGTH
C1	149.50'	65.20'	S 03°44'12" E	64.68'

#### LINE TABLE

LINE	BEARING	DISTANCE
L1	N 73°42'27" E	28.00'
L2	S 16°13'50" E	13.62'
L3	N 61°38'40" W	40.79'

SIGNED: *Robert C. Alford* 4-29-19  
 ROONEY E. JR.,  
 NORTH CAROLINA REG. NO. L-4510

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: \_\_\_\_\_  
 TOWN ENGINEER

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

Digitally signed by \_\_\_\_\_  
 Reason: I am approving this document  
 Date: 2019.11.15 09:06:59 -0500

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 ADMINISTRATOR

Bectler Greenfield Surveying, LLC.  
 1430 West Peachtree St., NW, Suite 226  
 Atlanta, Georgia 30309  
 Phone: (770) 422-8101  
 Fax: (770) 422-8101  
 Email: info@bgsurveying.com

DRAWING SCALE: 1" = 30 FT.  
 FIELDWORK DATE: 04-22-19  
 RELEASE DATE: 04-29-19  
 FIELDWORK BY: DAF/RW/S  
 DRAWN BY: DAF/RW/S  
 CHECKED BY: DAF/RW/S  
 NO. DATE REVISION DESCRIPTION  
 1 11-05-20 21 RETOPROBATION DRIVE LOCATED  
 2  
 3

2,349.0 ACRES  
 KNIGHTDALE BOULEVARD  
 KNIGHTDALE NORTH CAROLINA 27545  
 51. MATTHEWS TOWNSHIP - TOWN OF KNIGHTDALE  
 WAKE COUNTY - NORTH CAROLINA

BOUNDARY & TOPOGRAPHIC SURVEY  
 FOR  
**PANERA, LLC**

PROJECT NO.  
**19-124-0**  
 DRAWING FILE:  
 19-124-0 SURVEY.DWG  
 SHEET NO.  
**S-1**  
 1 OF 1