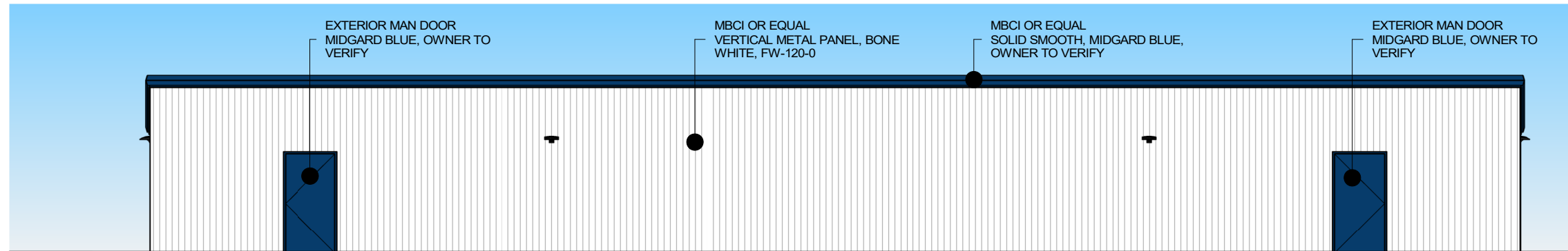
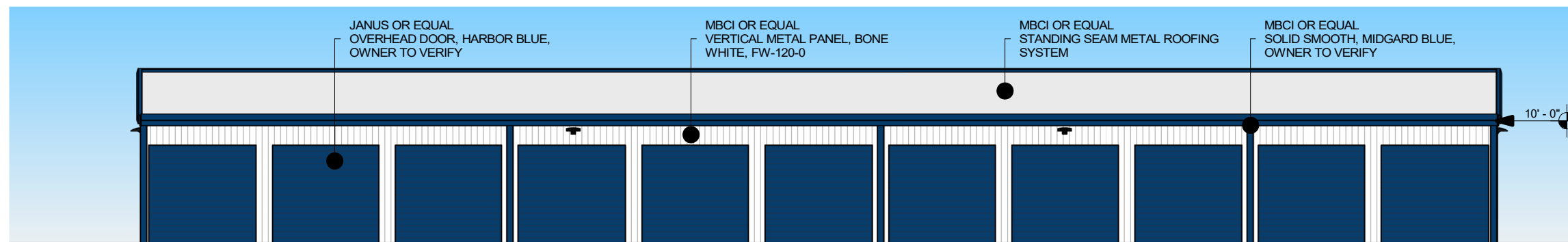


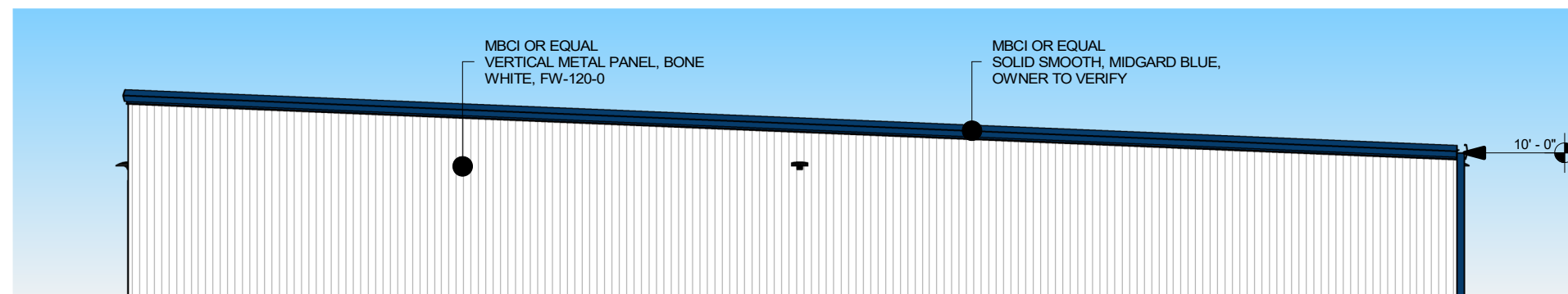
EXTERIOR ELEVATION - NORTH  
3/32" = 1'-0"



EXTERIOR ELEVATION - WEST  
3/32" = 1'-0"



EXTERIOR ELEVATION - EAST  
3/32" = 1'-0"

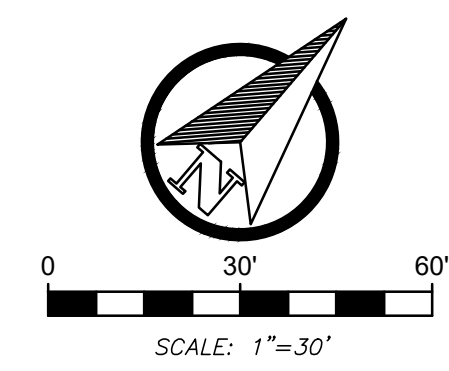


EXTERIOR ELEVATION - SOUTH  
3/32" = 1'-0"

MIDGARD SELF STORAGE - HARBINGER

8659 CARATOKE HIGHWAY  
HARBINGER, NC 27964

C:\USERS\BARBIE KELLY\CONTINUED-MASTER (DROPPBOX)\BRYAN RUSSELL (CONTINUED-MASTER)\PROJECTS\2022\22-419 - SELF-STORAGE - HARBINGER, NC.DWG



### LEGEND

- PROPERTY LINE
- SETBACK LINE
- EASEMENT LINE
- NEW ASPHALT
- EXISTING CONTOUR
- PROPOSED CONTOUR
- GAS
- UNDERGROUND WATER SERVICE
- UNDERGROUND SEWER SERVICE
- UNDERGROUND TELECOM SERVICE
- UNDERGROUND POWER SERVICE
- FIRE HYDRANT
- EXISTING LIGHT
- PROPOSED LIGHT

### SITE NOTES:

1. COMPLETION OF ALL WORK SHALL BE IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS, AS WELL AS, WITH FEDERAL, STATE AND LOCAL REGULATIONS. DEVIATION FROM THESE MAY CAUSE THE PROJECT TO BE UNACCEPTABLE.
2. PROJECT TO BE DELIVERED IN ACCORDANCE WITH AMERICANS WITH DISABILITY ACT (ADA) PER FEDERAL, STATE AND LOCAL CODES.
3. PROJECT TO BE DELIVERED IN ACCORDANCE WITH THE UNIFORM TRAFFIC CONTROL MANUAL (MUTCD), ASHTO, AS WELL AS STATE AND LOCAL REGULATIONS.
4. ARCHITECTURAL PLANS ARE TO GOVERN IN THE AREA WITHIN 5' OF THE BUILDING ENVELOPE. THIS IS TO INCLUDE, BUT NOT LIMITED, TO STEPS, STOOPS, SIDEWALKS, RAMPS, HANDRAILS, ETC. SITE CONTRACTOR IS RESPONSIBLE FOR ALL WORK OUTSIDE OF THIS ENVELOPE.
5. EXISTING AND REMAINING FACILITIES, WHETHER ON THE PROPERTY OR ON ADJACENT PROPERTIES, SHALL BE MAINTAINED IN THEIR ORIGINAL CONDITIONS. IF DISTURBED, THESE STRUCTURES SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
6. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL AS-BUILTS AND OTHER CERTIFICATIONS IN ORDER TO CAUSE THE ACCEPTANCE OF THE PROJECT BY THE CLIENT AND RELEASE OF A CERTIFICATE OF OCCUPANCY.
7. CONTRACTOR TO VERIFY THE EXISTING CONDITIONS ON WHICH THE PROJECT DESIGNS (ALL PHASES) ARE BASED AND BECOME FAMILIAR WITH ALL NECESSARY INFORMATION, WHETHER ON THE SUBJECT TRACT OR ADJACENT PROPERTIES. IF UNKNOWN CONDITIONS ARE DISCOVERED WHICH JEOPARDIZES THE SCOPE AND DELIVERY OF THE PROJECT, THE CONTRACTOR IS TO PROVIDE IMMEDIATE WRITTEN NOTIFICATION TO THE ENGINEER.
8. ALL EASEMENTS REQUIRED TO COMPLETE THE WORK, BUT NOT PROVIDED BY THE CLIENT, ARE THE RESPONSIBILITY OF THE CONTRACTOR.
9. THE CONTRACTOR SHALL DELIVER THE PARKING LOT PAINTING AND STRIPING WITH A MINIMUM OF TWO COATS OF PAINT PER PROJECT SPECIFICATIONS.



**CONTINUED GROUP**  
 7555 COMMERCE DRIVE  
 SUITE 600  
 DECATUR, GA 30030  
 770.335.7721  
 www.fcj.engineer



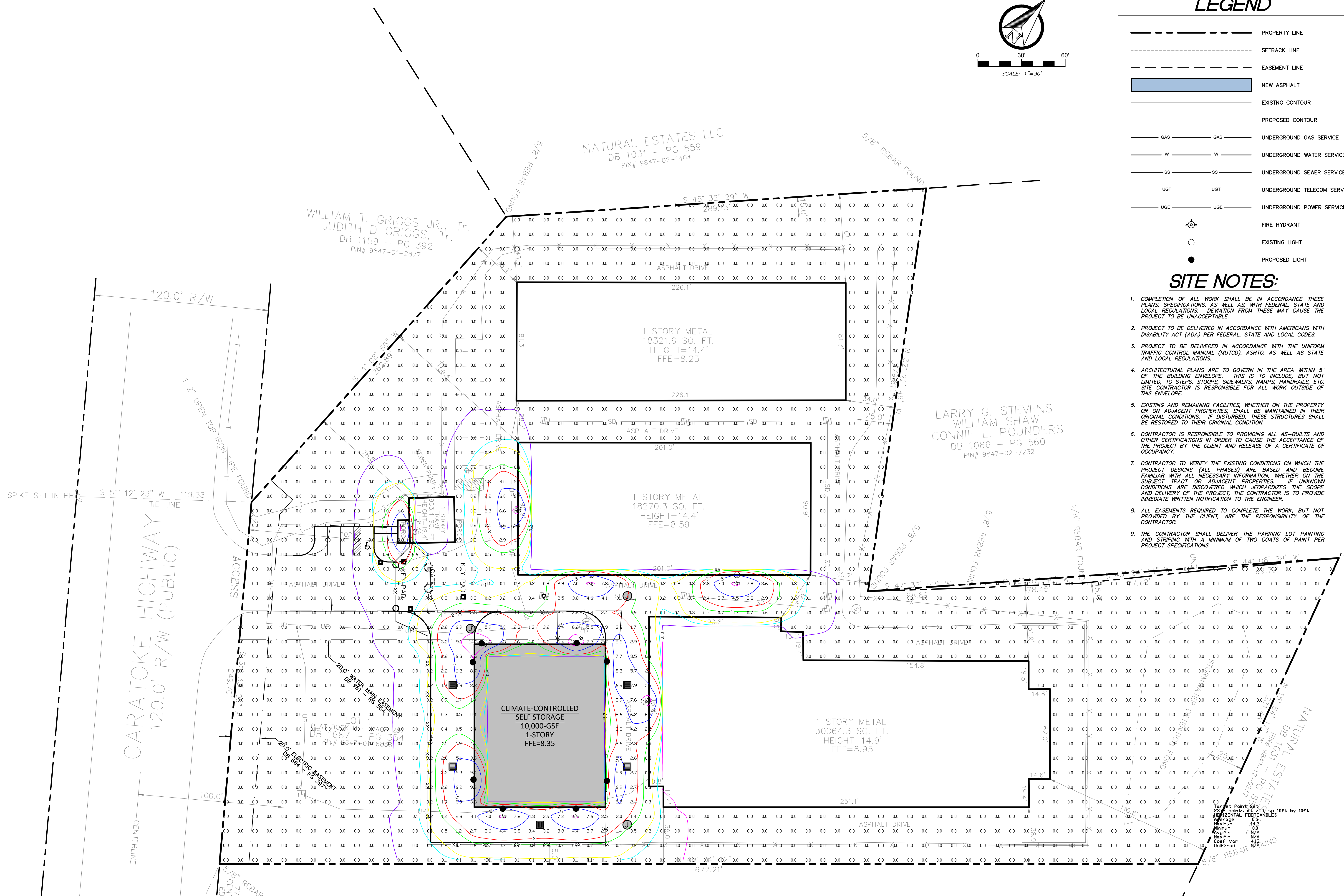
**RELIANT**  
 Real Estate Management, LLC  
 1146 CANTON ST.  
 ROSWELL, GA 30075  
 CONTACT: CAIT LOWE  
 770.609.8276

**MIDGARD SELF STORAGE FACILITY**  
 HARBINGER, NC  
 ISSUED FOR: CONCEPT  
 JURISDICTION: CURRITUCK COUNTY  
 LOCATION: 8659 CARATOKE HIGHWAY,  
 HARBINGER, NC

#	DATE	REVISIONS

DRAWN: KJH  
 CHECK: BHR  
 JOB NO: 22-419  
 DATE: 03/09/23

**PHOTOMETRIC PLAN**  
 SHEET **C201**



SYMBOL	QTY	MOUNTING HEIGHT	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	NUMBER LAMPS	LUMENS PER LAMP	LIGHT LOSS FACTOR	WATTAGE
●	8	10 FEET	LITHONIA LIGHTING	WDG3 LED P170 CRI 83 50K	WDGE 3 LED WITH P1 - PERFORMANCE PACKAGE, 5000K, 70 CRI, TYPE 3 OPTIC	1	7523.8	1	51.1717

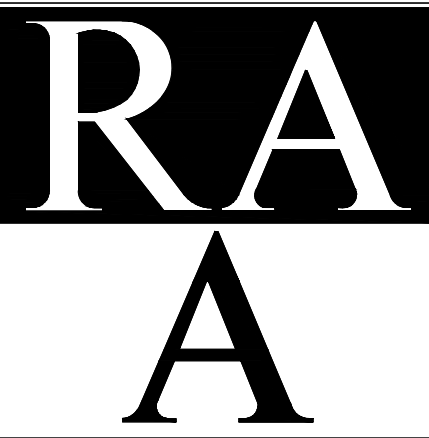
CUT

TOTAL DISTURBED AREA: 2.2 ACRES

2 CALIPER INCHES OF CANOPY TREES PER ACRE +  
1 SHRUB PER EACH 5 FEET OF BUILDING FACADE  
FACING A STREET.

(2) 2" CALIPER CANOPY TREES PROVIDED

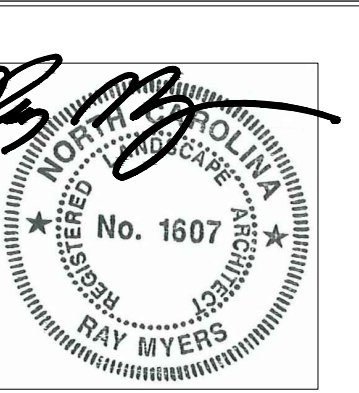
QU	SYM	Scientific Name	Common Name	Planting Size	Spacing	Comments
2		Quercus phellos	Willow Oak	2"-Cal	as shown	



RAA DESIGN, LLC  
Landscape Architects / Land Planners  
1155 Old Branch Road  
Alpharetta, Georgia 30009  
Phone (404) 852-2200  
Email rmj@raa-design.com

REVISIONS

NO.	DATE	DESCRIPTION



02-21-2023 SEAL

LANDSCAPE PLAN

MIDGARD  
SELF STORAGE  
HARBINGER, NORTH CAROLINA

DATE 02-21-2023  
JOB NO. 2023016  
SCALE  
DRAWN BY RM  
CHKD BY RM

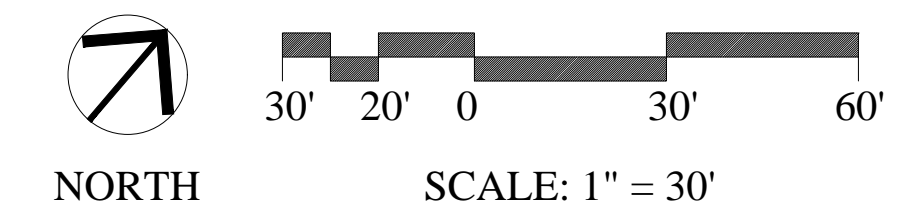
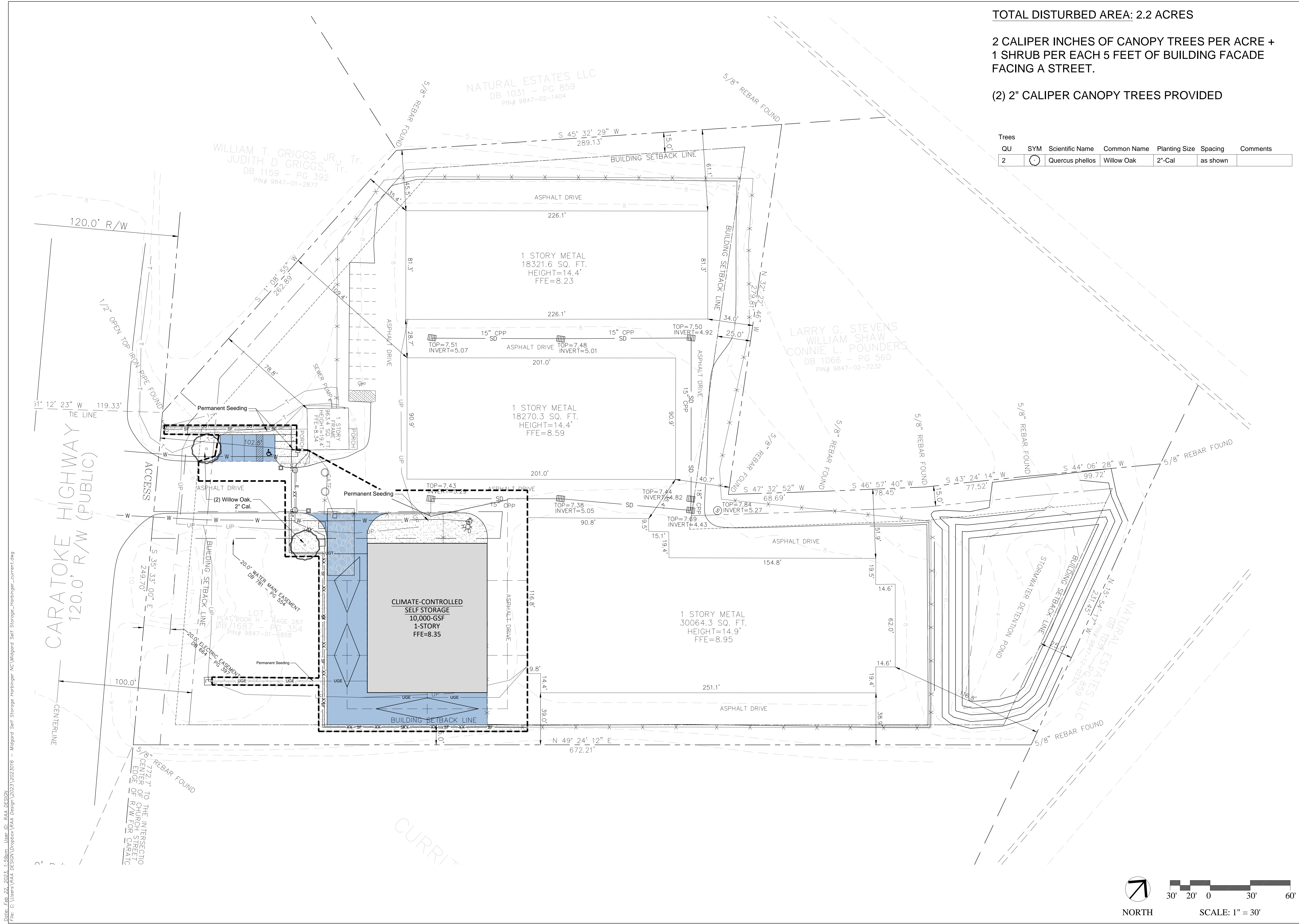
DISCLAIMER  
THIS DRAWING IS THE PROPERTY  
OF RAA DESIGN AND  
MAY NOT BE REPRODUCED WITHOUT  
WRITTEN CONSENT

RAA DESIGN

SHEET

LS-1

OF

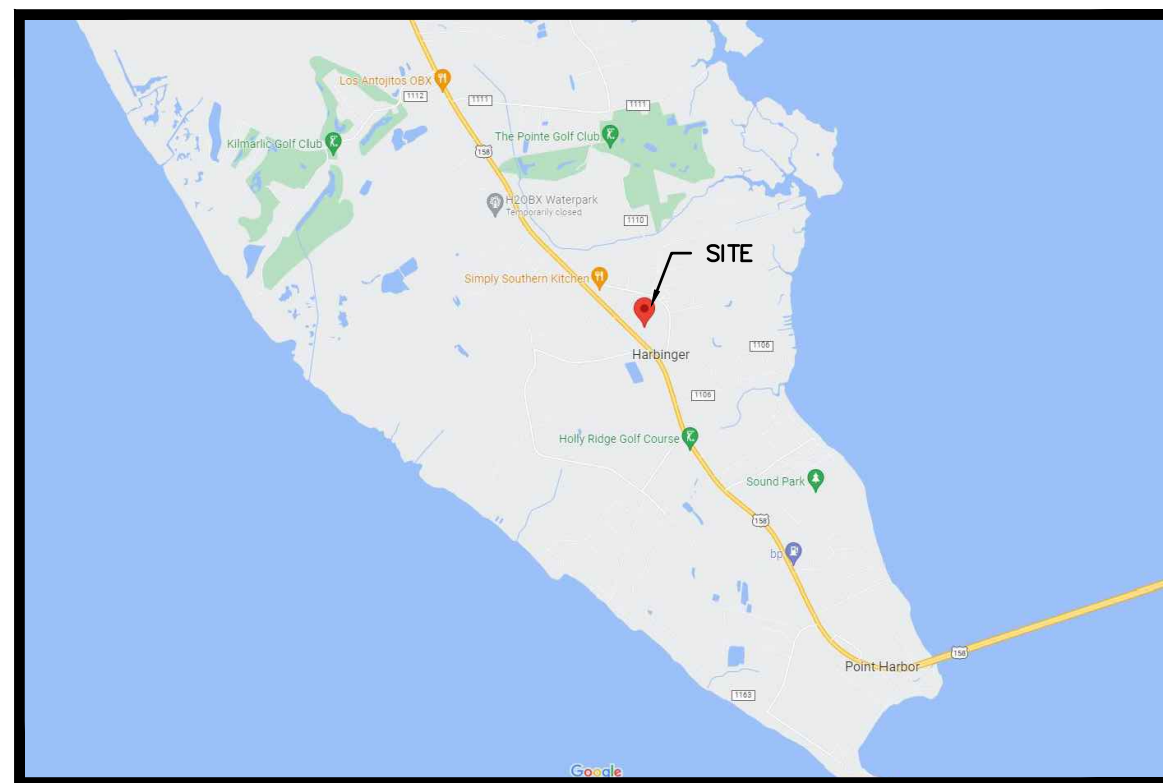


Date: Feb. 22, 2023, 1:59pm User: ID: RAA DESIGN  
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# MIDGARD HARBINGER, NC - SELF STORAGE EXPANSION

8659 CARATOKE HIGHWAY  
HARBINGER, NC 27964

PIN #: 9847-01-6856  
PID #: 0131000092G0000  
D.B. 1687, PG 354, CURRITUCK COUNTY  
CURRITUCK COUNTY PERMIT#:



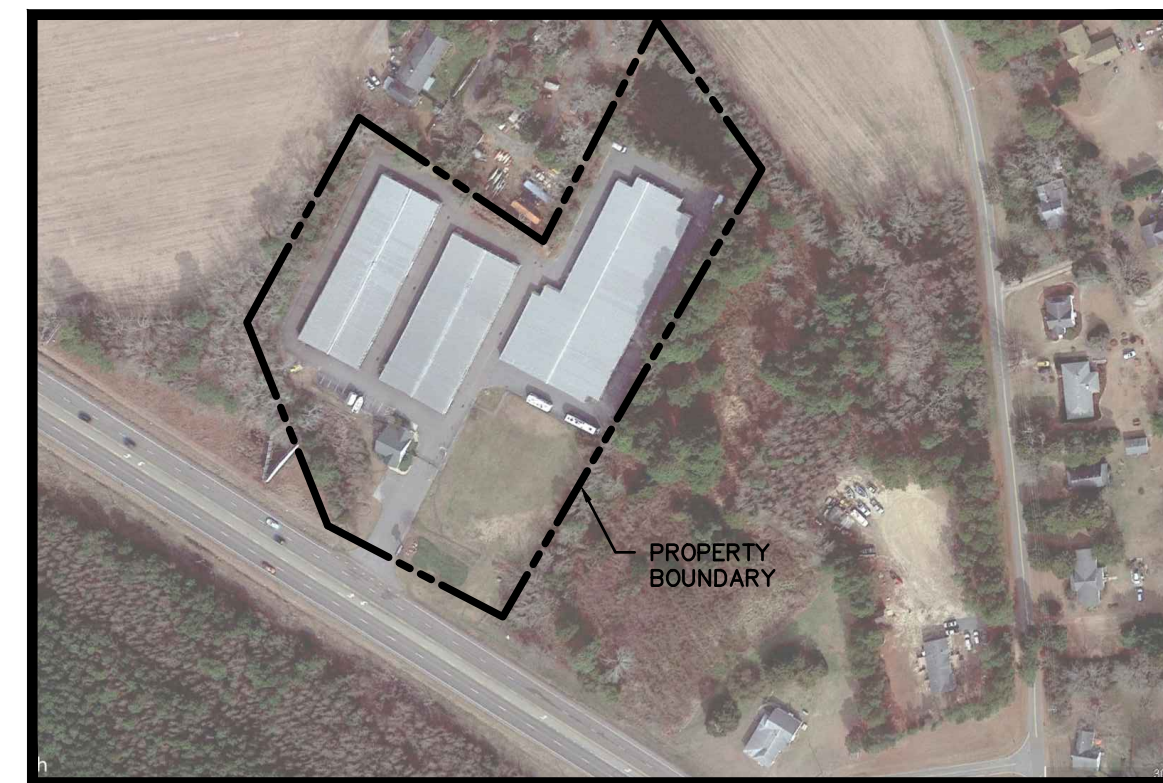
**VICINITY MAP**

NT.S.



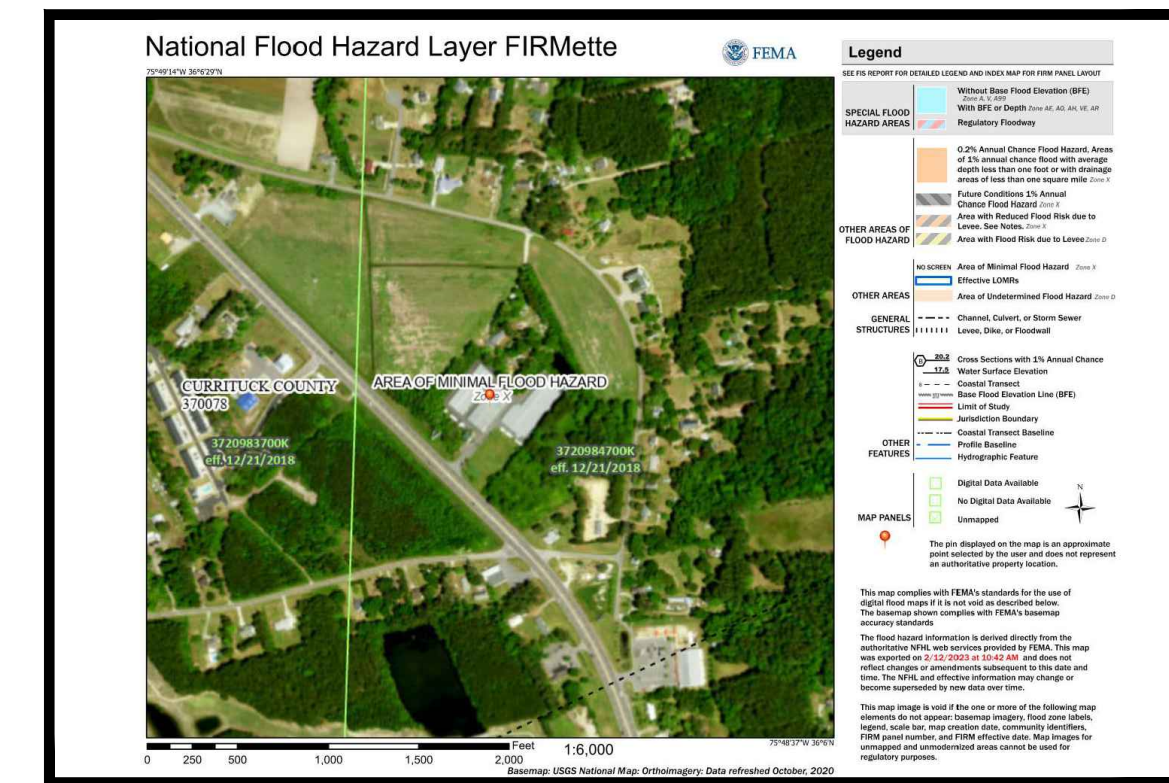
**USGS QUAD MAP**

NT.S.



**AERIAL MAP**

NT.S.



**FEMA MAP**

NT.S.

## SCOPE OF WORK

THE PROPOSED PROJECT INVOLVES THE EXPANSION OF AN EXISTING SELF-STORAGE FACILITY IN CURRITUCK COUNTY. A NEW 1-STORY CLIMATE-CONTROLLED STORAGE FACILITY SHALL BE CONSTRUCTED. ADDITIONAL PAVEMENT WILL BE INSTALLED, ALONG WITH THE REQUIRED POWER & TELECOM EXTENSIONS TO THE NEW STRUCTURE.

## GENERAL NOTES:

CONTRACTOR'S RESPONSIBILITY TO INCLUDE, BUT NOT LIMITED TO:

- CAUSE THE WORK TO BE COMPLETED PER FEDERAL, STATE AND LOCAL CODES DURING ALL PHASES OF THE PROJECT.
- VERIFY THE EXISTING CONDITIONS ON WHICH THE PROJECT DESIGNS (ALL PHASES) ARE BASED AND BECOME FAMILIAR WITH ALL NECESSARY INFORMATION, WHETHER ON THE SUBJECT TRACT OR ADJACENT PROPERTIES. IF UNKNOWN CONDITIONS ARE DISCOVERED WHICH JEOPARDIZES THE SCOPE AND DELIVERY OF THE PROJECT, THE CONTRACTOR IS TO PROVIDE IMMEDIATE WRITTEN NOTIFICATION TO THE ENGINEER.
- COORDINATE WITH UTILITY PROVIDERS TO CONFIRM THE LOCATION OF EXISTING AND PROPOSED SERVICES WILL BE ADEQUATE FOR THE DEVELOPMENT. THE ENGINEER DOES NOT ACCEPT RESPONSIBILITY FOR THE ACCURACY OF THE EXISTING UTILITY LOCATIONS AND PROPOSED LOCATIONS ARE APPROXIMATE IN NATURE.
- CONSTRUCTION LIMITS SHALL BE PROPERLY MARKED AND BARRIERS CREATED AS NECESSARY TO PROTECT CONSTRUCTION PERSONNEL AS WELL AS THE PUBLIC, OSHA AND ALL OTHER GOVERNING STANDARDS.
- PROVISION OF ALL NECESSARY WORK IN ORDER TO CAUSE THE PROJECT TO BE COMPLETED WHETHER OR NOT THE WORK IS SPECIFICALLY DESCRIBED WITHIN THE PROJECT DESIGNS OR REQUIRED BY REGULATION IN THE COURSE OF WORK.
- EROSION CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES DURING ALL PHASES OF THE PROJECT.
- DEMOLITION RESPONSIBILITIES:
  - CONSTRUCTION DEBRIS AND REFUSE RESULTING FROM DEMOLITION SHALL BE REMOVED FROM THE CONSTRUCTION LOCATION UNDER MEANS THAT ADHERE TO FEDERAL, STATE AND LOCAL REGULATIONS. UNDER NO CIRCUMSTANCES SHALL REFUSE MANAGEMENT COMPROMISE THE DELIVERY SCHEDULE OR QUALITY OF THE PROJECT.
  - FEDERAL, STATE AND LOCAL REGULATIONS SHALL BE ADHERED TO AT ALL TIMES DURING DEMOLITION.
  - PRIOR TO DEMOLITION COMMENCEMENT, CONTACT LOCAL "CALL DIG" SERVICES.
  - PROPER SHORING AND BRACING SYSTEMS SHALL BE UTILIZED FOR ALL EXCAVATIONS AT ALL TIMES. COMPLETELY FILL ALL EXCAVATIONS AT THE END OF EACH DAY.
  - BURNING OF MATERIALS IS PROHIBITED EXCEPT BY PROPER PERMIT FROM GOVERNING AGENCY.
  - EXISTING AND REMAINING FACILITIES, WHETHER ON THE PROPERTY OR ON ADJACENT PROPERTIES, SHALL BE MAINTAINED IN THEIR ORIGINAL CONDITIONS. IF DISTURBED, THESE STRUCTURES SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
  - EROSION CONTROL MEASURES DURING DEMOLITION PHASE SHALL BE MAINTAINED AT ALL TIMES DURING ALL PHASES OF THE PROJECT, PER FEDERAL, STATE AND LOCAL CODES. NO EARTHMOVING OR DISTURBANCE SHALL BE CAUSED TO HAPPEN UNTIL ALL APPROPRIATE MEASURES HAVE BEEN PUT INTO PLACE.

SITE DATA	
LOCAL JURISDICTION	CURRITUCK COUNTY
PRIMARY PARCEL ID	9847-01-6856
ZONING DESIGNATION	GB (GENERAL BUSINESS)
OVERLAY DISTRICT	N/A
TOTAL PROPERTY ACREAGE	±5.4 ACRES
TOTAL DISTURBED ACREAGE	±0.8 ACRES
PROPOSED EXPANSION	1-STORY CLIMATE CONTROLLED STORAGE (±10,000-GSF)
MIN. LOT SIZE	40,000-SF
MIN. LOT WIDTH	125 FEET
MAXIMUM IMPERVIOUS %	65%
EXISTING IMPERVIOUS %	53%
PROPOSED IMPERVIOUS %	61%
FRONT BUILDING SETBACK	30'
SIDE BUILDING SETBACK	15'
REAR BUILDING SETBACK	25'
EXISTING NON-CONFORMING SF	67,618-SF
MAX EXPANSION ALLOWED SF	33,809-SF
PROPOSED EXPANSION SF	10,000-SF
MAX. LOT COVERAGE	65%
PROPOSED LOT COVERAGE	61%

PARKING SUMMARY			
	UNIT	REQUIRED	PROVIDED
EXISTING STORAGE	377	4	10
STORAGE UNITS	200	2	6
TOTAL	577	6	16

REQUIREMENTS BASED ON:

- 100 STORAGE UNITS

## SHEET INDEX

- C100 COVER SHEET
- C200 SITE & UTILITY PLAN
- C300 GRADING & DRAINAGE PLAN
- C500 EROSION & SEDIMENT CONTROL NOTES
- C501 DEMO + INITIAL PHASE E+S CONTROL
- C502 FINAL PHASE E+S CONTROL PLAN
- C601 E+S CONTROL BEST MANAGEMENT PRACTICES
- C602 E+S CONTROL BEST MANAGEMENT PRACTICES
- C603 E+S CONTROL BEST MANAGEMENT PRACTICES
- C604 E+S CONTROL BEST MANAGEMENT PRACTICES
- C701 STANDARD DETAILS
- C702 STANDARD DETAILS
- LS-1 LANDSCAPE PLAN
- S-1 ALTA/NSPS LAND TITLE SURVEY

## GPS LOCATION (DECIMAL DEGREES)

LATITUDE: N 36.103406°  
LONGITUDE: W 75.815987°

THE PROPERTY BEING DEVELOPED IS LOCATED WITHIN ZONE 'X' (AN AREA OF MINIMAL FLOOD HAZARD) AS CAN BE ABOVE ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY MAP 3720984600K, CURRITUCK COUNTY, 370078.

## PROJECT DEVELOPER

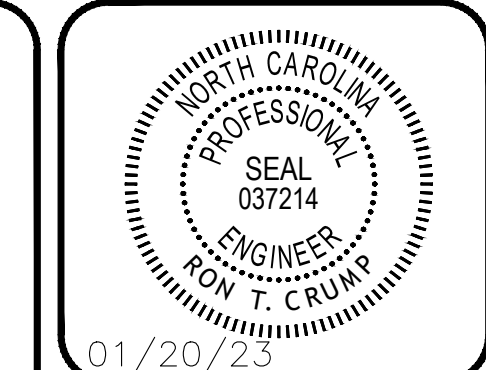
RELIANT REAL ESTATE MANAGEMENT, LLC  
1146 CANTON STREET  
ROSWELL, GA 30075  
CONTACT: MATT GARCIA  
PHONE: (770) 609-8276  
EMAIL: MGARCIA@RELIANT-MGMT.COM

## PROJECT CIVIL ENGINEER

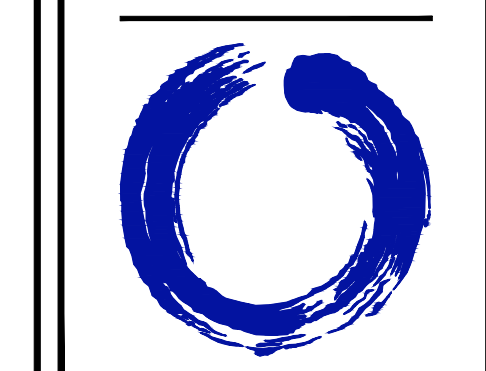
CONTINEO GROUP, LLC  
755 COMMERCE DRIVE  
SUITE 800  
ATLANTA, GA 30030  
CONTACT: RON CRUMP, P.E.  
PHONE: (404) 556-7721  
EMAIL: RONC@THECONTINEOGROUP.COM

## PROJECT LANDSCAPE ARCHITECT

RAA DESIGN, LLC  
11395 OLD ROSWELL ROAD  
ALPHARETTA, GA 30009  
CONTACT: RAY MYERS  
PHONE: (770) 846-9745  
EMAIL: RMYERS@RAA-DESIGN.COM



CONTINEO GROUP  
755 COMMERCE DRIVE  
SUITE 800  
DECATUR, GA 30030  
770.335.7721  
www.tcg.engineer



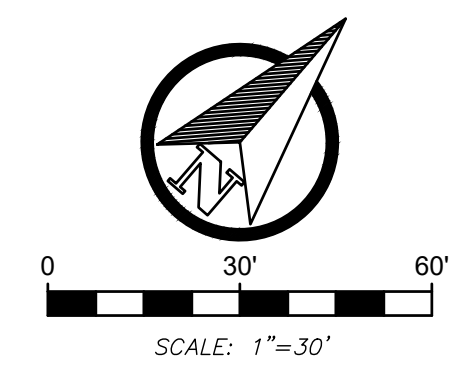
RELIANT  
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1146 CANTON ST.  
ROSWELL, GA 30075  
CONTACT: MATT GARCIA  
770.609.8276

MIDGARD SELF STORAGE FACILITY  
HARBINGER, NC  
ISSUED FOR: CONCEPT  
JURISDICTION: CURRITUCK COUNTY  
LOCATION: 8659 CARATOKE HIGHWAY,  
HARBINGER, NC

#	DATE	REVISIONS

DRAWN: JH  
CHECK: BHR  
JOB NO: 22-419  
DATE: 10/18/22

COVER SHEET  
**C100**



# LEGEND

- PROPERTY LINE
- SETBACK LINE
- EASEMENT LINE
- NEW ASPHALT
- EXISTING CONTOUR
- PROPOSED CONTOUR
- GAS
- UNDERGROUND WATER SERVICE
- UNDERGROUND SEWER SERVICE
- UNDERGROUND TELECOM SERVICE
- UNDERGROUND POWER SERVICE
- FIRE HYDRANT

# SITE NOTES:

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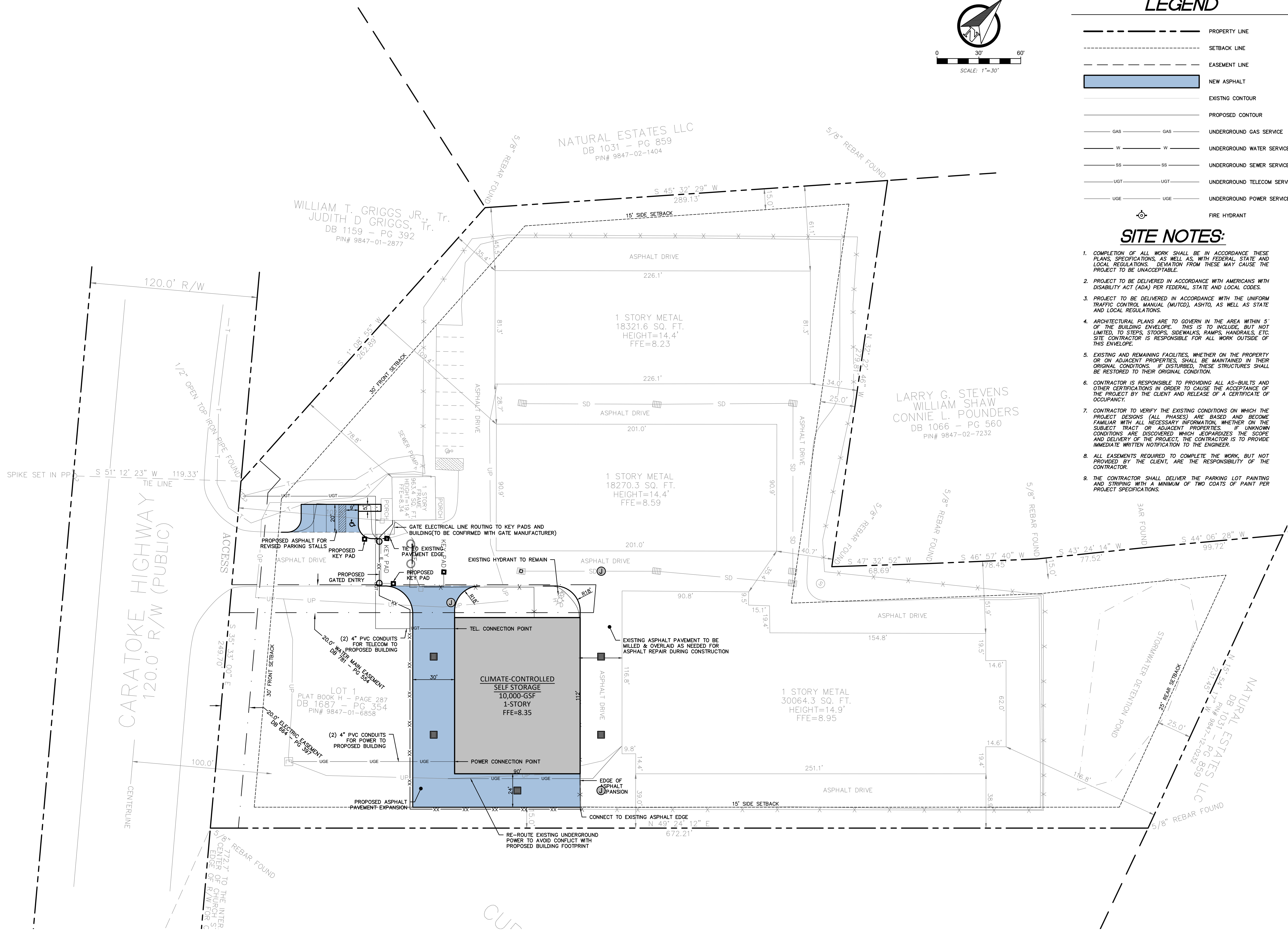
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 ROSWELL, GA 30075  
 CONTACT: CAIT LOWIE  
 770.609.8276

**MIDGARD SELF STORAGE FACILITY**  
 HARBINGER, NC  
 ISSUED FOR: CONCEPT  
 JURISDICTION: CURRITUCK COUNTY  
 LOCATION: 8659 CARATOKE HIGHWAY,  
 HARBINGER, NC

#	DATE	REVISIONS

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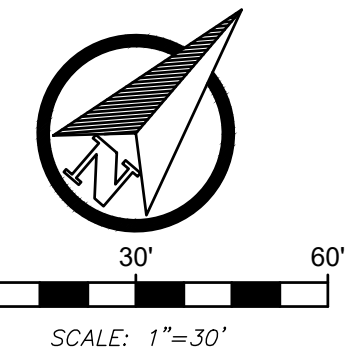
**SITE + UTILITY PLAN**  
 SHEET **C200**



C:\USERS\THEO\CONTINEO-MASTER DROPBOX\BRYAN RUSSELL (DROPPBOX)\CONTINEO-MASTER (P-DRIVE) PROJECTS\2022\22-419 - SELF-STORAGE - HARBINGER, NC.DWG

# GRADING NOTES

- PRIOR TO WORK COMMENCEMENT, CONTRACTOR IS TO CALL LOCAL "CALL DIG" SERVICES FOR LOCATION OF ALL UNDERGROUND UTILITIES. CONTRACTOR SHALL COORDINATE WITH ALL UTILITIES PRIOR TO COMMENCEMENT OF WORK, WHICH INCLUDES BUT NOT LIMITED TO, RELOCATION OF UTILITIES ALONG ROADWAYS AND OFF-SITE IMPROVEMENTS IN ORDER TO DELIVER THE PROJECT.
- REFER TO THE GEOTECHNICAL REPORT FOR INFORMATION ON EXISTING SOIL CONDITIONS.
- THE CONTRACTOR IS TO REMOVE ALL MATERIALS DEEMED UNSUITABLE BY THE OWNER AND/OR ENGINEER.
- POSITIVE DRAINAGE AWAY FROM ALL BUILDINGS SHALL BE MAINTAINED AT ALL TIMES.
- THE CONTRACTOR SHALL VALIDATE AND ACCEPT TOPOGRAPHIC INFORMATION PROVIDED PRIOR TO COMMENCEMENT OF WORK. ANY DEVIATIONS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER.
- CONTRACTOR TO PROVIDE CLEAN PAVEMENT AND CURB EDGES, VIA SAW-CUTTING OR OTHER METHODS, IF WORK IS WITHIN EXISTING PAVEMENT AREAS.
- REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ALL STRUCTURAL FOUNDATIONS, SLABS, AND EARTHEN BUILDING PADS.
- EXISTING AND REMAINING FACILITIES, WHETHER ON THE PROPERTY OR ON ADJACENT PROPERTIES, SHALL BE MAINTAINED IN THEIR ORIGINAL CONDITIONS. IF DISTURBED, THESE STRUCTURES SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
- ALL DISTURBED AREAS WITHOUT PERMANENT HARD SURFACES SHALL BE TREATED WITH PERMANENT STABILIZATION PER THE APPROPRIATE STATE AND LOCAL EROSION AND SEDIMENT CONTROL STANDARDS.
- THE CONTRACTOR SHALL DELIVER THE EARTHWORK FOR THE PROJECT ON AN UNCLASSIFIED BASIS.
- IN THE ABSENCE OF DIRECTION FROM OTHER SOURCES SUCH AS GEOTECHNICAL REPORTS, THE PLACEMENT OF FILL MATERIAL SHALL BE PER THE FOLLOWING:
  - CLEAN, GRANULAR MATERIAL, WHICH SHALL BE VERIFIED BY THE CONTRACTOR FOR SUITABILITY BY PERFORMING A GRADATION TEST.
  - PLACED IN LIFT THICKNESS NOT TO EXCEED EIGHT INCH.
  - POSSESS MOISTURE WITHIN 3% OF OPTIMUM.
  - COMPACTED TO 95% MINIMUM DENSITY OF THE MAXIMUM DRY DENSITY UTILIZING THE MODIFIED PROCTOR METHOD (ASTM D-1557)
- ALL STORMWATER SYSTEMS ARE TO BE DELIVERED TO THE OWNER CLEAN AND FREE OF DEBRIS.
- PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR IS TO NOTIFY THE ENGINEER OF ANY POTENTIAL CONFLICTS BETWEEN EXISTING AND PROPOSED GRAVITY UTILITIES.
- ANY RETAINING WALLS DEPICTED WITHIN THESE PLANS ARE TO BE DESIGNED UNDER THE DIRECTION OF THE CONTRACTOR AND ARE SHOWN FOR COORDINATION PURPOSES ONLY. THE CIVIL ENGINEER ACCEPTS NO RESPONSIBILITY FOR THESE WALLS.
- ALL PIPES ARE MEASURED BETWEEN THE CENTERS OF MANHOLES/STRUCTURES.
- THE MATERIAL FOR ALL STORM DRAINAGE PIPE SHALL CONFORM TO THE MINIMUM REQUIREMENTS SPECIFIED BY THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARDS.
- ALL CMP (QPL-56) MUST HAVE A MINIMUM OF 3' COVER. ALL HDPE (QPL-51) AND RCP (QPL-04) MUST HAVE A MINIMUM OF 2' COVER.



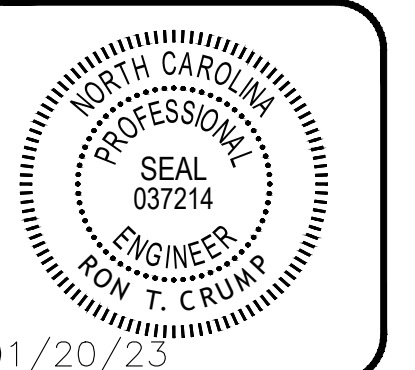
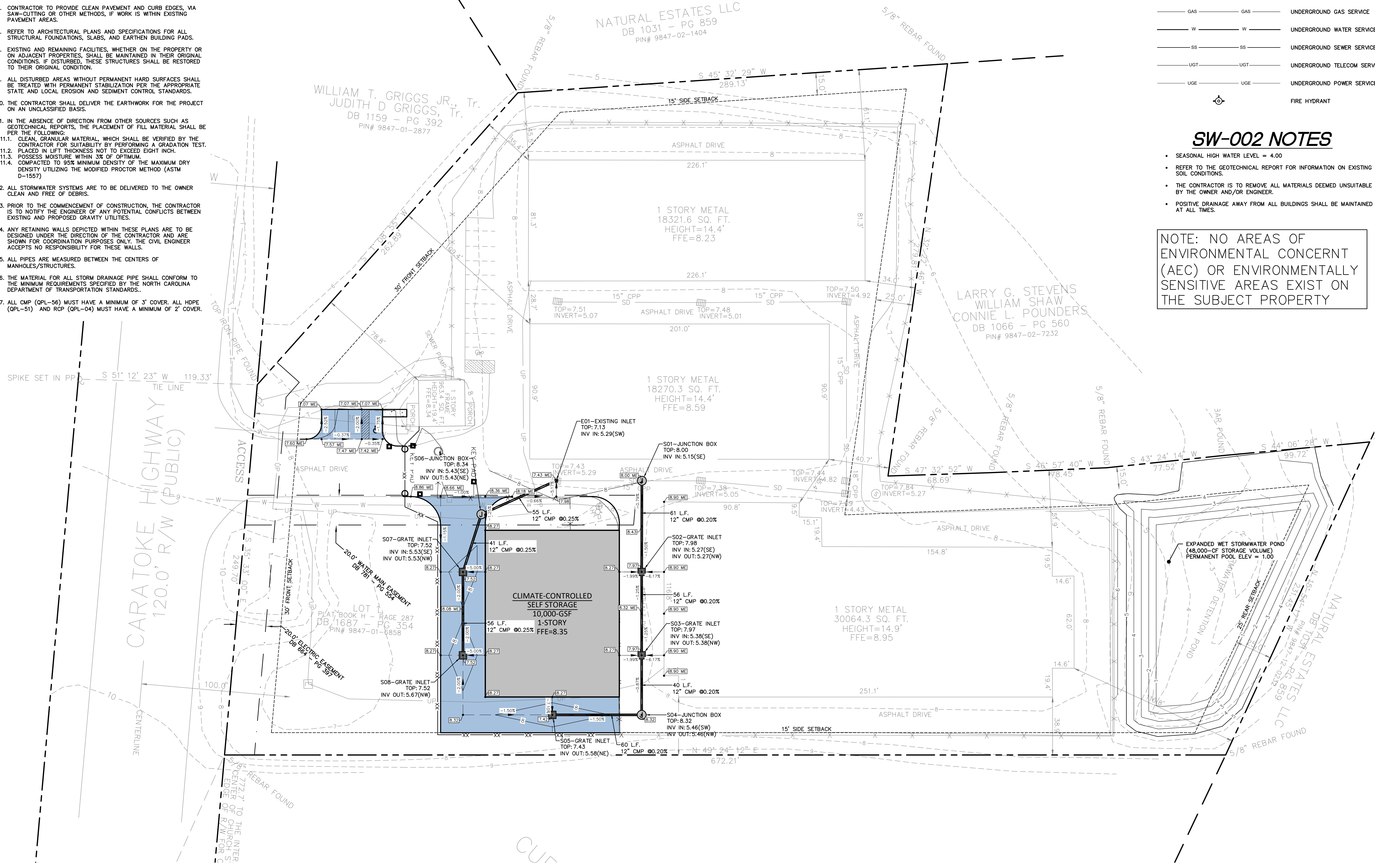
# LEGEND

- PROPERTY LINE
- SETBACK LINE
- EASEMENT LINE
- ASPHALT PAVEMENT
- EXISTING CONTOUR
- PROPOSED CONTOUR
- GAS UNDERGROUND GAS SERVICE
- UNDERGROUND WATER SERVICE
- UNDERGROUND SEWER SERVICE
- UNDERGROUND TELECOM SERVICE
- UNDERGROUND POWER SERVICE
- FIRE HYDRANT

# SW-002 NOTES

- SEASONAL HIGH WATER LEVEL = 4.00
- REFER TO THE GEOTECHNICAL REPORT FOR INFORMATION ON EXISTING SOIL CONDITIONS.
- THE CONTRACTOR IS TO REMOVE ALL MATERIALS DEEMED UNSUITABLE BY THE OWNER AND/OR ENGINEER.
- POSITIVE DRAINAGE AWAY FROM ALL BUILDINGS SHALL BE MAINTAINED AT ALL TIMES.

NOTE: NO AREAS OF ENVIRONMENTAL CONCERN (AEC) OR ENVIRONMENTALLY SENSITIVE AREAS EXIST ON THE SUBJECT PROPERTY



**CONTINEO GROUP**  
 7555 COMMERCE DRIVE  
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 DECATUR, GA 30030  
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 ISSUED FOR: CONCEPT  
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 HARBINGER, NC

#	DATE	REVISIONS

DRAWN: JH	CHECK: BHR
JOB NO: 22-419	DATE: 10/18/22

**GRADING + DRAINAGE PLAN**  
 SHEET **C300**

C:\USERS\THEO\CONTINEO-MASTER DROPBOX\BRYAN RUSSELL (DROPOX)\CONTINEO-MASTER PROJECTS\2022\22-419 - SELF-STORAGE - HARBINGER, NC.DWG

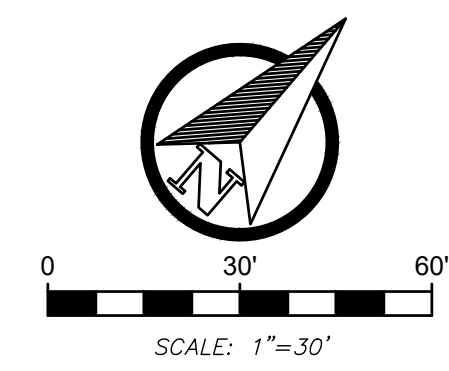


**DEMOLITION NOTES:**

- ALL MATERIALS FROM DEMOLITION SHALL BE REMOVED FROM THE SITE BY THE GENERAL CONTRACTOR OR SUBCONTRACTOR UNLESS APPROVED FOR REUSE ON SITE BY THE STRUCTURAL, GEOTECHNICAL ENGINEERS AND GOVERNING AGENCIES.
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**E+S CONTROL LEGEND**

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- SURFACE ROUGHENING
- TOPSOILING
- TREE PRES. & PROT.
- TEMP. GRAVEL ENTRANCE
- TEMPORARY SEEDING
- PERMANENT SEEDING
- SODDING
- MULCHING
- RIP-RAP
- ROLLED E.C. PRODUCTS
- TD → TEMPORARY DIVERSION
- PD → PERMANENT DIVERSION
- GRASS-LINED CHANNEL
- OUTLET STABILIZATION
- TEMP. EXC. INLET PROT.
- CLOTH INLET PROT.
- TEMP. SEDIMENT TRAP
- SF SILT FENCE
- → → CHECK DAM
- DC DUST CONTROL
- ROCK PIPE INLET PROTECTION



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 HARBINGER, NC**

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 LOCATION: 8659 CARATOKE HIGHWAY,  
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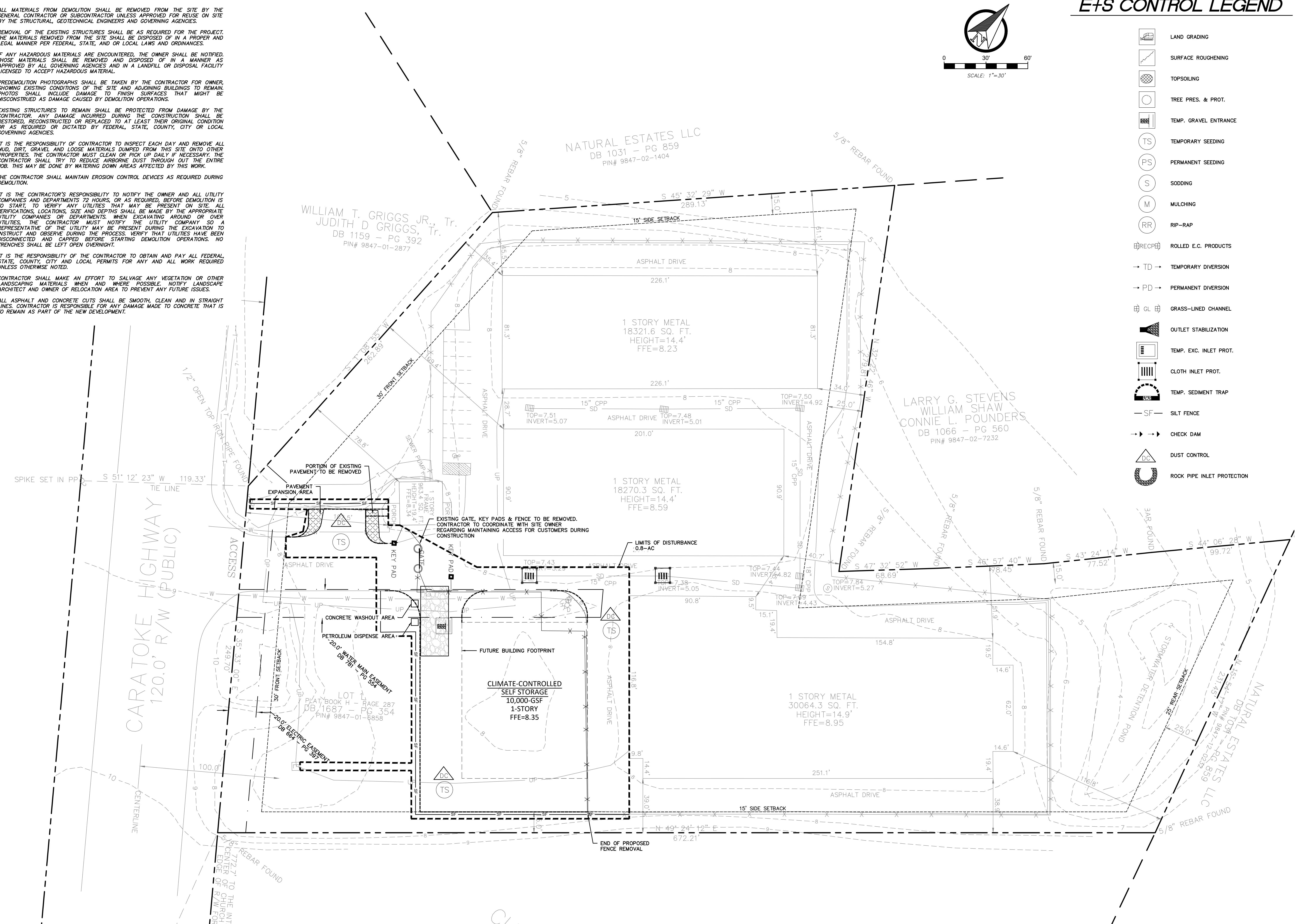
#	DATE	REVISIONS

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JOB NO: 22-419	DATE: 10/18/22

**INITIAL PHASE  
 EROSION +  
 SEDIMENT CONTROL**

SHEET **C501**

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These drawings were prepared by the undersigned professional engineer in accordance with the provisions of the North Carolina Professional Engineers Act. The undersigned professional engineer is not responsible for any errors or omissions in these drawings or for any consequences that may result from their use. The undersigned professional engineer is not responsible for any consequences that may result from their use. The undersigned professional engineer is not responsible for any consequences that may result from their use.

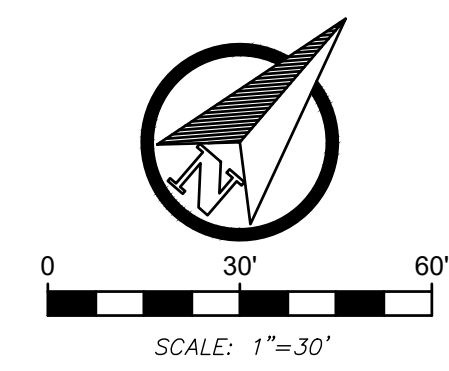


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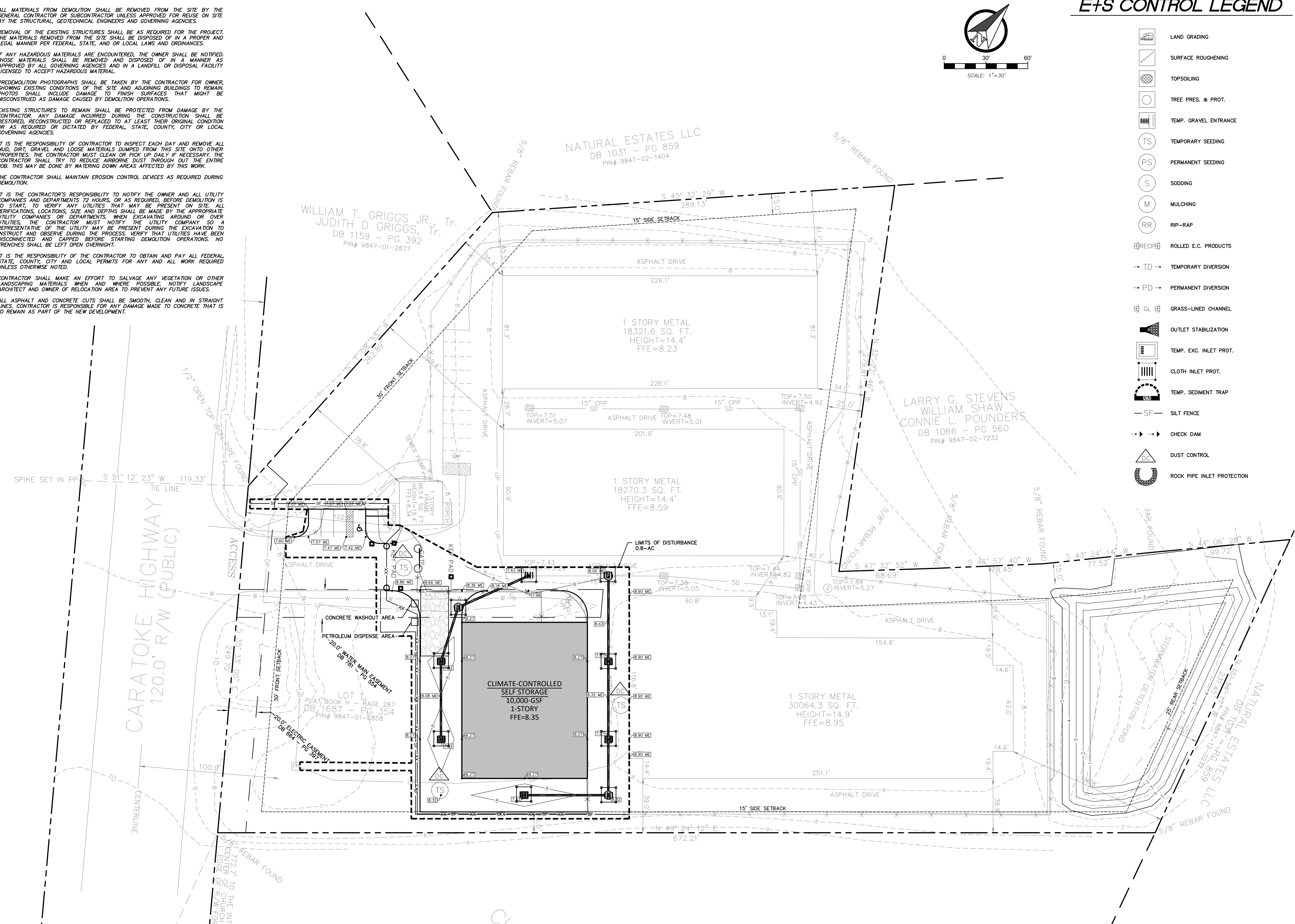
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**INTERMEDIATE  
 PHASE EROSION +  
 SEDIMENT CONTROL**

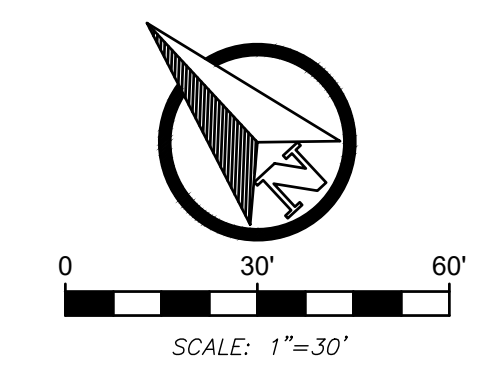
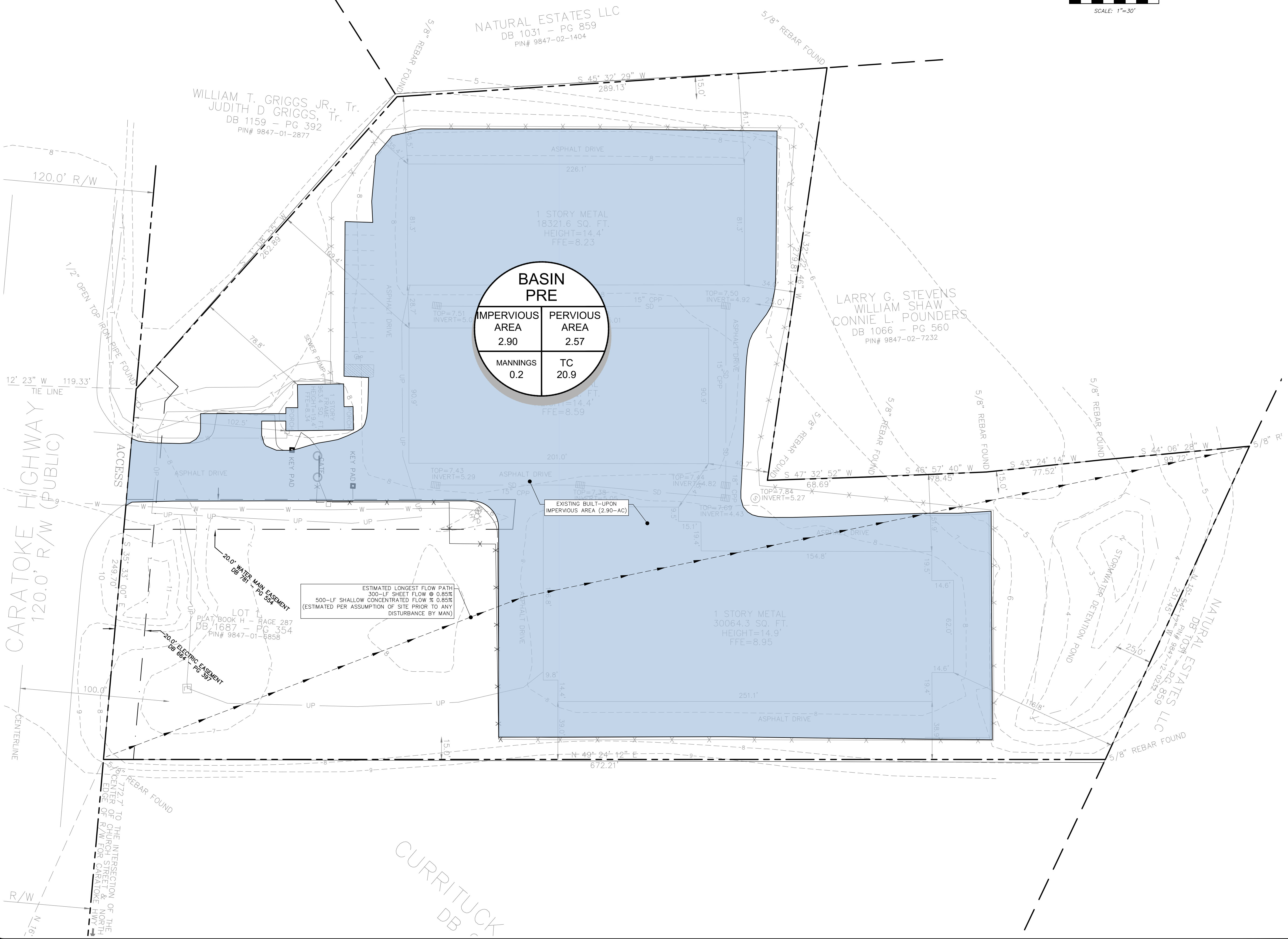
SHEET **C502**

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These drawings were prepared by the undersigned professional engineer in accordance with the provisions of the North Carolina Professional Engineers Act. The undersigned hereby certifies that he/she is a duly licensed professional engineer in the State of North Carolina and that he/she is the author of these drawings and that he/she is not providing engineering services to any other party in connection with these drawings. The undersigned further certifies that he/she is not providing engineering services to any other party in connection with these drawings.

NOTE: THE 'EXISTING CONDITION' SHALL BE MODELED AS UNDISTURBED WOODED CONDITION



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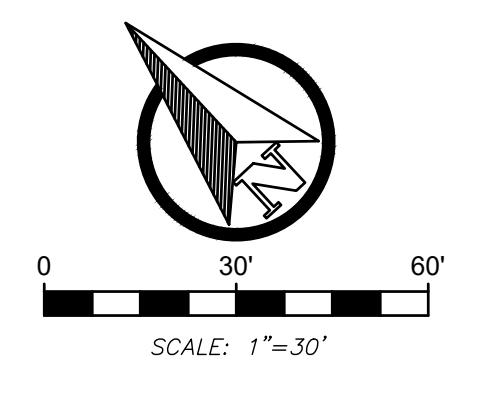
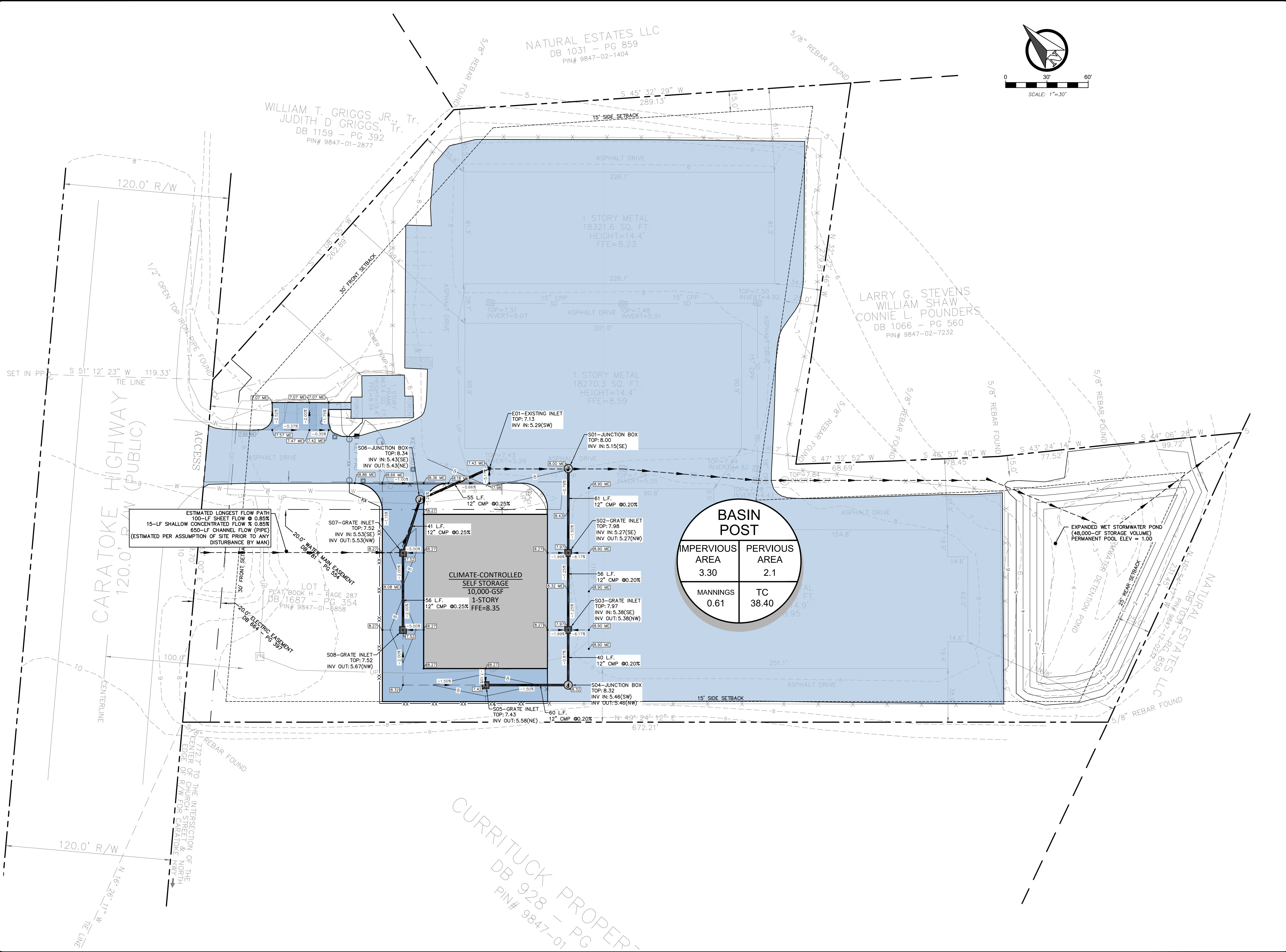
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**PRE-DEVELOPED CONDITIONS**

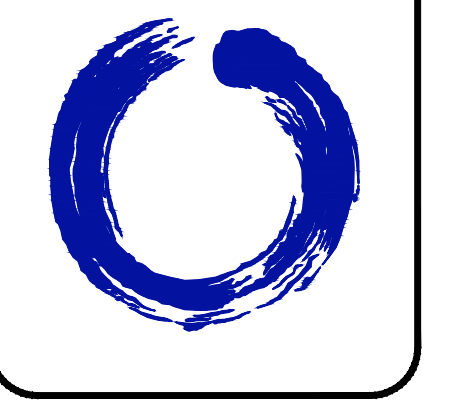
SHEET **H101**

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**POST-DEVELOPED CONDITIONS**

SHEET **H102**

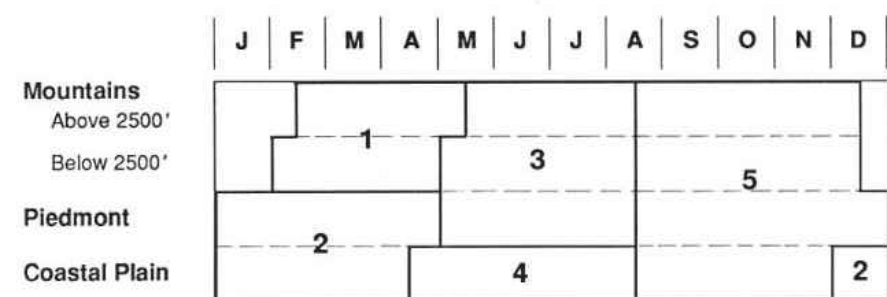
TEMPORARY SEEDING

Purpose To stabilize disturbed areas before final grading or in a season not suitable for permanent seeding (Figure 6.10a).



- Minimum Requirements: Seedbed preparation: lime and fertilizer incorporated 4-6 inches, where conditions allow, steep slopes roughened by tracking. Plant selection: temporary species appropriate for season and region (Figure 6.10b). Seed quality: North Carolina certified seed, tested within the past 9 months. Mulch: effective mulch such as clean grain straw, tacked and/or tied down with netting to protect seedbed and encourage plant growth (reference Practice 6.14, Mulching).

Installation Seedbed Preparation Apply soil amendments evenly and incorporate to a depth of 4-6 inches, if possible. Follow recommendations of soil tests or apply 2000 lb/acre ground agricultural limestone and 700-1000 lb/acre 10-10-10 fertilizer. Loosen surface just before broadcasting seed (reference Practice 6.11, Permanent Seeding). Plant Selection Select an appropriate temporary species based on the calendar in Figure 6.10b. Avoid seeding in December or January. If necessary to seed at these times, use eye grain and a securely tacked mulch.



Recommended Plantings Legend: 1 Korean Lespedeza with Rye Grain 50 lb/acre 120 lb/acre; 2 Kobe Lespedeza with Rye Grain 50 lb/acre 120 lb/acre; 3 German Millet or Sudangrass 40 lb/acre 50 lb/acre; 4 German Millet 40 lb/acre; 5 Rye Grain 120 lb/acre.

Figure 6.10b Calendar for scheduling temporary seedings.

Common Trouble Points

Apply seed evenly using a cyclone seeder, rotary-spreader, drop-spreader, cultipack seeder, or hydroseeder. Hand broadcasting is not recommended because it is difficult to achieve a uniform stand. Cover broadcast seed by raking or by dragging a chain. Firm lightly with a roller or cultipacker. When drill-seeding, plant small grains no more than 1 inch deep, and grasses and legumes no more than 1/2 inch deep. Mulch all seedings to reduce erosion and encourage seedling growth. Straw mulch is commonly used on gently sloping areas. Spread evenly at a rate of 2 tons/acre and anchor securely with tackifier, asphalt, or netting. Netting is the most effective method on steep slopes and in channels (reference Practice 6.14, Mulching).

Maintenance

Inspect within 6 weeks of planting to see if stands are adequate. Check for damage after heavy rains. Stands should be uniform and dense. Fertilize, reseed, and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary. Topdress fall plantings with 50 lb/acre nitrogen in February or March.

PERMANENT SEEDING

Purpose To stabilize disturbed areas with vegetation for periods longer than 12 months (Figure 6.11a).



- Minimum Requirements: Surface roughening: slopes steeper than 3:1 should be roughened by tracking, grooving, or furrowing. Amendments: lime and fertilizer, incorporated 4-6 inches where conditions allow (refer to Seedbed Preparation, below). Seed quality: North Carolina certified seed, tested within the past 9 months. Planting date: appropriate for region and species (Figure 6.11b). Plants: recommended erosion control plants are listed in Table 6.11a. Select a seeding mixture from those shown in Tables 6.11b-g. Mulch: 75% of the ground surface covered with approved material (reference Practice 6.14, Mulching). General: inspect seeded areas 2-4 weeks after seeding. Repair and reseed as necessary.

Permanent Seeding 6

Fertilization Satisfactory establishment may require re-fertilizing the stand in the second growing season. Do not fertilize cool season grasses in late May through July. Grass that looks yellow may be nitrogen deficient. Do not use nitrogen fertilizer if stand contains more than 20% legumes.

Table 6.11a Tolerance, Maintenance, and Propagation Characteristics of Erosion Control Plants

Table with columns: Region, Drainage, Planting, Tolerance, Maintenance. Rows include Grasses (Bahia, Bermudagrass, Centipedegrass, Fescue, etc.) and Legumes (Crown vetch, etc.).

\*Number of days required for majority of seeds to germinate under favorable conditions. \*\*Also 'Foral millet.'

Seedbed Preparation Apply ground agricultural limestone, unless a soil test indicates pH 6.0 or greater. If a soil test is not available, use a rate based on soil texture: Coarse textured: 1 - 1 1/2 tons/acre. Fine textured: 2 - 3 tons/acre. Apply a complete fertilizer at rates recommended by soil tests. In the absence of soil test, use the following as a guide: Grasses: 800-1200 lb/acre of a 10-10-10 analysis fertilizer (or equivalent). Grass-legume mixtures: 800-1200 lb/acre of a 5-10-10 fertilizer (or equivalent). Incorporate lime and fertilizer to a depth of 4-6 inches by disking or chiseling on slopes up to 3:1. Do not mix lime and fertilizer prior to application. Fill in depressions that can collect water. Where mowing is planned, continue tillage until a uniform, finely pulverized seedbed is achieved.

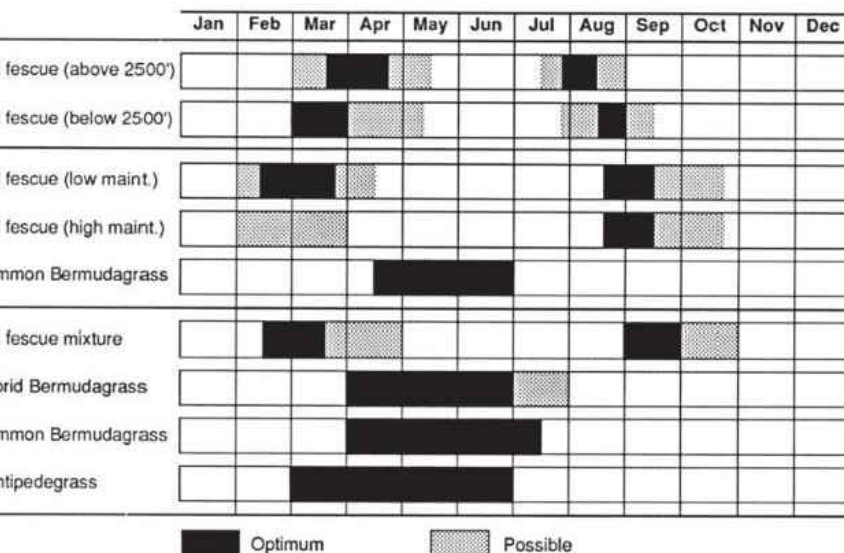


Figure 6.11b Calendar for permanent seeding recommendations by region.

Permanent Seeding 6

Seeding Seeding dates: Use the seeding calendar shown in Figure 6.11b. As you vary from the recommended dates, these probability of failure increases rapidly. If rescheduled outside these dates, use temporary seeding until preferred date for permanent seeding (reference Practice 6.10, Temporary Seeding). Select a seeding mixture from Tables 6.11b-g based on region (Mountains, Piedmont, Coastal Plain), soil characteristics, slope, and level of maintenance. Table 6.11a lists characteristics and applications of grasses and legumes used in the mixtures. Inoculate legume seed to ensure good growth. Cut-and-fill soils are likely to be deficient in the appropriate bacteria. Seeding rates in Tables 6.11b-g are based on poor growing conditions that typically exist, and a need for dense growth. Higher seeding rates will not substitute for good seedbed preparation. Apply seed uniformly, using a cyclone seeder, drop-type spreader, drill, cultipacker seeder, or hydroseeder. When using a drill seeder, plant rye or other grains not more than 1 inch deep, grasses and legumes not more than 1/2 inch. Calibrate equipment in the field. Cover seed by raking chain-dragging, or dragging a brush or mat, then firm the soil lightly with a roller. Seed can also be covered with hydro-mulched wood fiber and tack. Do not roll hydro-mulched seed.

Sprigging Sprigs are sold by the bushel, and can be broadcast or planted in furrows using a vegetable transplanter. Make furrows 4-6 inches deep and 2 ft apart. Place sprigs about 2 ft apart with one end at or above surface. If broadcast, select rate from Table 6.11g. Press into top 1/2-2 inches of soil with a cultipacker or mulch crimper.

Mulching Cover area evenly with approved mulch (75% cover minimum). Crimp, tack, or tie mulch with netting. Mulching is extremely important for successful seeding (reference Practice 6.14, Mulching).

Common Trouble Points

Inadequate seedbed preparation-a well tilled, limed, and fertilized seedbed is the most important step in vegetative establishment. Unsuitable choice of plant materials-do not plant Bermudagrass in the fall, Kentucky bluegrass in the Coastal Plain, or annual ryegrass in a permanent seeding mixture. Nurse crop rate too high in mixture-competes with perennial; limit rates to those shown in Tables 6.11b-g. Seeding at the wrong time of year-consult Figure 6.11b. If timing is not right, use temporary seeding to stabilize soil until preferred seeding dates. Inadequate mulching-cover area evenly and tack or tie down well, especially on slopes, ridges, and in channels.

Maintenance

Expect emergence of grasses within 4-28 days and legumes 5-28 days after seeding, with legumes following grasses. A successful stand should exhibit the following: vigorous dark green or bluish green seedlings-not yellow; uniform density, with nurse plants, legumes, and grasses well inter-mixed; green leaves. Perennials should remain green throughout the summer, at least at the plant bases. For at least a year, inspect stands for erosion or die-out. Repair damaged, bare, or sparse areas by filling any gullies, re-fertilizing, reseedling, and mulching.

Reseeding

If plant cover is sparse or patchy, re-evaluate the choice of plant materials and quantities of lime and fertilizer. Depending on the condition of the stand, repair by overseeding or reseeding after complete seedbed preparation. If timing is bad, overseed with rye grain or German millet to thicken the stand until a suitable time for seeding perennials. If vegetation fails to grow, have the soil tested to determine whether acidity or nutrient deficiency is a problem.

Definitions Certified seed: seed that has been inspected and tested according to official North Carolina standards and is labeled with information on germination, purity, and contaminating species. High maintenance: (as used in Tables 6.11b-g) plantings that receive frequent mowing, fertilizer, and pest control. Hulled seed: seed that has its outer protective covering, or hull, removed to speed germination. It is also called "clean" seed. Hulled seed is not always scarified (see below). Inoculant (for legume seed): nitrogen-fixing bacteria, sold in airtight plastic bags. The bacteria colonize roots of the legume, providing nitrogen to the plant and soil. Legumes: members of the pea family such as lespedeza or crown vetch. Legumes are particularly suited for erosion control because they add nitrogen to the soil by means of bacteria that live on their roots (see Inoculant, above). Nurse crop or nurse plant: an annual species such as rye grain, Sudangrass, or German millet that germinates rapidly. Nurse plants are included in mixtures to prevent erosion while slower-growing permanent plants are developing. Scarified seed: seed that has been treated by scratching the hard seed coat after any hull has been removed. Scarified legume seeds germinate rapidly. Most unscarified seeds lie dormant until the following spring. Sprigs: fragments of spreading grasses that include at least one node (joint). Planting sprigs is an alternative to seeding; it is the only means of establishing hybrid Bermudagrass, which cannot be seeded.

Installation During final grading, take soil samples from the top 6 inches in each area to be seeded. Sample containers and directions are available from the North Carolina Department of Agriculture (NCDCA) soil testing lab, or through county Agricultural Extension offices. Submit samples to the NCDCA or a commercial laboratory for liming and fertilizer recommendations.\*

Table 6.11b Low-maintenance Mixtures - Mountains

Table with columns: Seeding No., Site, Plants, lb/acre. Rows include 1M Steep slopes, average soils; 2M Gentle or steep slopes with stony, dry soils; 3M Gentle slopes, average soils; 7M Gentle or steep slopes with stony, dry soils (trees); 8M Channels.

\* Seeding numbers refer to seeding specifications in the N.C. Erosion and Sediment Control Planning and Design Manual (1988). "M" indicates Mountain region. \*\* After Aug. 15 use unscarified seed for sericea lespedeza. \*\* Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye grain.

Permanent Seeding 6

Table 6.11c High-maintenance Mixtures - Mountains: 4M Soils with average or better moisture retention - cool sites (Shady locations: substitute 40% by weight fine fescue - hard, red or chewings.); 5M & 6M Full sun or semi-shade including drought-prone soils - minimum-care lawns.

Table 6.11d Low-maintenance Mixtures - Piedmont: 1P Steep slopes or poor soils; 2P Gentle slopes, average soil; 5P Channels.

\* Seeding numbers refer to seeding specifications in the N.C. Erosion and Sediment Control Planning and Design Manual (1988). "P" indicates Piedmont. \*\* After Aug. 15 use unscarified seed for sericea lespedeza. \*\* Between May 1 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 40 lb/acre rye grain.

Table 6.11e High-maintenance Mixtures - Piedmont

Table with columns: Seeding No., Site, Plants, lb/acre. Rows include 3P Soils with average or better moisture retention - cool sites; 4P Dry soils, soils with physical limitations, or warm sites.

Table 6.11f Low-maintenance Mixtures - Coastal Plain: 1CP Well- to poorly-drained soils with good moisture retention; 5CP Dry to well-drained areas; 7CP Channels.

\* Seeding numbers refer to seeding specifications in the N.C. Erosion and Sediment Control Planning and Design Manual (1988). "CP" indicates Coastal Plain. \*\* From Sept. 1 to March 1, use unscarified seed for sericea lespedeza. Where a neat appearance is required omit sericea and increase Kobe to 40 lb/acre. \*\* Between April 15 and Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to April 15 or after Aug. 15, add 40 lb/acre rye grain.

MULCHING

Purpose To provide temporary erosion protection and promote growth of vegetation. This is one of the most important, effective, and economical erosion control practices (Figure 6.14a).



- Minimum Requirements: Material: as specified in the approved plan, or an equivalent mulch selected from Table 6.14a. On steep slopes and in channels, install and anchor matting, geofabric, or netting-over straw. Coverage: at least 75% of the soil surface. Anchoring method: straw or hay mulch should be anchored by applying tackifier, stapling netting over the top, or crimping with a mulch crimping tool. Materials that are heavy enough to stay in place do not need anchoring (for example, bark or wood chips).

Mulching 6

Table 6.14a Typical Mulching Materials and Application Rates

Table with columns: Material, Rate Per Acre, Requirements, Notes. Rows include Organic Mulches (Straw, Wood fiber, Wood chips, Bark), Nets and Mats (Jute net, Excelsior mat), and Chemical Stabilizers (Fiberglass roving).

\*Use of trade names does not imply endorsement of product.

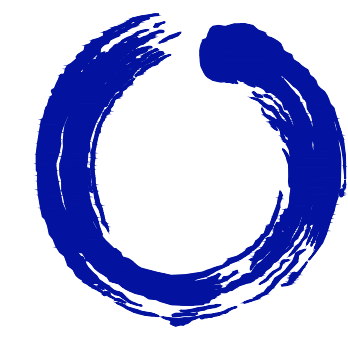
Installation Spread mulch uniformly, by hand, with a mulch blower, or with a hydro-mulcher. After spreading, no more than 25% of the ground surface should be visible. Straw mulch: apply 1-2 tons/acre (use the higher rate on steeper slopes). Anchor organic mulch (other than wood or bark chips) by one of the following means, to resist runoff and wind: Crimping with a mulch anchoring tool or with a weighted farm disk set nearly straight. Applying a liquid tackifier-apply emulsified asphalt 0.1 gal/yd<sup>2</sup>; heavier at edges of area and at crests of ridges and banks. Apply other tackifiers according to manufacturers' specifications. Stapling netting securely over straw mulch (Figure 6.14b). Netting may be the only effective anchoring method for steep slopes and channels.

Installing Netting and Matting Bury up slope end of net in a trench 6 inches deep and unroll downgrade (Figure 6.14b). Allow netting to lay loosely on the surface-do not stretch. Staple strips every 1 ft across the top, and every 3 ft around the edges, bottom, and down the middle. In channels, staple every 2 ft down the edges and middle. Overlap adjacent strips 3 inches and staple, every 3 ft, on the overlap. To join ends of strips: overlap 18 inches and staple every 1 ft on the overlap. An anchor slot is recommended to secure mats in channels with unstable soils. Backfill must be well compacted. On slopes steeper than 3:1, make a 6-inch check slot every 15 ft, insert a fold of net into slot, backfill with soil and compact firmly.

Installing Fiber Glass Roving Roving is applied with a compressed air ejector, alone or over straw. Apply uniformly at a rate of 0.25 - 0.35 lb/yd<sup>2</sup>. Anchor with emulsified asphalt at a rate of 0.25 - 0.35 gal/yd<sup>2</sup>. On steep slopes and in channels, bury up slope end of roving and anchor with stakes on 10-ft centers.



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Table with columns: #, DATE, REVISIONS.

DRAWN: JH CHECK: BHR

JOB NO: 22-419 DATE: 10/18/22

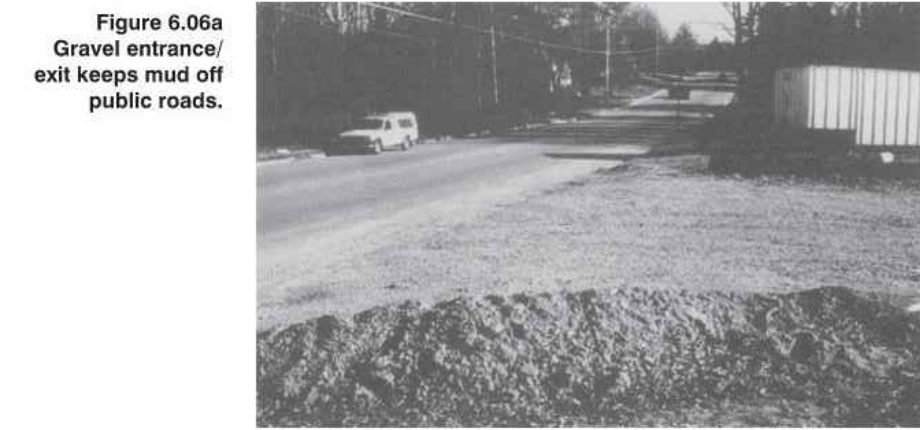
E+S BMPs - VEGETATIVE

SHEET C601

6.06

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

**Purpose** To provide a stable entrance/exit condition from the construction site and keep mud and sediment off public roads (Figure 6.06a).



- Minimum Requirements**
- Material: 2-3-inch washed stone over a stable foundation as specified in the plan.
  - Thickness: 6 inches minimum (Figure 6.06b).
  - Width: 12 ft minimum or full width of exit roadway, whichever is greater.
  - Length: 50 ft minimum.
  - Washing facility (if required): level area with 3-inch washed stone minimum, or a commercial rack. Divert waste water to a sediment trap or basin.

6.06.1

Temporary Gravel Construction Entrance/Exit 6

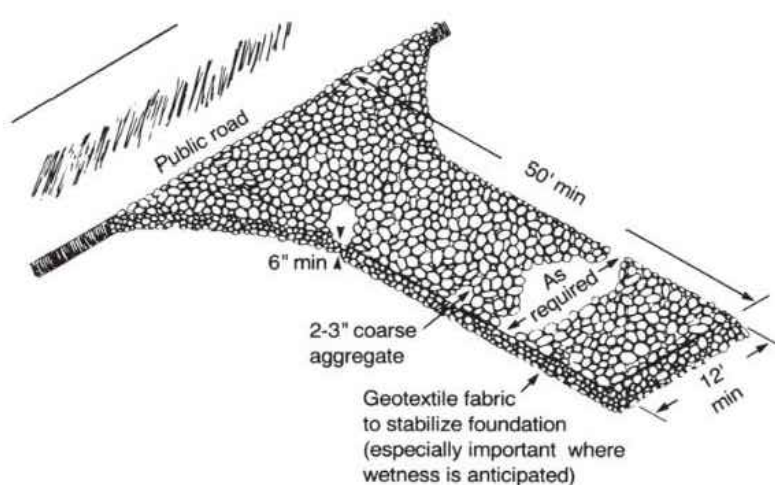


Figure 6.06b Plan of temporary construction entrance/exit.

**Installation** Avoid curves in public roads and steep slopes. Remove all vegetation and other objectionable material from the foundation area. Grade and crown foundation for positive drainage.

If the slope toward the road exceeds 2%, construct a ridge, 6 to 8 inches high with 3:1 side slopes, across the foundation approximately 15 ft from the entrance to divert runoff away from the public road (Figure 6.06c).

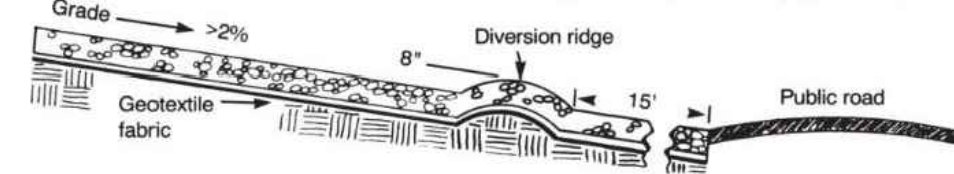


Figure 6.06c Temporary gravel construction entrance/exit with diversion ridge where grade exceeds 2%.

6.06.2

6.06

Place geotextile fabric on graded foundation to improve stability, especially where wet conditions are anticipated.

Place stone to dimensions and grade shown on plans. Leave surface smooth and sloped for drainage.

Divert all surface runoff and drainage from the stone pad to a sediment trap or basin.

Install pipe under pad if needed to maintain proper public road drainage.

**Common Trouble Points**

- Inadequate runoff control—sediment washes onto public road (Figure 6.06d).
- Stone too small, pad too thin, or geotextile fabric absent—results in muddy conditions as stone is pressed into soil.
- Pad too short for heavy construction traffic—extend pad beyond the minimum 50-ft length as necessary.
- Pad not flared sufficiently at road entrance—results in mud being tracked onto road and possible damage to road edge.
- Unstable foundation—use geotextile fabric under pad and/or improve foundation drainage.

6.06.3

Temporary Gravel Construction Entrance/Exit 6



Figure 6.06d Trouble point: Inadequate runoff control—sediment washes onto public road.

**Maintenance**

Inspect entrance/exit pad and sediment disposal area weekly and after heavy rains or heavy use.

Reshape pad as needed for drainage and runoff control.

Topdress with clean stone as needed.

Immediately remove mud and sediment tracked or washed onto public road.

Repair any broken road pavement immediately.

6.06.4

6.20

TEMPORARY DIVERSIONS

**Purpose** To protect work areas from runoff and divert water to sediment traps or stable outlets (Figure 6.20a).



**Minimum Requirements**

- Drainage area: limited to 5 acres.
- Capacity: peak runoff from 10-yr storm.
- Ridge cross section (Figure 6.20b): Side slopes—2:1 or flatter (3:1 or flatter where vehicles cross) Top width—2 ft minimum Freeboard—0.3 minimum
- Channel cross section: Shape—parabolic, trapezoidal, or V-shaped Side slopes—2:1 or flatter (3:1 or flatter where vehicles cross)
- Grade: uniform or gradually increasing toward outlet, generally not exceeding 2.0%
- Outlet: must be nonerosive for design flow. Divert flow containing sediment to a sediment trap.

6.20.1

Temporary Diversions 6

**Installation** Stabilization: ridge must be stabilized with vegetation if in place longer than 30 working days. Channel must be stable for design flow.

**Site Preparation** Mark diversion location and remove trees, brush, stumps, and other objectionable material.

Set grade and alignment to fit site needs and topography. Maintain constant or gradually increasing grade. Realign or elevate ridge as needed to avoid reverse grade. Deviation from the plan may require prior approval.

**Construction** Construct diversion to dimensions and grades shown in plan (Figure 6.20b). Build ridge higher than design and compact with wheels of construction equipment. Compacted ridge must be at or above design grade at all points. Channel must be constructed on design grade. Leave sufficient area along diversion to permit cleanout and regrading.

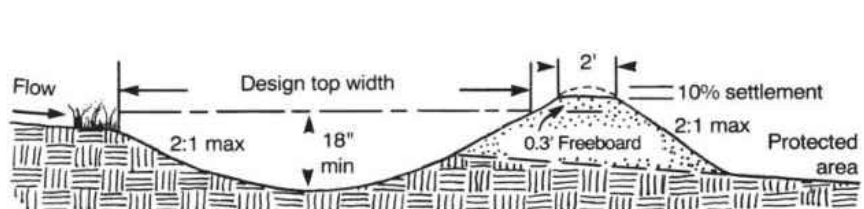


Figure 6.20b Temporary diversion cross section.

**Outlets** Stabilize outlets during installation of diversion. Where temporary diversions are constructed above steep slopes, install temporary slope drains for outlets (reference Practice 6.32, Temporary Slope Drains). Flow containing sediment must be diverted to a sediment trap.

6.20.2

6.20

**Stabilization** Vegetate ridge immediately after construction unless diversion will be in place less than 30 days.

**Common Trouble Points**

- Sedimentation where channel grade decreases or reverses causes overtopping—realign or deepen channel to maintain grade (Figure 6.20c).
- Low point in ridge often occurs where diversion crosses a natural depression—build up ridge.
- Vehicle crossing point—maintain ridge height, flatten side slopes, and protect ridge with gravel at crossing point.
- Excessive grade in channel—requires liner or realignment to reduce grade (reference Practices 6.30, Grass-lined Channels, and 6.31, Rip-rap-lined Channels).
- Excessive velocity at outlet—install outlet stabilization structure (reference Practice 6.41, Outlet Stabilization Structure).
- Ridge not compacted—attack by storm flow may cause failure.



Figure 6.20c Trouble point: Sedimentation in channel results in overflow and erosion.

6.20.3

Temporary Diversions 6

**Maintenance** Inspect once a week and following each rainfall event. Remove sediment from channel and reinforce ridge as needed. Check outlets, remove sediment from traps when they are 50% full, and make necessary repairs immediately.

When watershed area has been stabilized, remove ridge and fill channel to blend with natural ground. Remove temporary slope drains. Stabilize all disturbed areas.

6.20.4

PERMANENT DIVERSIONS

**Purpose** To divert water from areas where it is in excess to locations where it can be used or released without causing erosion or flood damage (Figure 6.21a).



**Minimum Requirements**

- Capacity: peak runoff from 10-yr storm. Use higher capacity where safety is a concern or flood damage cannot be tolerated.
- Ridge cross section (Figure 6.21b): Side slopes—2:1 or flatter (3:1 or flatter if mowed) Top width—2 ft minimum Freeboard—0.5 ft minimum Settlement—10% of fill height
- Channel: Lining—to meet velocity requirements and site aesthetics Side slopes—2:1 or flatter (3:1 or flatter if mowed)
- Grade: uniform or gradually increasing as shown on plan.
- Outlet: must be nonerosive for design flow.
- Stabilization: ridge and channel must be stabilized with vegetation or other appropriate measures.

6.21.1

Permanent Diversions 6

**Installation**

**Site Preparation** Set grade and alignment to fit site conditions and maintain constant or gradually increasing grade. Avoid reverse grade. Deviation from the plan may require prior approval. Remove and properly dispose of all trees, brush, stumps, or other objectionable material. Fill and compact all ditches, swales, or gullies to be crossed. Final foundation elevation must be at or above surrounding ground level. Disk the base of ridge before placing fill.

**Construction** Excavate, fill, shape, and stabilize the diversion to line, grade, and cross section shown in the approved plan (Figure 6.21b). Overfill and compact ridge, allowing 10% for settlement. Settled ridge top must be at or above design elevation at all points. Compaction may be achieved by driving wheeled equipment along the ridge as lifts are added. Shape ridge and channel to blend with surrounding landscape.

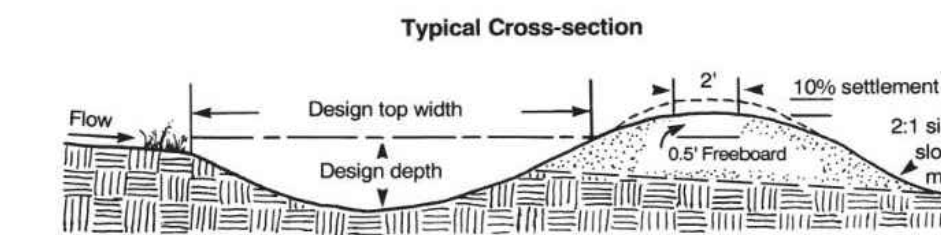


Figure 6.21b Typical cross section of permanent diversion.

6.21.2

6.21

Stabilize outlets when installing diversions. Diversions carrying sediment must empty into sediment traps.

Stabilize permanent diversions with vegetation, riprap, or paving immediately after installation. If vegetation is used, protect seeding with properly anchored mulch or install sod (reference Practices 6.12, Sodding, and 6.30, Grass-lined Channels).

**Common Trouble Points**

- Sedimentation where channel grade decreases or reverses. Realign or deepen channel to maintain grade.
- Low point in ridge resulting from negative grade in channel and ridge where diversion crosses a natural depression. Build up ridge to maintain positive ridge grade.
- Vehicle crossings—build up ridge and protect with gravel at crossing points.
- Erosion occurs in channel before vegetation is fully established. Install sod or use a temporary liner to protect vegetation (reference Practices 6.12, Sodding, and 6.30, Grass-lined Channels).
- Erosion in vegetated channel bottom—grade too steep for vegetation. Install riprap or a paved liner (reference Practice 6.31, Rip-rap-lined Channels).
- Erosion damage at outlet due to excessive velocity. Install outlet stabilization structure (reference Practice 6.41, Outlet Stabilization Structure).

**NOTE:** Subsurface drains or stone channel bottoms may be needed where permanent vegetation cannot be established because of seepage or poor drainage.

**Maintenance** Inspect once a week and following each rainfall event, until diversion is vegetated. After vegetation is fully established, inspect periodically and after major storms.

6.21.3

Permanent Diversions 6

Remove debris and sediment from channel and rebuild ridge to design elevation where needed.

Check outlets and make timely repairs to prevent erosion. Remove sediment from sediment traps when 50% full.

Maintain vegetation in a vigorous, healthy condition.

When watershed has been stabilized, remove sediment traps and repair bare or damaged areas in the vegetation. Stabilize all disturbed areas.

6.22

DIVERSION DIKE (Perimeter Protection)

**Purpose** To prevent storm runoff from entering the work area or sediment from leaving the construction site (Figures 6.22a and 6.22b).



**Minimum Requirements**

- Drainage area: limited to 5 acres.
- Capacity: peak runoff from 10-yr storm.
- Ridge cross section (Figure 6.22c): Side slopes—2:1 or flatter (3:1 or flatter where vehicles cross) Top width—2 ft minimum Height—1.5 ft minimum from channel bottom Freeboard—0.5 ft minimum Settlement—10% of fill height
- Channel cross section (Figure 6.22c): Side slopes—2:1 or flatter (3:1 or flatter where vehicles cross) Depth and grade—as shown on plans
- Outlet: must be stable. Divert sediment-laden water to sediment trap; divert runoff from undisturbed areas to a stable natural outlet or outlet stabilization structure.

6.22.1

Diversion Dike (Perimeter Protection) 6

**Stabilization:** ridge must be stabilized with vegetation immediately after construction and flow area stabilized according to design requirements.

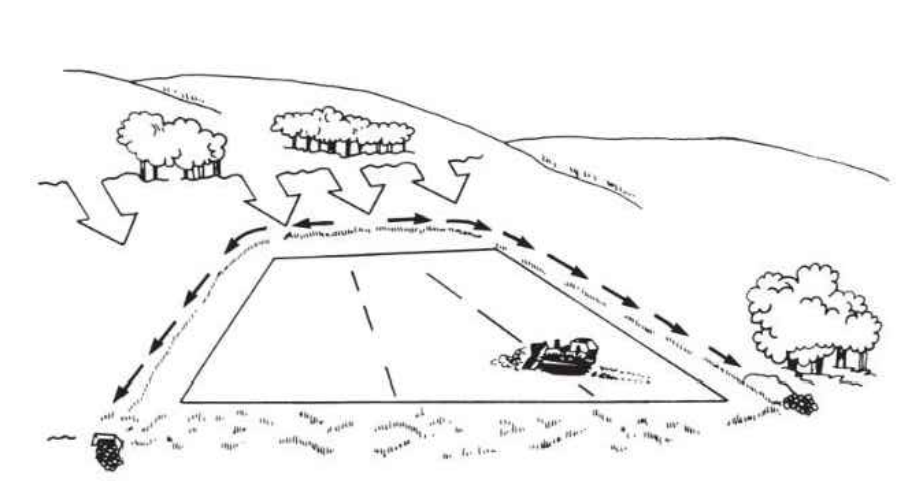


Figure 6.22b Perimeter dikes prevent surface runoff from entering construction sites.

**Installation**

**Site Preparation** Remove all trees, brush, stumps, or other objectionable material and dispose of properly.

Fill and compact all ditches or gullies to be crossed. Foundation elevation must be at or above surrounding ground level. Disk base of dike before placing fill.

**Construction** Fill dike higher than design elevation and compact with wheels of construction equipment to design height plus 10% (Figure 6.22c). Construct channel to dimensions and elevations shown on plans.

6.22.2

6.22

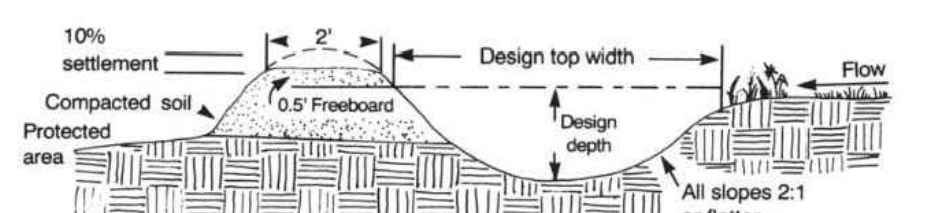


Figure 6.22c Cross section of diversion dike above area to be protected.

**Outlets** Leave sufficient area along diversion dike to permit access by machines for cleanout and maintenance. Install outlet protection and sediment traps as part of diversion dike installation. All outlets must be stable.

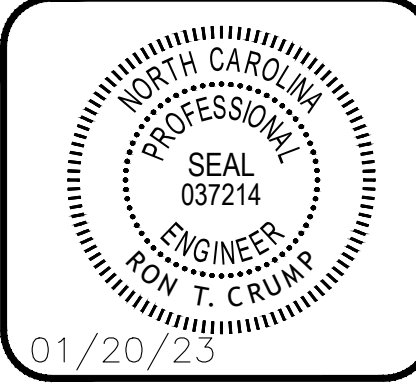
**Stabilization** Stabilize channel as shown in plans. Use temporary liners to protect vegetation. Steep slopes may require riprap linings. Seed and mulch dike immediately following construction.

**Common Trouble Points**

- Erosion in channel from excessive grade—install a temporary liner in channel.
- Overtopping caused by sediment deposition in channel where grade decreases or reverses—deepen channel or realign grade.
- Overtopping at low point in ridge where diversion crosses shallow draw—reconstruct ridge with positive grade at all points.
- Erosion at outlet—install outlet stabilization structure.
- Sedimentation at diversion outlet—install sediment trap (reference Practice 6.60, Temporary Sediment Trap).

**CAUTION:** Water diverted from the construction site must not damage adjacent property.

6.22.3



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**E+S BMPs - STRUCTURAL**

SHEET **C602**

6.41

**OUTLET STABILIZATION STRUCTURE**

**Purpose** To reduce velocity and prevent erosion at the outlet of a channel, culvert, or other high-velocity section.

Figure 6.41a Riprap outlet stabilization structure prevents erosion by reducing velocity of concentrated flow.



- Minimum Requirements**
- Capacity: peak runoff from 10-yr storm.
  - Apron: as shown in plans, set on zero grade, aligned straight, with sufficient length to dissipate energy (Figures 6.41b and 6.41c).
  - Foundation: extra-strength filter fabric or well-graded gravel filter layer, 6 inches thick, minimum.
  - Material: hard, angular, and highly weather-resistant stone (riprap) with specific gravity at least 2.5. Stone size as specified in plans.
  - Thickness: as shown in plans, at least 1.5 times the maximum stone diameter.

6.41.1

**Outlet Stabilization Structure 6**

**Installation** Excavate subgrade below design elevation to allow for thickness of filter and riprap. Install riprap to minimum thickness of 1.5 times maximum stone diameter. Final structure should be to lines and elevations shown in plans.

**NOTE:** Over-excavation to allow for riprap and filter increases the amount of spoil considerably (reference Practice 6.31, *Riprap-lined Channels*).

Construct apron on zero grade. If there is no well-defined channel, cross section may be level or slightly depressed in the middle (Figure 6.41b). In a well-defined channel, extend riprap and filter to the top of the bank or as shown on plans (Figure 6.41c). Blend riprap smoothly to the surrounding land.

Apron should be straight and properly aligned with the receiving stream. If a curve is necessary to fit site conditions, curve the apron near the upstream end.

Compact any fill used in the subgrade to the density of the surrounding undisturbed material. Subgrade should be smooth enough to protect fabric from tearing.

Install a continuous section of extra-strength filter fabric on smooth, compacted foundation.

Protect filter fabric from tearing while placing riprap with machinery. Repair any damage immediately by removing riprap and installing another section of filter fabric. Upstream section of fabric should overlap downstream section to a minimum of 1 ft.

Make sure top of riprap apron is level with receiving stream or slightly below it. Riprap should not restrict the channel or produce an overfall.

Immediately following installation, stabilize all disturbed areas with vegetation as shown in plans.

6.41.2

6.41

Figure 6.41b Pipe outlet to flat area with no well-defined channel.

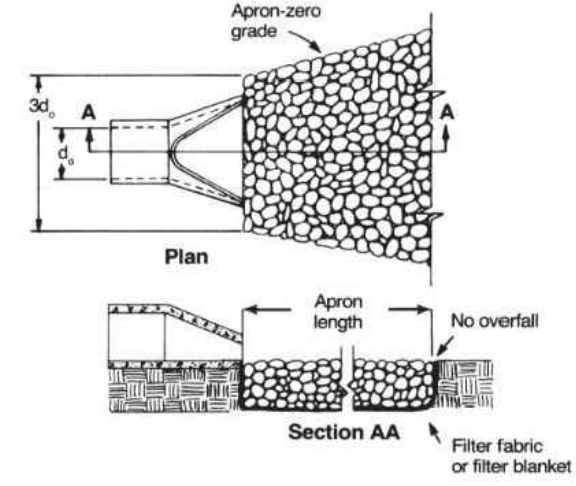
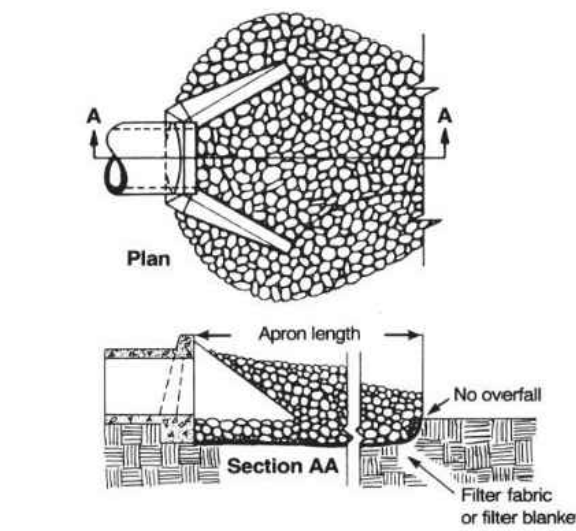


Figure 6.41c Pipe outlet to well-defined channel.



Note: In both figures, the thickness of riprap is as shown in plans (minimum thickness is 1.5 times maximum stone diameter).

6.41.3

**Outlet Stabilization Structure 6**

- Common Trouble Points**
- Foundation not excavated deep enough or wide enough—riprap restricts flow cross section, resulting in erosion around apron and scour holes at outlet.
  - Riprap apron not on zero grade—causes erosion downstream.
  - Stones too small or not properly graded—results in movement of stone and downstream erosion.
  - Riprap not extended far enough to reach a stable section of channel—results in downstream erosion.
  - Appropriate filter not installed under riprap—results in stone displacement and erosion of foundation.

**Maintenance** Inspect riprap outlet structures after heavy rains for erosion at sides and ends of apron and for stone displacement. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade.

6.41.4

6.50

**EXCAVATED DROP INLET PROTECTION (Temporary)**

**Purpose** To trap sediment at the approach to a storm drain inlet. This practice allows use of the storm drain system during the construction period (Figure 6.50a).

Figure 6.50a Excavation around inlet creates an effective settling pool.



- Minimum Requirements**
- Drainage area: limited to 1 acre.
  - Excavated depth: 1-2 ft, measured from crest of inlet structure.
  - Excavated volume: 35 yd<sup>3</sup>/acre disturbed, minimum.
  - Side slopes: 2:1 or flatter.
  - Dewatering: weep holes in drop inlet, covered with wire screen (hardware cloth) and gravel.
  - Capacity: runoff from 10-yr storm must enter storm drain without bypass flow.

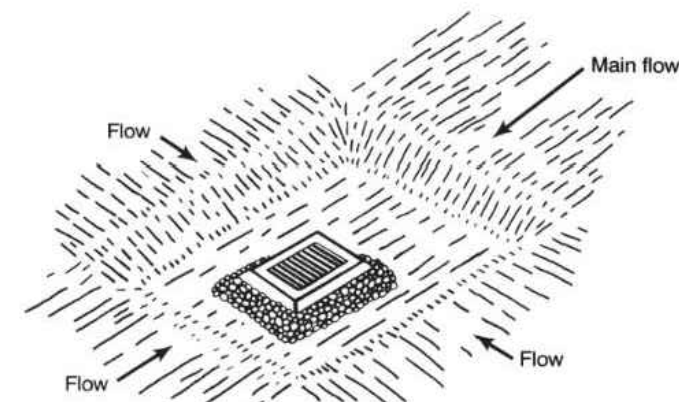
6.50.1

**Excavated Drop Inlet Protection (Temporary) 6**

**Installation** Clear area of all debris. Remove and stockpile or spread soil so that it will not block flow or wash back into the excavation. Excavate basin to depth, side slopes, and dimensions shown in plans. Shape basin to fit site conditions with longest dimensions oriented toward the largest inflow (Figure 6.50b).

**NOTE:** This practice may be used to improve the effectiveness and reliability of other sediment traps and barriers such as fabric, or block and gravel inlet protection.

Figure 6.50b Perspective of excavated drop inlet protection.



6.50.2

6.50

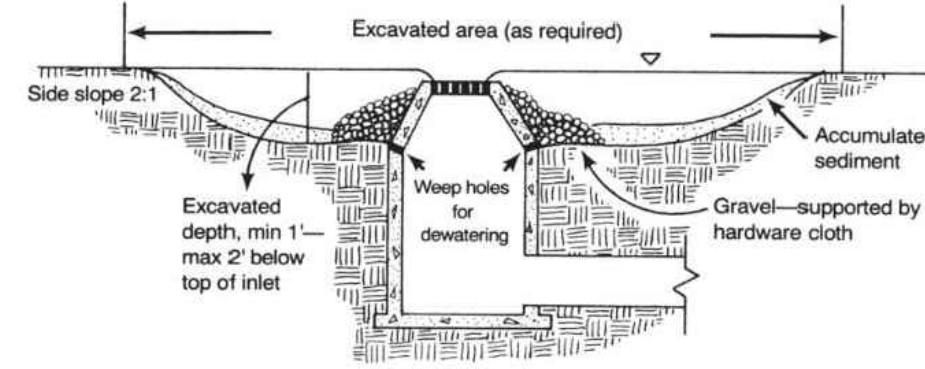


Figure 6.50c Cross section of excavated drop inlet protection.

Install weep holes in drop inlet to drain pool slowly. Cover holes with wire screen (hardware cloth) and gravel to hold sediment in place (Figure 6.50b). Gravel to be 1/2- to 3/4-inch washed aggregate (NC DOT #57 or #5), 1 ft thick, minimum.

Excavate minimum depth 1 ft and the maximum depth at 2 ft as measured from the crest of the inlet structure.

Maintain side slopes around the excavation no steeper than 2:1.

When necessary, spoil may be placed to form a dike on the downslope side of the excavation to prevent bypass flow.

Stabilize all disturbed areas, except the excavated pool bottom, in accordance with vegetation plan.

6.50.3

**Excavated Drop Inlet Protection (Temporary) 6**

- Common Trouble Points**
- Sediment fills excavated basin and enters storm drain—sediment-producing area too large for basin design or inlet not properly maintained.
  - Excessive ponding—gravel over weep holes may be plugged with sediment. Remove debris, clear sediment, and replace gravel.
  - Flooding and erosion due to blockage of storm drain. Install trash guard.

**Maintenance** Inspect, clean, and properly maintain the excavated basin after every rainfall until contributing drainage area has been permanently stabilized. Remove sediment when the excavated volume is approximately one-half full. Remove and replace gravel over weep holes when drainage stops. When the contributing drainage area has been permanently stabilized, inspected, and approved, seal weep holes, remove sediment, and fill basin with stable soil. Compact and grade to final elevation. Stabilize all disturbed areas immediately as shown in plans.

6.50.4

**TEMPORARY SEDIMENT TRAP**

**Purpose** To trap sediment at designated locations accessible for cleanout. Prevents off-site sedimentation (Figure 6.60a).

Figure 6.60 Temporary settling pool traps sediment.



- Minimum Requirements**
- Drainage area: limited to 5 acres.
  - Structure life: limited to 2 yrs.
  - Sediment storage: 1800 ft<sup>3</sup>/acre disturbed, minimum.
  - Embankment: machine-compacted earth fill (Figure 6.60b). Height—5 ft maximum. Side slopes—2:1 or flatter. Top width—5 ft minimum.
  - Spillway outlet section: Capacity—10-yr peak storm. Freeboard—0.5 ft minimum.
  - Stone: a hard, angular, well-graded mixture with d<sub>10</sub> of 9 inches minimum. Inside facing is lined with a 1-ft thick layer of 1/2- to 3/4-inch washed aggregate (NC DOT #57 or #5 washed stone).
  - Side slopes: spillway and excavated basin, 2:1 or flatter.

6.60.1

**Temporary Sediment Trap 6**

- Protection from piping: filter fabric or cut-off trench is required between the stone spillway outlet section and the compacted embankment.
- Spillway depth: 1.5 ft minimum below design, settled top of embankment.
- Spillway width: based on drainage area as shown in Table 6.60a. Any change must be approved as a modification of the plan.

Table 6.60a Minimum Spillway Design

Drainage Area (acres)	Minimum Bottom Width (ft)
1	4.0
2	6.0
3	8.0
4	10.0
5	12.0

- Outlet apron: 5-ft long, minimum, on level grade with filter fabric foundation. Exit velocity must be nonerosive for receiving stream.
- Stabilization: embankment and all disturbed areas should be stabilized with vegetation immediately following installation.

**Installation** Locate sediment trap as near the sediment source as topography allows. Divert runoff from all undisturbed areas away from sediment trap.

Clear, grub, and strip all vegetation and root mat from area of embankment. Use stable mineral soil free of roots, rocks, debris, and other objectionable material.

Place fill in 9-inch lifts, maximum. Machine compact each lift. Construct side slopes 2:1 or flatter (3:1 recommended for backslope to improve stability of stone spillway).

Overfill embankment to 6 inches above design elevation to allow for settlement.

6.60.2

6.60

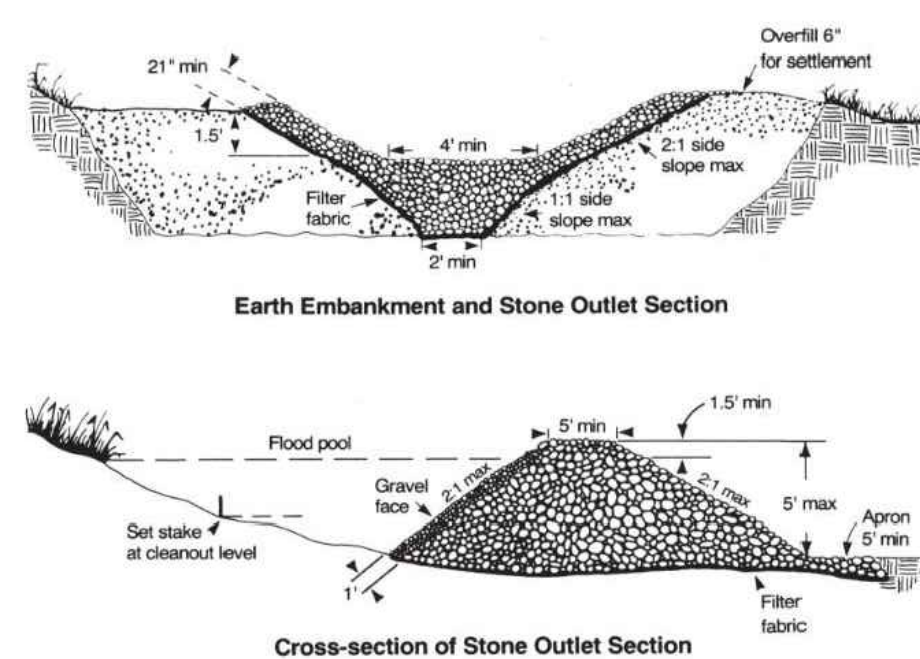


Figure 6.60b Construction detail of sediment trap.

**Outlet Section** Excavate trapezoidal stone outlet section from compacted embankment (Figure 6.60b). Allow for thickness of stone side slopes (21 inches minimum).

Install filter fabric under riprap. Extend fabric up the sides to top of embankment.

Place specified stone to lines and grades shown on plans, working the smaller stones into the voids to achieve a dense mass. Spillway crest must be level with minimum inside dimension specified in plan. Measure spillway depth from the highest stones in the spillway to the design elevation of dam. Minimum depth is 1.5 ft.

6.60.3

**Temporary Sediment Trap 6**

Keep sides of the stone outlet section at least 21 inches thick through the level section and the downstream face of the dam.

Extend outlet apron below toe of dam on level grade until stable conditions are reached (5 ft minimum). Edges and end of the stone apron section must be flush with surrounding ground. No overfall should exist.

Cover inside face of stone outlet section with a 1-ft thick layer of 1/2- to 3/4-inch aggregate (NC DOT #57 or #5 washed stone).

Vegetate the embankment in accordance with the vegetation plan.

Set a stake at one-half the design depth. This will be the "cleanout level."

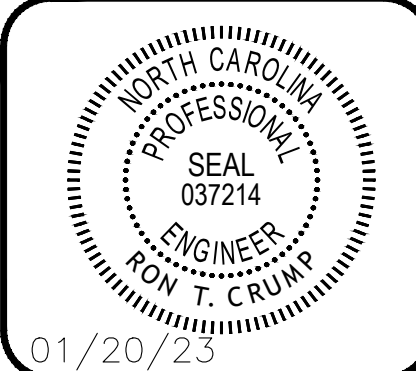
- Common Trouble Points**
- Inadequate spillway size—results in overtopping of dam, poor trap efficiency and possible failure of the structure. Modification of the plan may be required.
  - Omission or improper installation of filter fabric—results in washout under sides or bottom of the stone outlet section (piping).
  - Low point in embankment caused by inadequate compaction and settling—results in overtopping and possible failure.
  - Stone outlet apron does not extend to stable grade—results in erosion below the dam.
  - Stone size too small or backslope too steep—results in stone displacement.
  - Inadequate vegetative protection—results in erosion of embankment.
  - Inadequate storage capacity—sediment not removed from basin frequently enough.
  - Contact slope between stone spillway and earth embankment too steep—piping failure is likely.

6.60.4

6.60

**Maintenance** Inspect temporary sediment traps after each significant rainfall event. Repair any erosion and piping holes immediately. Remove sediment when it has accumulated to one-half the design depth; a stake set at the cleanout level is helpful. Clean or replace spillway gravel facing if clogged. Inspect vegetation; reseed and re mulch if necessary. Check spillway depth periodically to ensure minimum of 1.5 ft depth from lowest point of the settled embankment to highest point of spillway crest. Fill any low areas of the embankment to maintain design elevation. Promptly replace any displaced riprap, being careful that no stones in the spillway are above design grade. After all sediment-producing areas have been stabilized, inspected, and approved, remove the structure and all unstable sediment. Smooth site to blend with adjoining areas and stabilize in accordance with vegetation plan.

6.60.5



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**MIDGARD SELF STORAGE FACILITY  
HARBINGER, NC**  
ISSUED FOR: CONCEPT  
JURISDICTION: CURRITUCK COUNTY  
LOCATION: 8659 CARATOKE HIGHWAY,  
HARBINGER, NC

#	DATE	REVISIONS

DRAWN: JH CHECK: BHR

JOB NO: 22-419 DATE: 10/18/22

**E+S BMPs -  
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SHEET **C603**

6.41

**OUTLET STABILIZATION STRUCTURE**

**Purpose** To reduce velocity and prevent erosion at the outlet of a channel, culvert, or other high-velocity section.



- Minimum Requirements**
- Capacity: peak runoff from 10-yr storm.
  - Apron: as shown in plans, set on zero grade, aligned straight, with sufficient length to dissipate energy (Figures 6.41b and 6.41c).
  - Foundation: extra-strength filter fabric or well-graded gravel filter layer, 6 inches thick, minimum.
  - Material: hard, angular, and highly weather-resistant stone (riprap) with specific gravity at least 2.5. Stone size as specified in plans.
  - Thickness: as shown in plans, at least 1.5 times the maximum stone diameter.

6.41.1

6.63

**ROCK DAM**

**Purpose** To trap sediment on the construction site and prevent off-site sedimentation. Useful where earth fill material is not readily available (Figure 6.63a).



- Minimum Requirements**
- Drainage area: limited to 50 acres.
  - Design life: limited to 3 yrs.
  - Sediment storage: 1800 ft<sup>3</sup>/acre disturbed minimum, measured 1 ft below spillway crest.
  - Dam crest height: limited to 8 ft.
  - Basin area and shape: the largest surface area gives the greatest trapping efficiency. Basin length-to-width ratio should be 2:1 minimum.
  - Spillway capacity: 10-yr peak runoff, at maximum flow depth of 1 ft and minimum freeboard of 1 ft. Entire length of dam between rock abutments may serve as spillway.

6.63.1

Rock Dam 6

- Rock embankment** (Figure 6.63b):
  - Top width—5 ft minimum
  - Side slopes—upstream, 2:1 or flatter
  - downstream, 3:1 or flatter
- Earth abutments:** smooth, stable slopes, 2:1 or flatter.
- Rock abutments:** must protect earth abutments and extend along downstream face to toe of dam. Abutments must be at least 1 ft higher than the spillway face at all points.
  - Height—2 ft minimum above spillway crest
  - Width—2 ft thick, minimum
  - Side slopes—2:1 or flatter
- Outlet protection:** rock apron, 1.5 ft thick, minimum, zero grade, length equal to height of dam or extended to stable grade, whichever is greater.
- Rock material:** well graded, hard, angular, weather-resistant stone with  $d_{15}$  of 9 inches minimum.
- Protection from piping:** extra-strength filter fabric covers entire foundation including earth abutments and apron (Figure 6.63b).
- Basin dewatering:** through 1 ft thick minimum layer of 1/2- to 3/4-inch aggregate on upstream face of dam (NC DOT #57 or #5 washed stone).

**Installation** Divert runoff from undisturbed areas away from the basin (reference Practice 6.29, Temporary Diversion). Delay clearing pond area until dam is in place.

Excavate foundation for apron and use it as a temporary sediment basin during construction of dam.

Clear and grub area under dam, removing all root mat and other objectionable material. Grade earth abutments no steeper than 1:1. Dispose of material in approved location.

If cutoff trench is required, excavate at center line of dam, extending all the way up earth abutments.

6.63.2

6.63

**Protection from Piping** The entire foundation including both earth abutments must be covered by filter fabric. Overlap 1 ft at all joints, upstream strip over downstream strip (Figure 6.63b).

**Embankment and Pool** Construct embankment to dimensions shown on plans. Use well-graded, hard, angular, weather-resistant rock. Rock abutments must be at least 2 ft higher than the spillway crest and at least 1 ft higher than the downstream face of dam at all points (Figure 6.63c).

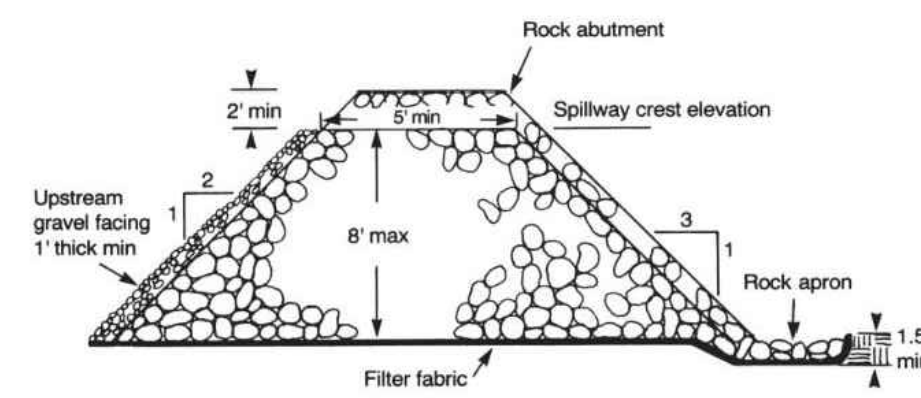


Figure 6.63b Rock dam cross section.

Divert sediment-laden flow to upper end of basin.

Set marker stake to indicate clean-out elevation where sediment pool is 50% full.

Stabilize all disturbed areas except the lower one-half of sediment pool as shown in the vegetation plan.

6.63.3

Rock Dam 6

**Safety** Sediment basins that impound water are hazardous. Basin should be dewatered between storms. Avoid steep side slopes. Fences with warning signs may be necessary if trespassing is likely. State and local requirements must be followed.

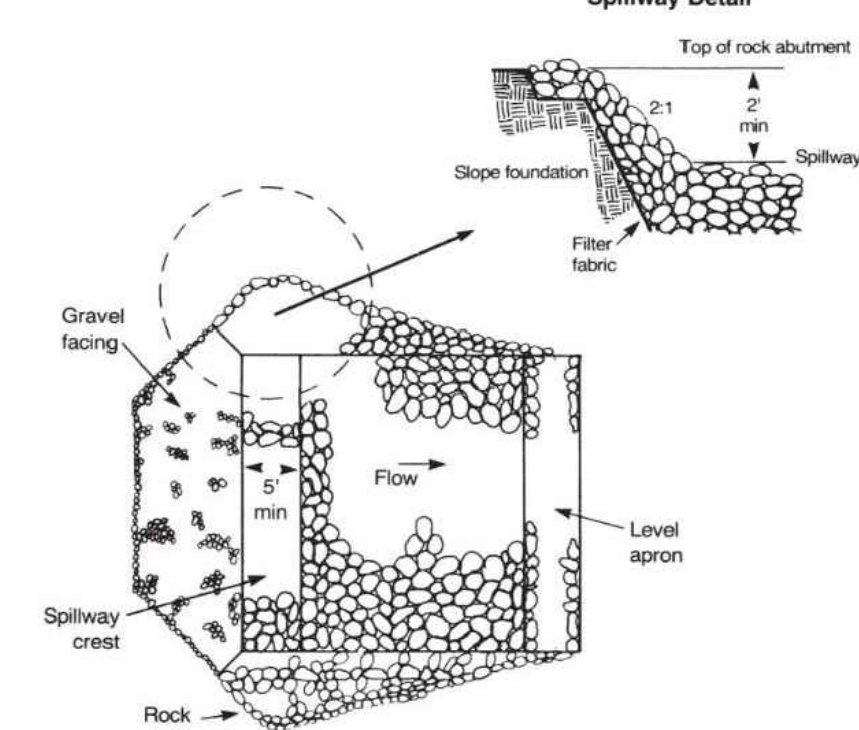


Figure 6.63c Plan view of rock dam with spillway detail.

6.63.4

6.63

- Common Trouble Points**
- Failure from piping along abutments—filter material not properly installed, or earth abutments too steep.
  - Stone displaced from face of dam—stone size too small and/or face too steep.
  - Erosion of abutments during spillway flow—rock abutment height inadequate.
  - Sediment carried through spillway—drainage area too large. Divert runoff from undisturbed area away from basin.
  - Sediment loss through dam—inadequate layer of aggregate on inside face or aggregate too coarse to restrict flow through dam.

**Maintenance** Inspect rock dam and pool after each rainfall event.

Remove sediment when it accumulates to one-half design volume (marked by stakes).

Check structure and abutments for erosion, piping, or rock displacement. Repair immediately.

Replace aggregate on inside face of structure when sediment pool does not drain between storms.

Add fine gravel to upstream face of dam if sediment pool drains too rapidly (less than 6 hrs) following a storm.

Remove rock dam after the contributing drainage area has been permanently stabilized, inspected, and approved. Remove all water and sediment prior to removing dam. Dispose of waste materials in designated disposal areas. Smooth site to blend with surrounding area and stabilize according to vegetation plan.

6.63.5

Sediment Fence (Silt Fence) 6

- Location:** Fence should be nearly level and at least 10 ft from the toe of slopes to provide a broad, shallow sediment pool (Figure 6.62b).
- Spacing of support posts:** 8 ft maximum if fence is supported by wire, 6 ft maximum for extra-strength fabric without support-wire backing.
- Trench:** bottom 1 ft of fence must be buried 8 inches deep minimum.
- Fence height:** depth of impounded water should not exceed 1.5 ft at any point along the fence.
- Support posts:** 4-inch diameter pine or 1.33 lb/linear ft steel, buried or driven to depths of 18 inches. Steel posts should have projections for fastening fabric.
- Support wire:** wire fence (14 ga with 6-inch mesh) is required to support standard-strength fabric.
- Reinforced, stabilized outlets** (Figure 6.62c): located to limit water depth to 1.5 ft measured at lowest point along fence line. Outlet allows safe storm flow bypass.
- Crest height:**—1 ft maximum
- Width of splash pad:**—5 ft minimum
- Length of splash pad:**—5 ft minimum
- Fence fabric:** synthetic filter fabric conforming to specifications in Table 6.62b, and containing UV inhibitors and stabilizers to provide a life of 6 months minimum at temperatures from 0° to 120°F. (Burlap may be used for short periods, not exceeding 60 days.)

Table 6.62b Specifications for Sediment Fence Fabric

Physical Properties	Minimum Requirements
Filtering efficiency	85%
Tensile strength at 20% (max) elongation:	
Standard strength	30 lb/linear inch
Extra strength	50 lb/linear inch
Slurry flow rate	0.3 gpm/ft <sup>2</sup>

6.62.2

6.62

**Installation** NOTE: Sediment fence captures sediment by backing up water to allow deposition. It is relatively ineffective for filtration because it clogs too rapidly. The sedimentation pool behind the fence is very effective and may reduce the need for expensive traps and basins.

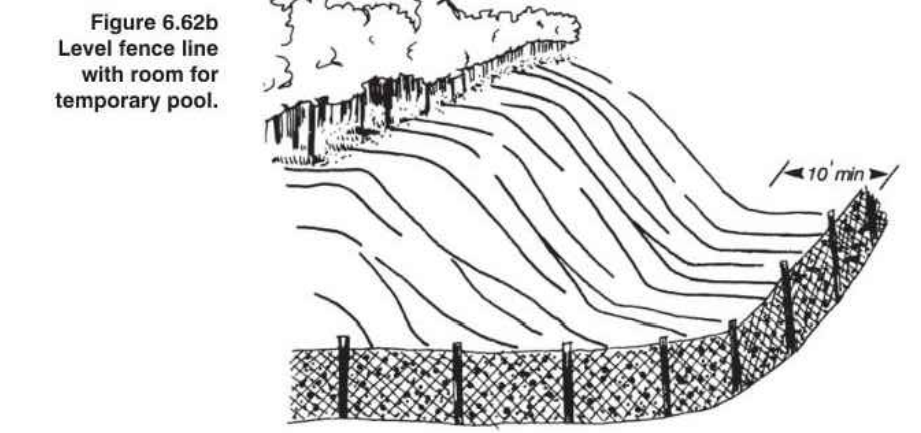
To use sediment fence effectively, provide access to the locations where sediment accumulates and provide reinforced, stabilized outlets for emergency overflow (Figure 6.62c).

Sediment fence is most effective when used in conjunction with other practices such as perimeter dikes or diversions.

**Location** Locate the fence at least 10 ft from the toe of steep slopes to provide sediment storage and access for cleanout (Figure 6.62b).

The fence line should be nearly level through most of its length to impound a broad, temporary pool. Stabilized outlets are required for bypass flow, unless fence is designed to retain all runoff from the 10-yr storm (Figure 6.62b).

The fence line may run slightly off level (grade less than 1%) if it terminates in a level section with a stabilized outlet, diversion, basin, or sediment trap. There must be no gully along the fence or at the ends. Sediment fence should not be used as a diversion.



6.62.3

Sediment Fence (Silt Fence) 6

**Reinforced, Stabilized Outlets** Any outlet where storm flow bypass occurs must be stabilized against erosion.

Set outlet elevation so that water depth cannot exceed 1.5 ft at the lowest point along the fence line (Figure 6.62c).

Set fabric height at 1 ft maximum between support posts spaced no more than 4 ft apart. Install a horizontal brace between the support posts to serve as an overflow weir and to support top of fabric. Provide a riprap splash pad as shown in Figure 6.62c.

Excavate foundation for the splash pad a minimum of 5 ft wide, 1 ft deep, and 5 ft long on level grade. The finished surface of the riprap should blend with surrounding area, allowing no overfall. The area around the pad must be stable.

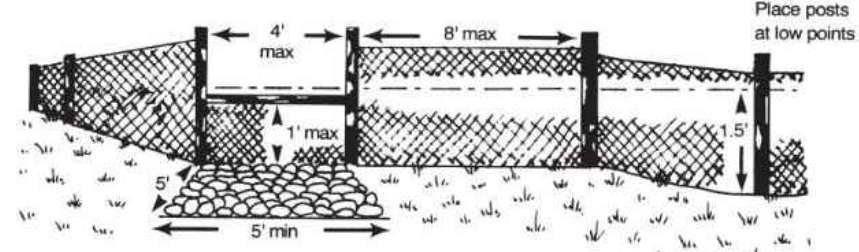


Figure 6.62c Perspective of reinforced, stabilized outlet for sediment fence.

**Construction** Dig a trench approximately 8 inches deep and 4 inches wide, or a V-trench, in the line of the fence as shown in Figure 6.62d.

Drive posts securely, at least 18 inches into ground, on the downslope side of the trench. Space posts a maximum of 8 ft if fence is supported by wire, 6 ft if extra-strength fabric is used without support wire. Adjust spacing to place posts at low points along the fence line.

Fasten support wire fence to upslope side of posts, extending 6 inches into the trench as shown in Figure 6.62d.

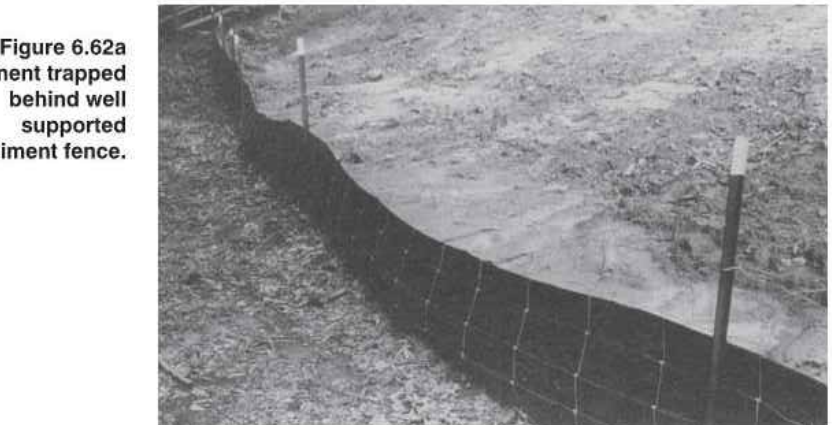
Attach continuous length of fabric to upslope side of fence posts. Avoid joints, particularly at low points in the fence line. Where joints are necessary, fasten fabric securely to support posts and overlap to the next post.

6.62.4

6.62

**SEDIMENT FENCE (SILT FENCE)**

**Purpose** To retain sediment from small, sloping disturbed areas by reducing the velocity of sheet flow (Figure 6.62a).



- Minimum Requirements**
- Drainage area: limited to 1/4 acre per 100 ft of fence. Area is further restricted by slope steepness as shown in Table 6.62a.

Table 6.62a Maximum Land Slope and Distance for Which Sediment Fence is Applicable

Land Slope (%)	Maximum Slope Distance Above Fence (ft)
<2	100
2 to 5	75
5 to 10	50
10 to 20	25
>20	15

\*Slope distance may be increased if design is supported by appropriate runoff calculations.

6.62.1

Sediment Fence (Silt Fence) 6

- Common Trouble Points**
- Fence sags or collapses—common causes are:
    - drainage area too large,
    - too much sediment accumulation allowed before cleanout,
    - approach too steep, or
    - fence not adequately supported.
  - Fence fails from undercutting—common causes are:
    - bottom of fence not buried at least 8 inches at all points,
    - trench not backfilled with compacted earth or gravel,
    - fence installed on excessive slope, or
    - fence located across drainage way.
  - Fence is overtopped—common causes are:
    - storage capacity inadequate, or
    - no provision made for safe bypass of storm flow.
  - Do not locate fence across drainage way.
  - Erosion occurs around end of fence—common causes are:
    - fence terminates at elevation below the top of the temporary pool,
    - fence terminates at unstabilized area, or
    - fence located on excessive slope.

**Maintenance** Sediment fence requires a great deal of maintenance. Inspect sediment fences periodically and after each rainfall event.

Should fabric tear, decompose, or in any way become ineffective, replace it immediately. Replace burlap at least every 60 days.

Remove sediment deposits promptly to provide adequate storage volume for the next rain and to reduce pressure on fence. Take care to avoid undermining fence during clean out.

Remove all fencing materials and unstable sediment deposits after the contributing drainage area has been properly stabilized, inspected, and approved. Bring the disturbed area to grade and stabilize as shown in the vegetation plan.

6.62.6

6.62

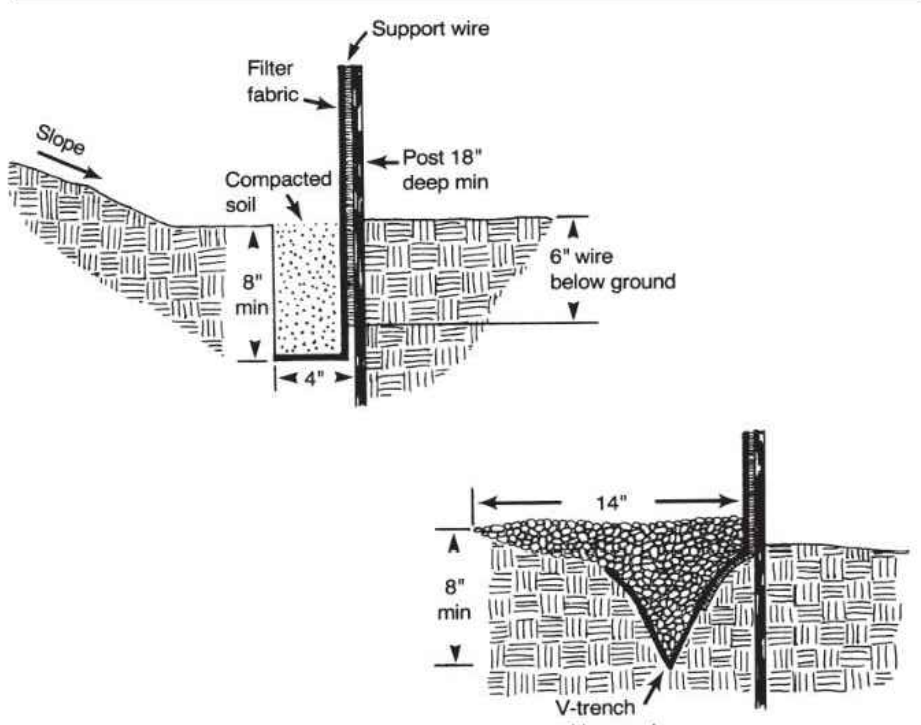


Figure 6.62d Detail of sediment fence installation.

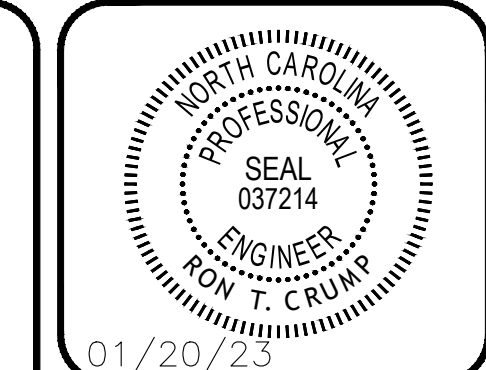
Place the bottom 1 ft of fabric in 8-inch deep trench lapping toward the upslope side. Backfill with compacted earth or gravel as shown in Figure 6.62d.

To reduce maintenance, excavate a shallow sediment storage area on upslope side of fence where sedimentation is expected. Provide good access to deposition areas for cleanout and maintenance.

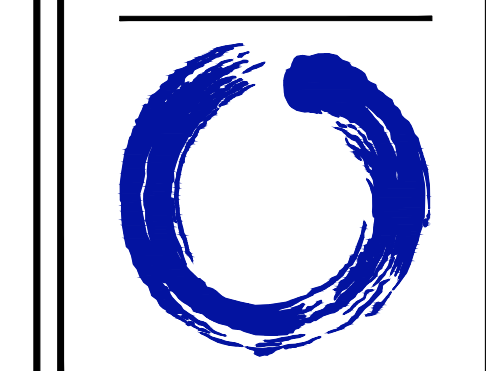
Allow for safe bypass of storm flow to prevent overtopping failure of fence.

DO NOT install sediment fence across intermittent or permanent streams, channels, or any location where concentrated flow is anticipated.

6.62.5



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HARBINGER, NC**

ISSUED FOR: CONCEPT  
JURISDICTION: CURRITUCK COUNTY  
LOCATION: 8659 CARATOKE HIGHWAY,  
HARBINGER, NC

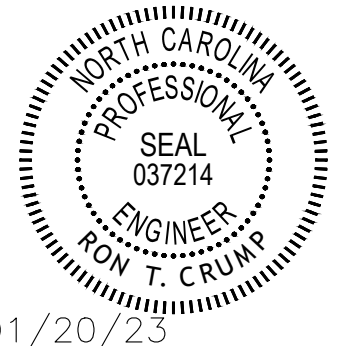
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DATE: 10/18/22

**E+S BMPs -  
STRUCTURAL**

SHEET **C604**



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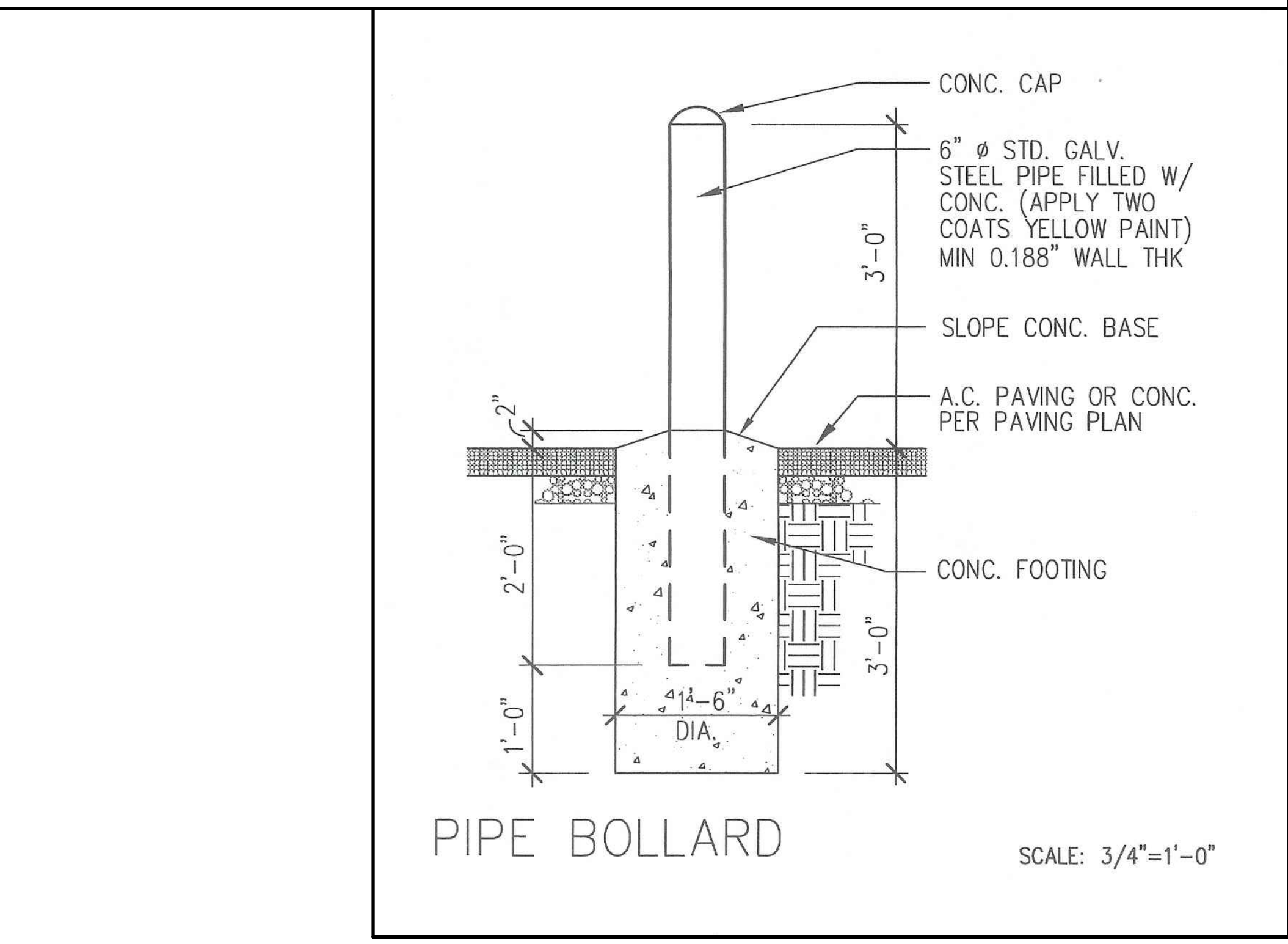
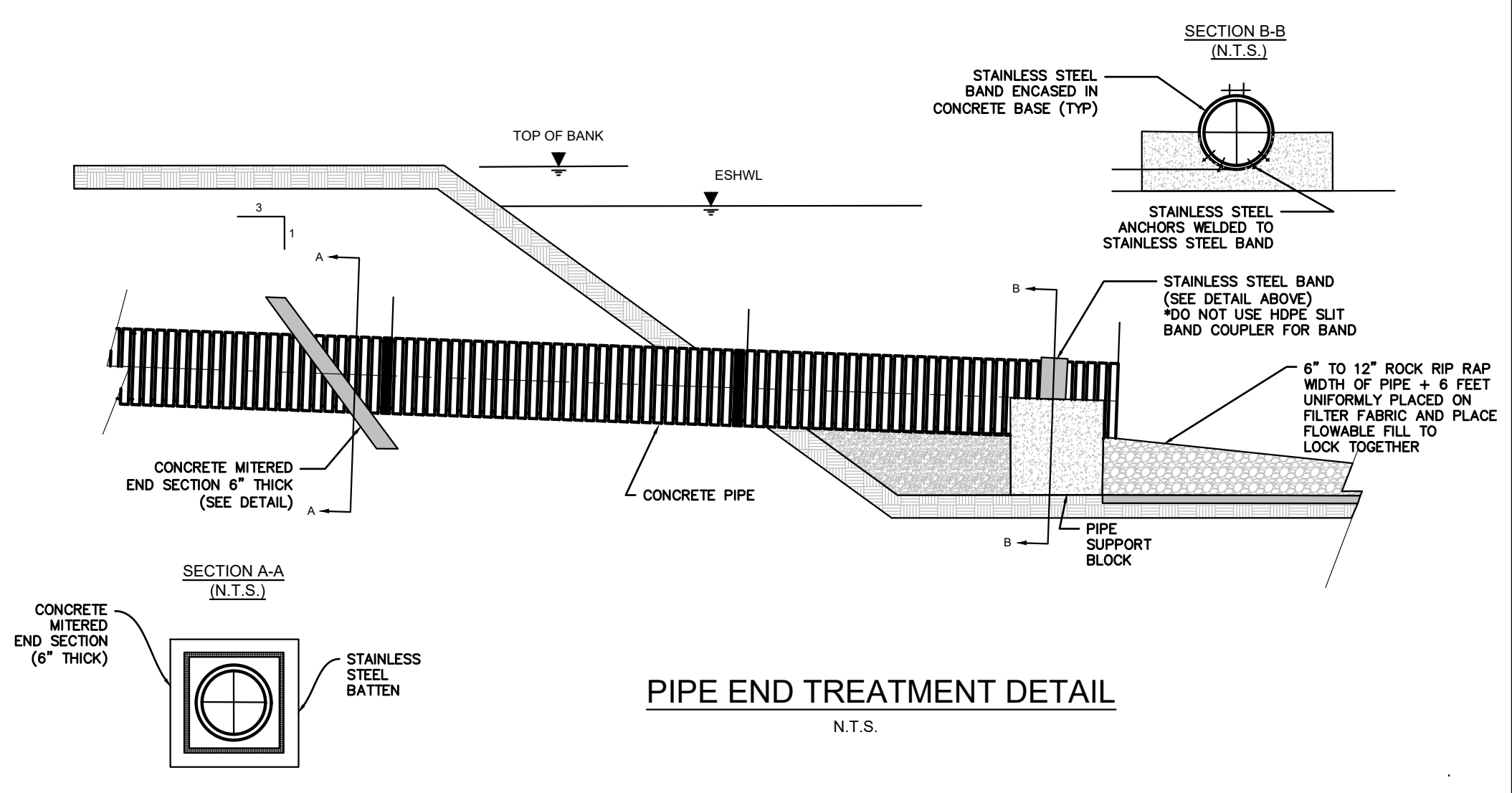
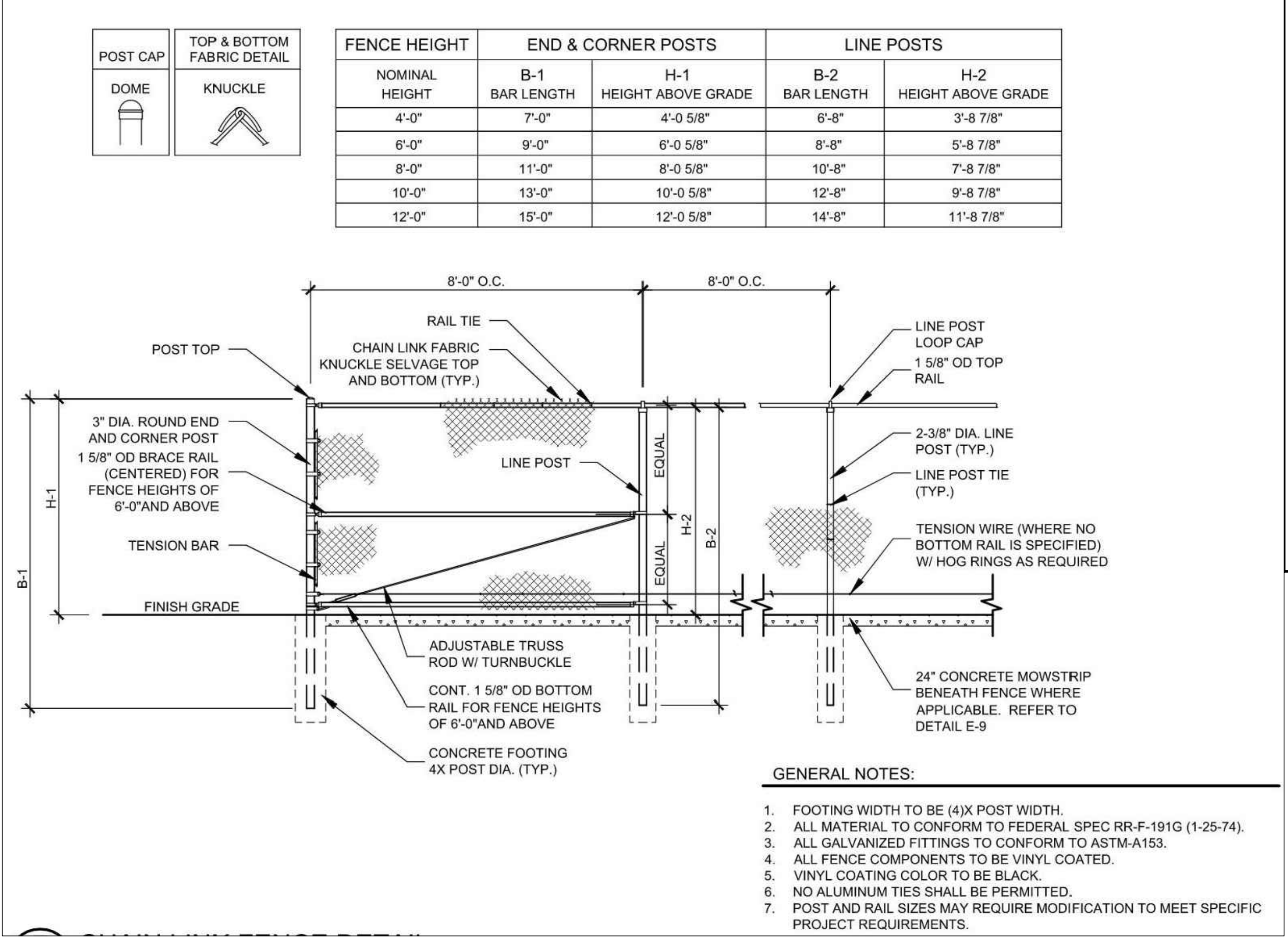
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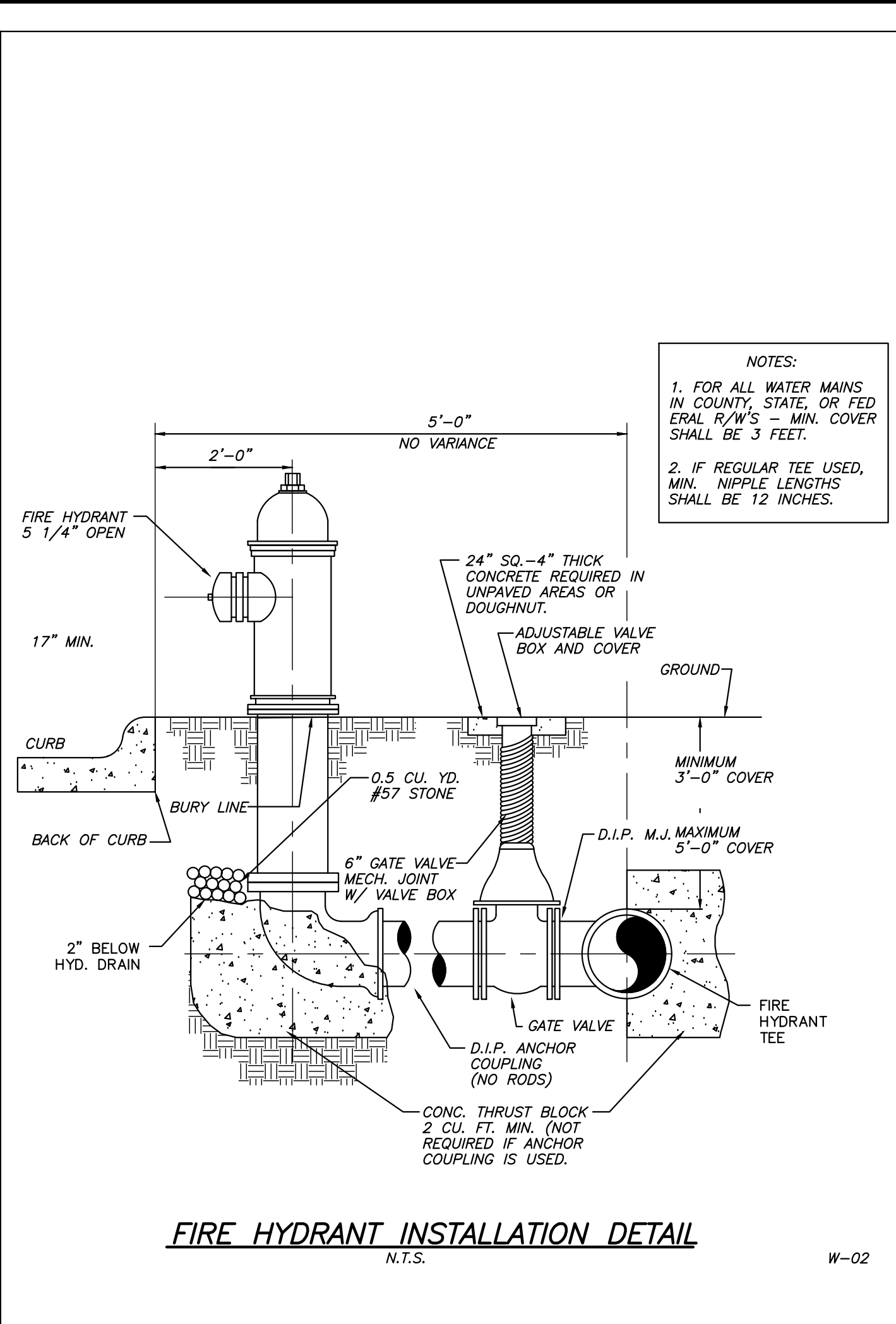
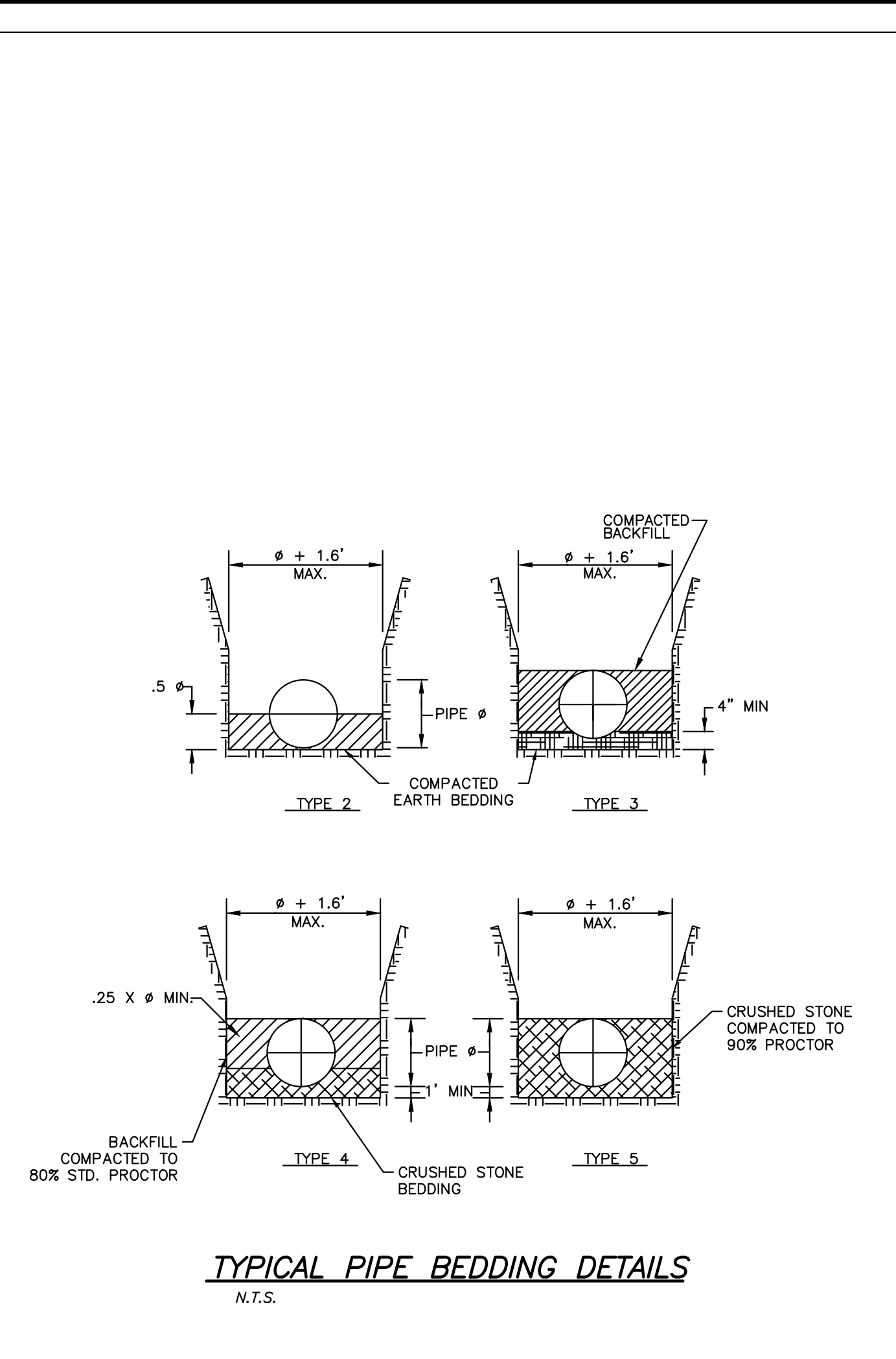
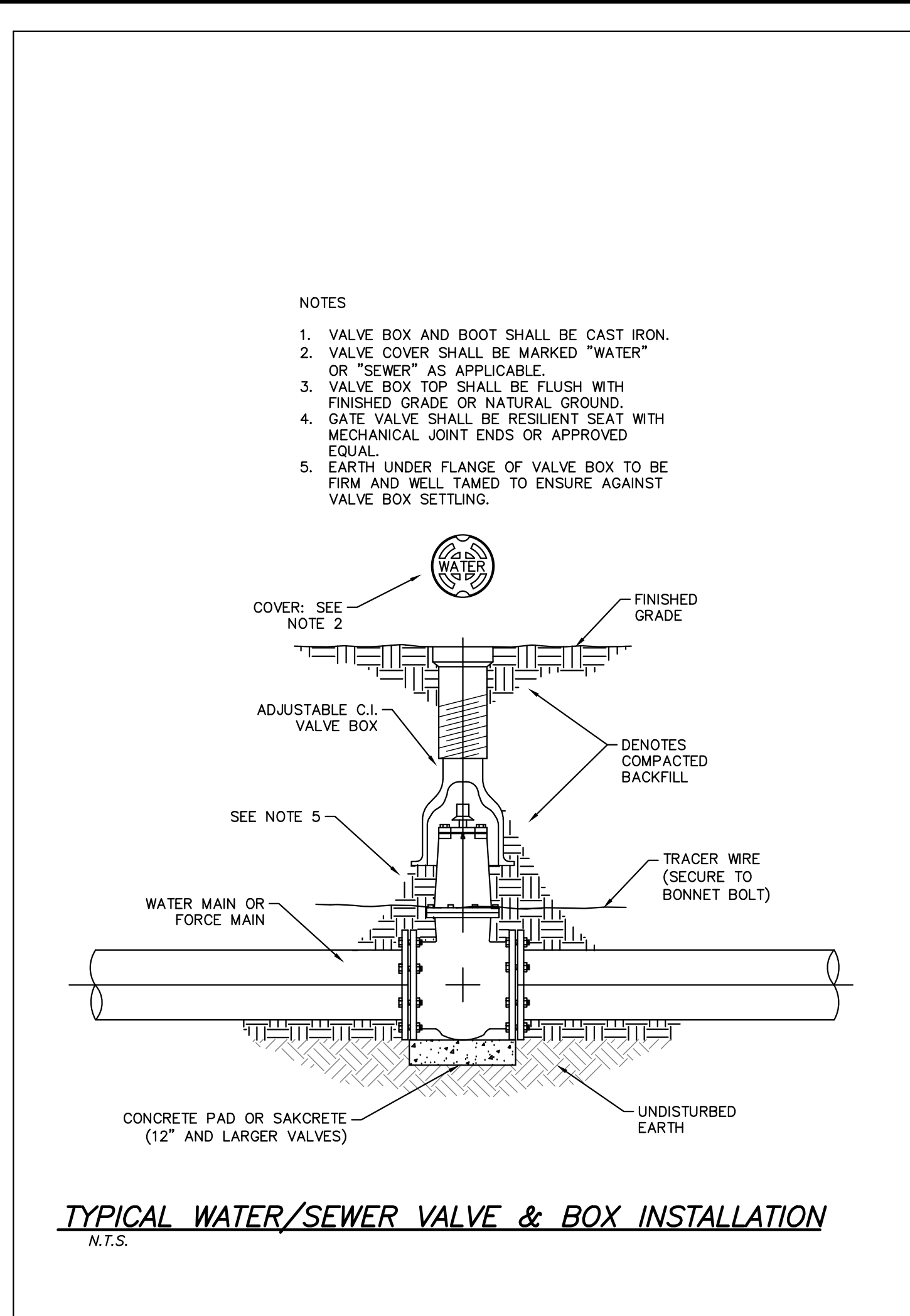
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JOB NO: 22-419	DATE: 10/18/22

**STANDARD DETAILS**  
 SHEET **C701**





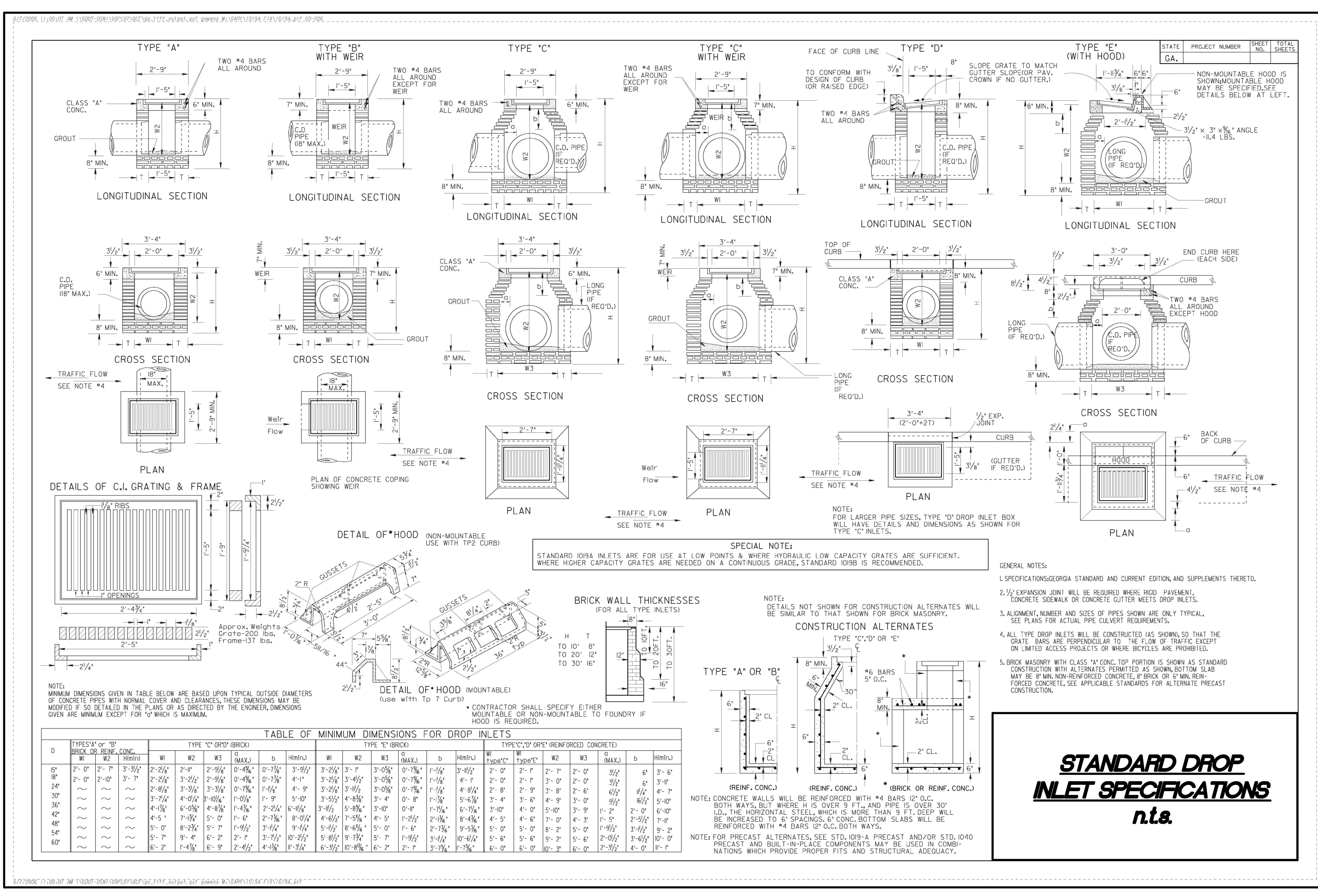


01/20/23  
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 HARBINGER, NC



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 JOB NO: 22-419  
 DATE: 10/18/22

**STANDARD DETAILS**  
 SHEET **C702**



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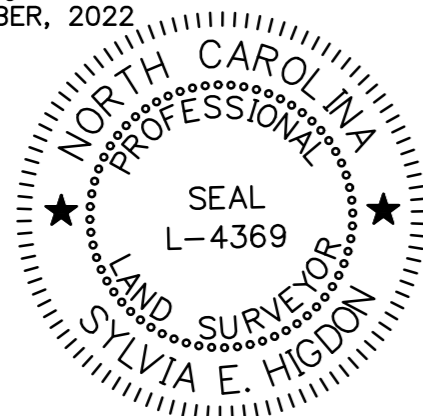
ALTA/NSPS Land Title Survey

**HARBINGER TOPO**  
SURVEYOR CERTIFICATION  
8659 CARATOKE HIGHWAY  
HARBINGER, NC 27941  
COUNTY OF CURRITUCK

**Surveyor's Certification**

TO: HARBOR CITY TITLE INSURANCE AGENCY OF NC, INC.;  
MIDGARD SELF STORAGE HARBINGER NC, LLC, A DELAWARE LIMITED LIABILITY COMPANY;  
AND AMERICAN NATIONAL, L.L.C.  
This is to certify that this map or plat and the survey on which it is based  
were made in accordance with the 2021 Minimum  
Standard Detail Requirements for ALTA/NSPS Land  
Title Surveys, jointly established and adopted by ALTA  
and NSPS, and includes items 1, 2, 3, 4, 6a, 6b, 7a, 7b1, 7b2,  
7c, 8, 9, 10, 11a, 13, 14, 15, 16, 17, 18, 19 and 20 of Table A thereof.  
The fieldwork was completed on NOVEMBER 9 2022.

I, SYLVIA E. HIGDON, certify that this plat was drawn under  
my supervision from an actual survey made under my supervision;  
that the boundaries not surveyed are clearly indicated as drawn  
from information found in referenced documents; that the ratio  
of precision as calculated is 1:15,000+, that this plat was prepared  
in accordance with G.S. 47-30 as amended. Witness my original  
signature, license number and seal this 15th day of NOVEMBER, 2022



NAME OF SURVEYOR: SYLVIA E. HIGDON  
LAND SURVEYOR NUMBER: L-4369  
IN STATE OF: NORTH CAROLINA  
DATE OF PLAT OR MAP: NOVEMBER 15 2022

NETWORK REFERENCE # 20223124-1

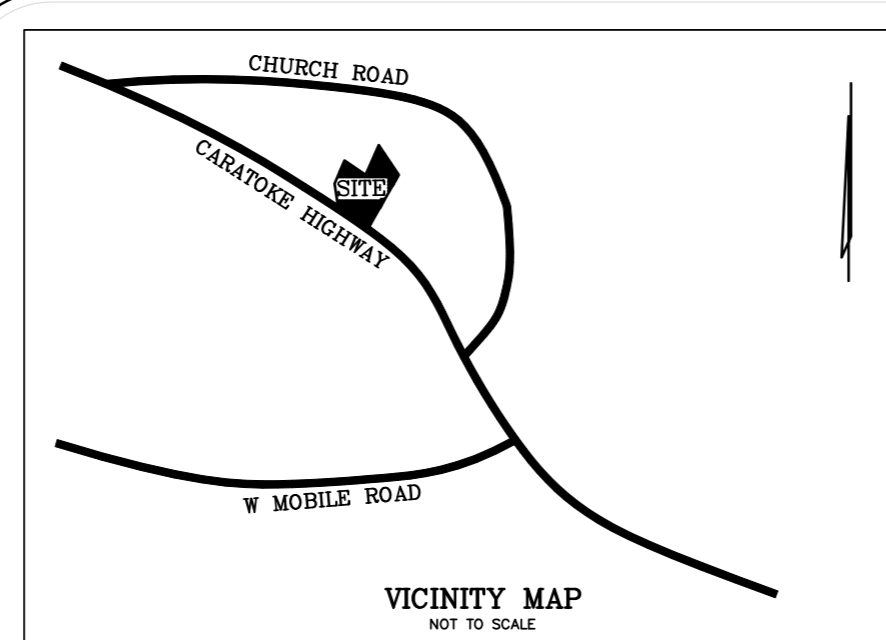
CERTIFIED BY: SYLVIA E. HIGDON, P.L.S.  
UNIT 136 WINESVILLE PLAZA - SUITE 3 - WINESVILLE, NC 28786  
PHONE: (828) 456-5761  
SURVEY UPDATES: surveys@amnational.net

20223124.P50/DWG  
4199-1205-A

Legal Description

Tract 1:  
All of Lot 1 of Harbinger Acres as recorded in Plat Cabinet F, Slide 53,  
Currituck County Public Registry, North Carolina

BEING THE IDENTICAL PROPERTY DESCRIBED IN TITLE COMMITMENT FILE NO.: 2205-2208  
BY HARBOR CITY TITLE INSURANCE AGENCY OF NC, INC., COMMITMENT DATE: MAY 09, 2022  
TRACT 2 IS NOT A PART OF THIS SURVEY.



LEGEND OF SYMBOLS & ABBREVIATIONS

AE - AERIAL EASEMENT	⊖ - ELECTRIC BOX
BL - BUILDING LINE	⊖ - ELECTRIC MH
BLDG - BUILDING	⊖ - FIRE HYDRANT
ESMT - EASEMENT	⊖ - FIBER OPTIC MARKER
FND - FOUND	⊖ - FLAG POLE
CB - CATCH BASIN	⊖ - GAS METER
DI - DROP INLET	⊖ - GAS VALVE
YI - YARD INLET	⊖ - IRRIGATION VALVE
POB - POINT OF BEGINNING	⊖ - LIGHT POLE
POC - POINT OF COMMENCING	⊖ - CLEAN OUT
PS - PARKING SPACES	⊖ - MONITORING WELL
R/W - RIGHT OF WAY	⊖ - GAS LINE MARKER
SQ FT - SQUARE FEET	⊖ - SERVICE POLE
UE - UTILITY EASEMENT	⊖ - SANITARY MANHOLE
CL - CHAIN LINK FENCE	⊖ - SANITARY SEWER CLEAN OUT
WF - WROUGHT IRON FENCE	⊖ - STORM MANHOLE
W - WATER	⊖ - TELEPHONE PEDESTAL
SS - SANITARY SEWER	⊖ - TRANSFORMER
CON - CONCRETE	⊖ - TRAFFIC SIGNAL POLE
COV - COVERED CONCRETE	⊖ - UNDERGROUND CABLE MARKER
OE - OVERHEAD ELECTRIC LINES	⊖ - WATER WELL
SS - SANITARY SEWER LINE	⊖ - WATER METER
WF - WOOD FENCE	⊖ - WATER VALVE
W - WROUGHT IRON FENCE	⊖ - REGULAR PARKING SPACE
W - WIRE	⊖ - HANDICAP PARKING SPACE
CB - CATCH BASIN	⊖ - UNDERGROUND TELEPHONE
FOH - FIBER OPTIC HAND HOLE	⊖ - UNDERGROUND POWER
	SD - STORM DRAINAGE
	G - GAS LINE
	W - WATER LINE
	SS - SANITARY SEWER

GENERAL NOTES

- ALL BEARINGS AND STREET RIGHT OF WAYS ARE BASED ON RECORDED PLAT.
- SURVEYOR DID NOT ABSTRACT PROPERTY. SURVEY BASED ON LEGAL DESCRIPTIONS SUPPLIED BY TITLE COMPANY. EASEMENTS, BUILDING LINES, ETC. SHOWN ARE AS IDENTIFIED BY FILE NO. 2205-2208 HARBOR CITY TITLE INSURANCE AGENCY OF NC, INC. EFFECTIVE MAY 09, 2022.
- NOTHING IN THIS SURVEY IS INTENDED TO EXPRESS AN OPINION REGARDING OWNERSHIP OR TITLE.
- THE WORD CERTIFY IS UNDERSTOOD TO BE AN EXPRESSION OF PROFESSIONAL JUDGMENT BY THE SURVEYOR, WHICH IS BASED ON HIS BEST KNOWLEDGE, INFORMATION AND BELIEF.
- SURVEY IS CERTIFIED FOR THIS TRANSACTION ONLY.
- THIS SURVEY IS BEING PROVIDED SOLELY FOR THE USE OF THE CURRENT PARTIES AND NO OTHERS. THIS SURVEY EXPRESSLY PROVIDES THAT NO OTHER USES OR APPLICATIONS ARE INTENDED AND NECESSARY IN CONNECTION WITH THE ORIGINAL TRANSACTION.
- ACREAGE CALCULATED BY COORDINATE COMPUTATION METHOD.
- ALL PROPERTY CORNERS NOT DESCRIBED ARE COMPUTED "POINTS" ONLY.
- PROPERTY IS SUBJECT TO ALL APPLICABLE EASEMENTS AND RIGHTS OF WAY OF RECORD.
- ERROR OF CLOSURE MEETS OR EXCEEDS 1:15,000+. ALL DISTANCES ARE HORIZONTAL GROUND MEASURED.
- THIS SURVEY MEETS THE REQUIREMENTS OF A CLASS "A" SURVEY.
- LOCATION OF ALL UNDERGROUND UTILITIES ARE APPROXIMATE, UNLESS OTHERWISE INDICATED. EXACT LOCATION TO BE DETERMINED BY OWNER.
- THERE IS NO RECOVERABLE HORIZONTAL CONTROL WITHIN 2000'.
- NORTH IS "PLAT NORTH" OF PLAT BOOK H @ PAGE 287.
- THIS PLAT REPRESENTS A SURVEY OF THE DEED BOOK 1687 - PAGE 354.
- THERE IS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADJUSTMENTS WITHIN RECENT MONTHS.
- THERE ARE NO OBSERVABLE CHANGES IN STREET RIGHT-OF-WAY LINES EITHER COMPLETED OR PROPOSED AT THE TIME OF THIS SURVEY AS SHOWN.
- THERE IS NO OBSERVABLE EVIDENCE OF THE SITE BEING USED AS A SOLID WASTE DUMP, DUMP OR SANITARY LANDFILL.
- THERE IS NO OBSERVABLE EVIDENCE OF WETLANDS AS SHOWN.
- DIRECT PEDESTRIAN AND VEHICULAR SITE ACCESS IS PROVIDED FROM THE WEST VIA CARATOKE HIGHWAY, A PUBLIC ROAD.
- SITE ADDRESS IS POSTED AS 8659 CARATOKE HIGHWAY.
- ALL STREETS, ROADS AND DRIVES WITHIN THE SUBJECT PARCEL ARE PRIVATE.
- THERE IS NO OBSERVABLE EVIDENCE OF THE PROPERTY BEING USED AS A CEMETERY, BURIAL GROUNDS OR ISOLATED GRAVESITES.
- THERE IS NO OBSERVABLE EVIDENCE OF PARTY WALLS.
- THE PROPERTY IS A MATHEMATICALLY CLOSED FIGURE WITH NO GAPS, STRIPS OR GORES.
- THE LOCATION OF UTILITIES SHOWN HEREON ARE FROM OBSERVED EVIDENCE OF ABOVE GROUND APPURTENANCES ONLY. THE SURVEYOR WAS NOT PROVIDED WITH UNDERGROUND PLANS OR SURFACE GROUND MARKINGS TO DETERMINE THE LOCATION OF ANY SUBTERRANEAN USES.

ZONING INFORMATION

ZONING INFORMATION FROM ZONING COMPLIANCE REPORT  
PROJECT NUMBER: 20221568 SITE 1 DATED: MAY 19 2022  
SUBJECT PROPERTY ZONE: GB (GENERAL BUSINESS)

PER ZONING REPORT			CONTACT INFO:	
STATUS	REQUIRED	OBSERVED	STATUS	CONTACT INFO:
PERMITTED USE	GENERAL BUSINESS	SELF/MINI STORAGE	STATUS	CURRITUCK COUNTY ZONING DEPT.
MIN. LOT AREA	40,000 SF	234,933.2 SF	STATUS	SAVANNAH NEWBERN-PLANNER II
MIN. FRONTAGE	125.0'	249.70'	STATUS	(252) 232-3055
MAX. BLDG COVERAGE	FAR 0.40	FAR 0.29	NOTES:	
MIN. SETBACKS FRONT	100.0' FROM CENTERLINE	102.5'	BECAUSE THERE MAY BE A NEED	
MIN. SETBACKS SIDE	15.0'	35.4'	FOR INTERPRETATION OF THE	
MIN. SETBACKS REAR	25.0'	34.0'	APPLICABLE ZONING CODES, WE	
MAX. BLDG HEIGHT	35.0'	19.4'	REFER YOU TO THE CURRITUCK	
PARKING REGULAR	1 PER 100 UNITS= 8	9	COUNTY PLANNING DEPT. FOR	
PARKING HANDICAP		1	ZONING LAWS AND APPLICABLE	
PARKING TOTAL		10	CODES.	

FLOOD NOTE:

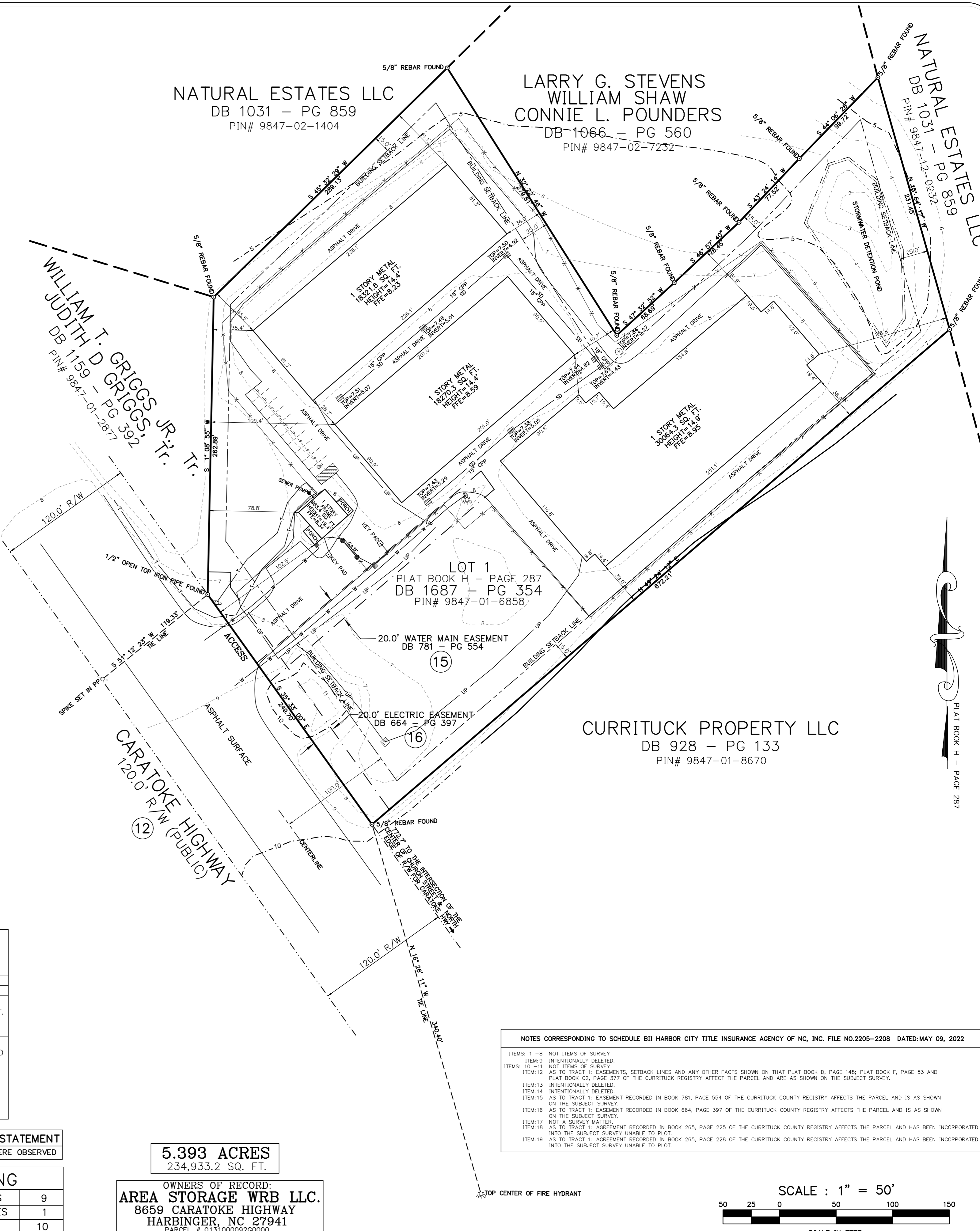
By graphic plotting only, this property is in Zone(s)  
"X" of the Flood Insurance Rate Map, Community Panel No.  
3720984700K, which bears an effective date of  
DECEMBER 21, 2018 and is NOT in a Special Flood Hazard Area.

ENCROACHMENT STATEMENT  
NO ENCROACHMENTS WERE OBSERVED

PARKING	
REGULAR SPACES	9
HANDICAP SPACES	1
TOTAL SPACES	10

5.393 ACRES  
234,933.2 SQ. FT.

OWNERS OF RECORD:  
AREA STORAGE WRB LLC.  
8659 CARATOKE HWY  
HARBINGER, NC 27941  
PARCEL # 013100009260000



NOTES CORRESPONDING TO SCHEDULE BII HARBOR CITY TITLE INSURANCE AGENCY OF NC, INC. FILE NO. 2205-2208 DATED: MAY 09, 2022

ITEMS: 1-8 NOT ITEMS OF SURVEY  
ITEM 9 INTENTIONALLY DELETED.  
ITEMS 10-11 NOT ITEMS OF SURVEY.  
ITEM 12 AS TO TRACT 1: EASEMENTS, SETBACK LINES AND ANY OTHER FACTS SHOWN ON THAT PLAT BOOK D, PAGE 148; PLAT BOOK F, PAGE 53 AND PLAT BOOK C2, PAGE 377 OF THE CURRITUCK COUNTY REGISTRY AFFECTS THE PARCEL AND ARE AS SHOWN ON THE SUBJECT SURVEY.  
ITEM 13 INTENTIONALLY DELETED.  
ITEM 14 INTENTIONALLY DELETED.  
ITEM 15 AS TO TRACT 1: EASEMENT RECORDED IN BOOK 781, PAGE 554 OF THE CURRITUCK COUNTY REGISTRY AFFECTS THE PARCEL AND IS AS SHOWN ON THE SUBJECT SURVEY.  
ITEM 16 AS TO TRACT 1: EASEMENT RECORDED IN BOOK 664, PAGE 397 OF THE CURRITUCK COUNTY REGISTRY AFFECTS THE PARCEL AND IS AS SHOWN ON THE SUBJECT SURVEY.  
ITEM 17 NOT A SURVEY MATTER.  
ITEM 18 AS TO TRACT 1: AGREEMENT RECORDED IN BOOK 265, PAGE 225 OF THE CURRITUCK COUNTY REGISTRY AFFECTS THE PARCEL AND HAS BEEN INCORPORATED INTO THE SUBJECT SURVEY UNABLE TO PLOT.  
ITEM 19 AS TO TRACT 1: AGREEMENT RECORDED IN BOOK 265, PAGE 228 OF THE CURRITUCK COUNTY REGISTRY AFFECTS THE PARCEL AND HAS BEEN INCORPORATED INTO THE SUBJECT SURVEY UNABLE TO PLOT.

